

July 27, 2012

Mr. Steve Eisenberg, General Manager
Energy Products
National Technical Systems
533 Main Street
Acton, MA 01720

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT NO.
99900923/2012-201, NOTICE OF VIOLATION, AND NOTICE OF
NONCONFORMANCE

Dear Mr. Eisenberg:

From June 11-15, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the National Technical Systems (NTS) facility in Acton, MA. The purpose of this limited-scope routine inspection was to assess NTS'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." This technically focused inspection evaluated NTS's quality assurance activities associated with the seismic qualification testing of the tension bolt and position switch of the AP1000 design squib valves. These qualification tests are associated with or directly impact closure of inspections, tests, analyses, and acceptance criteria (ITAAC) from Revision 19 of the certified AP1000 design. Currently, these ITAAC are incorporated into the combined licenses of Vogtle Units 3 and 4 and V.C. Summer Units 2 and 3. The enclosed report presents the results of this inspection. This NRC inspection report does not constitute the NRC's endorsement of your overall quality assurance 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 subject inspection report details the circumstances surrounding it. The Notice cites the violation because NTS failed to inform all affected purchasers within five working days that NTS did not have the capability to perform an evaluation to determine if a defect exists.

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's review of your response to the Notice also will determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In addition, during this inspection the NRC inspection team 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, the NRC inspection team determined that NTS was not fully implementing its quality assurance program in the areas of design control, commercial grade-dedication, control of purchased material, equipment, and services, nonconforming materials, parts of components, and corrective action. The Notice of Nonconformance (NON) cites these nonconformances, and the circumstances surrounding them are described in detail in the enclosed inspection report. Even though the NRC inspection team did not identify issues in all areas reviewed, in the response to the enclosed NON, NTS should document the results of the extent of condition and determine if there are any effects on other components and testing activities.

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.

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, 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 (SGI) 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 be 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 SGI 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. 99900923

Enclosure:
As stated

In addition, during this inspection the NRC inspection team 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, the NRC inspection team determined that NTS was not fully implementing its quality assurance program in the areas of design control, commercial grade-dedication, control of purchased material, equipment, and services, nonconforming materials, parts of components, and corrective action. The Notice of Nonconformance (NON) cites these nonconformances, and the circumstances surrounding them are described in detail in the enclosed inspection report. Even though the NRC inspection team did not identify issues in all areas reviewed, in the response to the enclosed NON, NTS should document the results of the extent of condition and determine if there are any effects on other components and testing activities.

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.

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, 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 (SGI) 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 be 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 SGI 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. 99900923

Enclosure:

As stated

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NRO-001

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NAME	YDiaz-Castillo	JOrtega-Luciano	RPatel	AKeim
DATE	07/23/12	07/26/2012	07/26/2012	07/26/2012
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NAME	JBartleman	TFrye	ERoach	
DATE	07/26/2012	07/27/2012	07/27/2012	

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NOTICE OF VIOLATION

National Technical Systems
533 Main Street
Acton, MA 01720

Docket No. 99900923
Report No. 2012-201

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the National Technical Systems (NTS) facility in Acton, MA, from June 11 through June 15, 2012, identified a violation of NRC requirements. In accordance with the NRC Enforcement Policy, the violation is listed below:

Paragraph 21.21(b), "Notification of Failure to Comply or Existence of a Defect and its Evaluation," of Title 10 of the *Code of Federal Regulations* (10 CFR) 21.21(b) requires that "if the deviation or failure to comply is discovered by a supplier of basic components, or services associated with basic components, and the supplier determines that it does not have the capability to perform the evaluation to determine if a defect exists, then the supplier must inform the purchasers or affected licensees within five working days of this determination so that the purchasers or affected licensees may evaluate the deviation or failure to comply, pursuant to § 21.21(a)."

Contrary to the above, as of June 15, 2012, NTS failed to inform all affected purchasers within five working days that NTS did not have the capability to perform an evaluation to determine if a defect exists. Specifically, on June 18, 2011, NTS determined that it could not perform a 10 CFR Part 21 evaluation of an identified test deviation and failed to inform the two customers affected of this determination until January 18, 2012, and January 23, 2012, respectively.

This issue has been identified as Violation 99900923/2012-201-01.

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," NTS is hereby required to submit 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, Construction 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, U.S. 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 Agencywide Document Access and Management System, accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html>, it

should not include any personal privacy, proprietary, or safeguards information, to the extent possible, so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

In accordance with 10 CFR 19.11, "Posting of Notices to Workers," you may be required to post this notice within 2 working days of receipt.

Dated this 27th of July 2012.

NOTICE OF NONCONFORMANCE

National Technical Systems
533 Main Street
Acton, MA 01720

Docket No. 99900923
Report No. 2012-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the National Technical Systems (NTS) facility in Acton, MA, from June 11, 2012, through June 15, 2012, it appears that certain activities were not conducted in accordance with NRC requirements that were contractually imposed upon NTS by its customers or by NRC licensees.

- A. Criterion III, "Design 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 "Measures shall be also 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."

Subsection 5.3, "Design," of Section 23, "Design Control," of NTS's "Quality Policy Manual," Revision 6, dated October 14, 2011, states, in part, that "For design of new or replacement components intended for nuclear safety-related applications, an engineering evaluation is required to identify the critical characteristics that are required."

Subsection 3.2.1 of Section 3, "Requirements," of Standard Operating Procedure NO NUC 04, "Dedication of Commercial Grade Items," Revision 1, dated December 18, 2011, states, in part, that "The Project Engineer shall determine the critical characteristics to be verified: Critical characteristics are identifiable and measurable attributes of a commercial-grade item which, once verified, provide reasonable assurance that the item received is the item specified."

Contrary to the above, as of June 15, 2012, NTS 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 dedication process, failed to review the suitability of the application of the Honeywell Limit Micro Switch P/N BZE6-2RN in safety related applications, and failed to perform a technical evaluation to verify the design adequacy when performing commercial-grade dedication of the 8210G88 ASCO Solenoid Valves.

Specifically,

1. NTS did not conduct a technical evaluation to identify additional technical requirements for the specific M&TE being calibrated, and it did not review the calibration records (e.g., as part of receipt inspection) to verify that the critical characteristics had been met and would perform their intended safety function.
2. NTS did not perform an engineering evaluation to document the sample population identified for the control of critical characteristics used for material verification of the Honeywell Limit Micro Switch P/N BZE6-2RN and did not verify that the supplier had lot and batch control to ensure traceability of material.

Enclosure

3. NTS did not identify and verify the following critical characteristics as specified in the 8210G88 ASCO Solenoid Valves purchase order: (1) valve material, (2) orifice size, and (3) size and thread type.

This issue has been identified as Nonconformance 99900923/2012-201-02.

- B. Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50 states, in part, that "Measures shall be established to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery. The effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee at intervals consistent with the importance, complexity, and quantity of the product or services."

Contrary to the above, as of June 15, 2012, NTS failed to perform an adequate evaluation of its commercial calibration suppliers and failed to perform an adequate evaluation of Specialized Technology Resources (STR) for use in activities affecting quality as part of the commercial-grade dedication process.

Specifically,

1. NTS placed its commercial calibration suppliers on its safety-related approved suppliers list based on the accreditation provided via ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories," by the American Association for Laboratory Accreditation or another domestic accrediting body. ISO/IEC 17025 accreditation may not be used as the basis for qualifying safety-related calibration services.
2. NTS did not perform a commercial-grade survey to verify that STR's testing program to support NTS's dedication activities included the requisite for the control of critical characteristics necessary to provide reasonable assurance that the commercial-grade items to be used as basic components will perform their intended safety function. NTS only verified that STR was certified to ISO/IEC 17025.

This issue has been identified as Nonconformance 99900923/2012-201-03.

- C. Criterion XV, "Nonconforming Materials, Parts or Components," of Appendix B to 10 CFR Part 50 states, in part, that "Measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation...Nonconforming items shall be reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures."

Subsection 3.0, "Requirements," of Section 11, "Corrective Action," of NTS's "Quality Policy Manual," Revision 6, dated October 14, 2011, states, in part, that "Nonconformances shall be identified promptly and corrected as soon as practical."

Subsection 5.2, "Testing Nonconformances/Anomalies," of NTS Quality Assurance Procedure (QAP) COR 16, "Control of Non-Conforming Items," Revision 3, dated November 5, 2004, states, in part, that "When a testing nonconformance occurs, a Notice of Deviation

(NOD) form shall be initiated. The disposition shall be noted on the NOD.” Subsection 5.6, “Disposition Control,” of COR 16 states, in part, that “The final disposition of nonconforming items shall be one of the following: (a) Use-as-is, (b) Reject, or (c) Repair or Rework.”

Contrary to the above, as of June 15, 2012, NTS failed to document an NOD for material testing services provided by STR in a timely manner. Specifically, on February 24, 2010, NTS identified a test anomaly related to an internal gasket. NTS staff evaluated the deviation and dispositioned it as “use-as-is.” NTS sent the gasket to the licensee on March 5, 2010, as a conforming item without documented objective evidence of how the NOD was dispositioned. During a quality review, NTS identified that the Project Manager (PM) failed to initiate and document the disposition of the NOD. The PM then proceeded to initiate and document the disposition of the NOD on November 8, 2011.

This issue has been identified as Nonconformance 99900923/2012-201-04.

- D. Criterion XVI, “Corrective Action,” of Appendix B to 10 CFR Part 50, states in part, that “Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.”

NTS QAP COR 17, “Corrective and Preventive Action,” Revision 1, dated January 24, 2003, states, in part, that “A Corrective/Preventive Action Report (CPAR) shall be used to document, process, track and drive any corrective/preventive action required as a result of internal audits, vendor audits, external audits, regulatory audits, vendor nonconformances, test nonconformances or customer complaints, as applicable.”

Contrary to the above, as of June 15, 2012, NTS failed to promptly identify and correct conditions adverse to quality and failed to adequately implement corrective actions. Specifically, NTS failed to initiate a CPAR related to NTS’s failure to document the disposition of an NOD related to a test anomaly results for an internal gasket in a timely manner and NTS failed to adequately implement corrective actions related to the review of calibration certificates. NTS did not generate a CPAR documenting its failure in initiating and documenting an NOD in a timely manner. In addition, NTS had generated CPAR 11-77 on August 22, 2011, in response to an external audit finding for its failure to review calibration certificates. NTS’s response to the CPAR was to assure that it reviews all calibration certificates for measuring and test equipment; however, the review of calibration certificates was not performed in accordance with CPAR 11-77.

This issue has been identified as Nonconformance 99900923/2012-201-05.

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

Dated this 27th of July 2012.

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

Docket No.: 99900923

Report No.: 99900923/2012-201

Vendor: National Technical Systems
533 Main Street
Acton, MA 01720

Vendor Contact: Mr. Steve Eisenberg, General Manager
Energy Products
Telephone: (978) 263-2933 ext. 223
E-mail: steve.eisenberg@nts.com

Nuclear Industry Activity: National Technical Systems (NTS) provides testing, equipment qualification, commercial-grade dedication, engineering, component supply and field services to nuclear utilities and suppliers worldwide. NTS has been contracted by Westinghouse Electric Company to perform seismic qualification testing of the tension bolt and position switch for the AP1000 reactor design squib valves.

Inspection Dates: June 11 - 15, 2012

Inspectors: Yamir Diaz-Castillo NRO/DCIP/CMVB, Lead Inspector
Jonathan Ortega-Luciano NRO/DCIP/CMVB
Raju Patel NRO/DCIP/CMVB
Andrea Keim NRO/DCIP/CEVB
John Bartleman R-II/DCI/CIB3

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

EXECUTIVE SUMMARY

National Technical Systems
99900923/2012-201

The U.S. Nuclear Regulatory Commission (NRC) conducted this inspection to verify that National Technical Systems (NTS) implemented an adequate quality assurance (QA) program for the seismic qualification testing of the tension bolt and position switch of the AP1000 squib valves that complied with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." In addition, the NRC performed this inspection to verify that NTS implemented a program under 10 CFR Part 21, "Reporting of Defects and Noncompliance," that met the NRC's regulatory requirements.

This technically focused inspection evaluated NTS's QA activities associated with the seismic qualification testing of the tension bolt and position switch of the AP1000 design squib valves. These tests, including qualification and functional tests are associated with or directly impact closure of inspections, tests, analyses, and acceptance criteria (ITAAC) from Revision 19 of the certified AP1000 design. Currently, these ITAAC are incorporated into the combined licenses of Vogtle Units 3 and 4 and V.C. Summer Units 2 and 3.

The NRC inspection team specifically observed the setup and performance of the low cycle fatigue qualification seismic testing simulating an operating basis earthquake and the sine beat seismic qualification testing simulating a safe shutdown earthquake for the 8-inch and 14-inch squib valve tension bolt and 14-inch squib valve position switch assemblies associated with ITAAC 2.01.02.5aⁱⁱ and 2.02.03.5aⁱⁱ from Revision 19 of the AP1000 certified design. The NRC inspection team also conducted interviews with responsible NTS personnel, and reviewed testing documents to determine if NTS performed these activities in accordance with the applicable design, quality, and technical requirements imposed in the Westinghouse Electric Company purchase orders.

Some of the activities observed by the NRC inspection team include:

- set-up and functional checks performed on the single axis seismic shaker table before the start of a new sequence of testing
- mounting and removal of the 8-inch and 14-inch squib valve test fixtures from the single axis seismic shaker table
- seismic test performance and documentation for the 8-inch and 14-inch squib valve tension bolts, and for the 14-inch squib valve position switch components to be used in production of AP1000 squib valves
- position displacement measurements on the 8-inch and 14 inch squib valve tension bolt test specimens after seismic tests
- function verification of the 14-inch squib valve position switch during and after seismic tests

In addition to these activities, the NRC inspection team observed commercial-grade dedication activities, and verified that measuring and test equipment (M&TE) used during seismic qualification testing was properly identified, marked, calibrated and used within its calibrated range. Furthermore, the NRC inspection team walked down NTS's commercial-grade dedication laboratory and testing areas and verified that nonconforming M&TE was properly identified, marked, and segregated when practical, to ensure it was not reintroduced into the dedication and testing activities.

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

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

During the course of this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated April 25, 2011, IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated April 25, 2011, and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 13, 2012.

The NRC had not previously performed any inspections at the NTS facility in Acton, MA.

With the exception of the violation and nonconformances described below, the NRC inspection team concluded that NTS 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 NRC inspection team issued Violation 99900923/2011-201-01 associated with NTS's failure to implement the regulatory requirements of 10 CFR Part 21. Specifically, Violation 99900923/2011-201-01 cites NTS for failing to inform all affected purchasers within 5 working days that NTS did not have the capability to perform an evaluation to determine if a defect exists. On June 18, 2011, NTS determined that it could not perform a 10 CFR Part 21 evaluation of an identified test deviation and failed to inform the two customers affected of this determination until January 18, 2012, and January 23, 2012, respectively.

Training and Qualification of Personnel

The NRC inspection team concluded that NTS is implementing its training and qualification program consistent with the regulatory requirements of Criterion II, "Quality Assurance Program," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that NTS is implementing its policies and procedures associated with its training and qualification program. No findings of significance were identified.

Commercial-Grade Dedication

The NRC inspection team issued Nonconformance 99900923/2012-201-02 in association with NTS's failure to implement the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-02 cites NTS for failing to adopt an effective dedication program. Specifically, NTS failed to conduct a technical

evaluation to identify additional technical requirements for the specific M&TE being calibrated, and did not review the calibration records (e.g., as part of receipt inspection) to verify that the critical characteristics had been met and would perform their intended safety function, failed to perform an engineering evaluation to document the sample population identified for the control of critical characteristics used for material verification and failed to verify that the supplier had lot/batch control to ensure traceability of material, and failed to identify and verify the following critical characteristics as specified in the customer's purchase order: (1) valve material, (2) orifice size, and (3) size and thread type.

Oversight of Contracted Activities

The NRC inspection team issued Nonconformance 99900923/2012-201-03 in association with NTS's failure to implement the regulatory requirements of Criterion VII, "Control of Purchased Equipment, Material, and Services," of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-03 cites NTS for failing to adequately control its suppliers. Specifically, NTS placed its commercial calibration suppliers on its safety-related approved suppliers list based on the accreditation provided via ISO/IEC 17025 and failed to perform a commercial-grade survey of a commercial supplier's testing program to verify the supplier's control of critical characteristics necessary to provide reasonable assurance that the commercial-grade items to be used as basic components will perform their intended safety function.

Test Control and Configuration Management

The NRC inspection team concluded that NTS is implementing its test control program consistent with the regulatory requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that NTS is implementing its policies and procedures associated with its test control program. No findings of significance were identified.

Nonconforming Material, Parts, or Components and Corrective Action

The NRC inspection team issued Nonconformance 99900923/2012-201-04 in association with NTS's failure to implement the regulatory requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-04 cites NTS for failing to document an NOD in a timely manner. Specifically, NTS failed to initiate and document the disposition of an NOD related to a test anomaly for an internal gasket in a timely manner.

The NRC inspection team issued Nonconformance 99900923/2012-201-04 in association with NTS's failure to implement the regulatory requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-05 cites NTS for failing to promptly identify and correct conditions adverse to quality and for failing to adequately implement corrective actions. Specifically, NTS failed to initiate a corrective and preventive action report related to NTS's failure to document the disposition of an NOD related to a test anomaly for an internal gasket in a timely manner and failed to adequately implement corrective actions related to the review of calibration certificates.

Quality Assurance Records

The NRC inspection team concluded that NTS is implementing its QA records program consistent with the regulatory requirements of Criterion XVII, "Quality Assurance Records," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that NTS is implementing its policies and procedures associated with its QA records program. No findings of significance were identified.

REPORT DETAILS

The U.S. Nuclear Regulatory Commission (NRC) inspection team observed various activities associated with the seismic qualification testing of the tension bolt and position switch of the AP1000 design squib valves. The NRC inspection team specifically observed the setup and performance of the low cycle fatigue qualification seismic testing simulating an operating basis earthquake (OBE) and the sine beat seismic qualification testing simulating a safe shutdown earthquake (SSE) for the 8-inch and 14-inch squib valve tension bolt and 14-inch squib valve position switch assemblies associated with inspection, tests, analyses, and acceptance criterion (ITAAC) 2.01.02.5aⁱⁱ and ITAAC 2.02.03.5aⁱⁱ from Revision 19 of the AP1000 certified design. The NRC inspection team also conducted interviews with responsible National Technical Systems (NTS) personnel, and reviewed testing documents to determine if NTS performed these activities in accordance with the applicable design, quality, and technical requirements imposed in the Westinghouse Electric Company (WEC) purchase orders (POs).

Some of the activities observed by the NRC inspection team include:

- set-up and functional checks performed on the single axis seismic shaker table prior to start of a new sequence of testing
- mounting and removal of the 8-inch and 14-inch squib valve test fixtures from the single axis seismic shaker table
- seismic test performance and documentation for the 8-inch and 14-inch squib valve tension bolts, and for the 14-inch squib valve position switch components to be used in production AP1000 squib valves
- position displacement measurements on the 8-inch and 14 inch squib valve tension bolt test specimens after seismic tests
- function verification of the 14-inch squib valve position switch during and after seismic tests

In addition to these activities, the NRC inspection team observed commercial-grade dedication activities, verified that NTS used measuring and test equipment (M&TE) during seismic qualification testing that was properly identified, marked, calibrated and used within its calibrated range. Furthermore, the NRC inspection team walked down NTS's commercial-grade dedication laboratory and testing areas and verified that nonconforming M&TE were properly identified, marked, and segregated when practical, to ensure they were not reintroduced into the testing activities.

1. 10 CFR Part 21 Program

a. Inspection Scope

The U.S. Nuclear Regulatory Commission (NRC) reviewed National Technical Systems' (NTS) policies and implementing procedures that govern the NTS program under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," to verify compliance with the regulatory requirements. In addition, the NRC inspection team evaluated the 10 CFR Part 21 postings and a sampling of NTS POs for compliance with the requirements

of 10 CFR 21.6, "Posting Requirements," and 10 CFR 21.31, "Procurement Documents," respectively. Furthermore, the NRC inspection team discussed the 10 CFR Part 21 program with NTS's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

b.1 Postings

The NRC inspection team verified that NTS had posted notices that included (1) a copy of Section 206 of the Energy Reorganization Act of 1974, (2) a copy of 10 CFR Part 21, and (3) a description of the NTS procedure that implements the regulation.

b.2 Purchase Orders

The NRC inspection team reviewed a sample of POs to verify that NTS had implemented a program consistent with the requirements described in 10 CFR 21.31, which specify the applicability of 10 CFR Part 21 in POs for safety-related services. The NRC inspection team verified that NTS imposed the requirements of 10 CFR Part 21 on qualified suppliers with programs that met the requirements 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."

b.3 10 CFR Part 21 Procedures and Implementation

NTS Quality Assurance Procedure (QAP) Corporate (COR) 25, "Reporting Requirements per 10 CFR Part 21," Revision 2, dated July 22, 2009, establishes the requirements for compliance with the regulatory requirements of 10 CFR Part 21. This document defines the process for reporting defects; the posting requirements; and the responsibilities, timelines, and actions for identifying and evaluating deviations and failures to comply. The NRC inspection team verified that NTS's nonconforming items and corrective action programs, as described in NTS Quality Assurance Procedure COR 16, "Control of Non-Conforming Items", Revision 3, dated November 5, 2004, and NTS Quality Assurance Procedure COR 17, "Corrective Action and Preventive Action" Revision 1, dated January 24, 2003, respectively, provide a connection to the 10 CFR Part 21 program during the initial screening process.

The NRC inspection team verified that NTS's procedural guidance adequately initiates the 10 CFR Part 21 process and that NTS's staff is knowledgeable about the conditions that would warrant a 10 CFR Part 21 evaluation. During the review of procedure COR 25, the NRC inspection team noted that the procedure did not provide guidance on how to contact the NRC for initial notification in case NTS identified a defect or failure to comply that could create a substantial safety hazard (SSH). Specifically, Subsection 4.4, "General Manager," of Section 4, "Responsibilities," of COR 25 states that: "If the situation is deemed a reportable item in accordance with 10 CFR Part 21, the General Manager or a designee shall be notified by the Quality Management Representative (QMR). The General Manager or a designee shall notify the U. S. Nuclear Regulatory Commission by FAX or by telephone. The current U. S. Nuclear Regulatory Commission FAX and telephone numbers may be obtained online at the <http://www.nrc.gov/> web site." The NRC inspection team proceeded to ask the NTS staff to indicate where on the NRC's public web site was the contact information to report an initial notification of a defect or failure to comply that could create an SSH. The NTS staff failed to find the NRC's contact information for initial notification of a defect or failure to comply on the NRC's

public web site as stated in procedure COR 25. NTS initiated corrective/preventive action report (CPAR) No. 12-38 to address this issue. As a result of CPAR 12-38, NTS revised COR 25 and included the phone numbers that are listed in the regulation to avoid any confusion or delay if NTS is required to report a defect or failure to comply to the NRC. The NRC inspection team reviewed the changes made to COR 25 and found them to be acceptable.

During the review of a sample of completed 10 CFR Part 21 evaluations, the NRC inspection team noted that NTS had initiated CPAR No. 11-37 on June 17, 2011, in response to an identified deviation associated with performing testing in accordance with the International Electrotechnical Commission (IEC) standard 61000-4-10, "Electromagnetic Compatibility - Part 4-10: Testing and Measurement Techniques - Damped Oscillatory Magnetic Field Immunity Test." On June 18, 2011, NTS attempted to perform an evaluation of the deviation but determined that it did not have the capability to perform the evaluation to determine if a defect exists. Although NTS initiated CPAR Nos. 12-08 and 12-09 for each of the customers affected, NTS failed to inform the two customers affected within 5 working days that NTS did not have the capability to perform an evaluation to determine if a defect exists in accordance with 10 CFR Part 21.21(b). NTS notified the two customers affected in letters dated January 18, 2012, and January 23, 2012, respectively. The NRC inspection team identified this issue as Violation 99900923/2012-201-01.

c. Conclusion

The NRC inspection team issued Violation 99900923/2011-201-01 associated with NTS's failure to implement the regulatory requirements of 10 CFR Part 21. Specifically, Violation 99900923/2011-201-01 cites NTS for failing to inform all affected purchasers within 5 working days that NTS did not have the capability to perform an evaluation to determine if a defect exists. On June 18, 2011, NTS determined that it could not perform a 10 CFR Part 21 evaluation of an identified test deviation and failed to inform the two customers affected by this determination until January 18, 2012, and January 23, 2012, respectively.

2. Training and Qualification of Personnel

a. Inspection Scope

The NRC inspection team reviewed NTS's policies and implementing procedures that govern the implementation of NTS's training and qualification of personnel to verify compliance with the regulatory requirements of Criterion II, "Quality Assurance Program," of Appendix B to 10 CFR Part 50. In addition, the NRC inspection team discussed the training and qualification of personnel with NTS's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

b.1 Testing Personnel

The NRC inspection team verified that NTS had established and implemented a training and qualification program for the training and qualification of test personnel involved in the seismic qualification testing of the tension bolt and position switch of the AP1000 squib valves. The NRC inspection team noted that NTS qualifies inspection and test personnel based on an evaluation of their education, experience, proficiency, and capability to perform the required task. Personnel designated to perform particular process functions, tests, and calibrations, and

to operate particular types of equipment and perform test functions must be sufficiently trained prior to conducting work without supervision. Completion of any training program is documented and placed in the employee's personnel file. NTS's department manager and the quality assurance manager review and approve test personnel proficiency and document it in the qualification and training record file and in the NTS facility specific Training Qualification Matrix.

The NRC inspection team reviewed a sample of training and qualification records, conducted interviews of NTS's testing personnel, and verified that the qualification records documented any certifications required by industry and contract requirements. The NRC inspection team confirmed that all personnel performing activities affecting the quality of the qualification testing had completed the required training and met all the specified requirements in accordance with NTS's policies and procedures.

b.2 Audit Personnel

The NRC inspection team reviewed a sample of the training and qualification records of NTS's lead auditors and auditors and confirmed that auditing personnel had completed all required training and maintained qualification and certification in accordance with NTS's policies and procedures. The NRC inspection team also verified that audit teams selected by NTS were sufficiently qualified to evaluate areas within the scope of the audit. In addition, the NRC inspection team verified that the qualification requirements for lead auditors and auditors are consistent with Supplement 2S-3, "Supplementary Requirements for the Qualification of Quality Assurance Program Audit Personnel," to ASME NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications," and Nonmandatory Appendix 2A-3, "Nonmandatory Guidance on the Education and Experience of Lead Auditors," to ASME NQA-1-1994.

c. Conclusion

The NRC inspection team concluded that NTS is implementing its training and qualification program consistent with the regulatory requirements of Criterion II of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that NTS is implementing its policies and procedures associated with its training and qualification program. The NRC inspection team identified no findings of significance.

3. Commercial-Grade Dedication

a. Inspection Scope

The NRC inspection team reviewed NTS's policies and implementing procedures that govern the dedication of commercial-grade items (CGIs) for use in safety-related applications to verify compliance with applicable regulatory requirements. The NRC inspection also reviewed several dedication packages, including dedication plans, the criteria for the selection of critical characteristics, the basis for sampling plan selection, and the selection of verification methods to verify effective implementation of the NTS's CGIs dedication process. The NRC inspection team observed the dedication of a Honeywell Limit Micro Switch by NTS staff. The NRC inspection team discussed the commercial-grade dedication program with NTS's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

NTS's Standard Operating Procedure NOR NUC 04, "Dedication of Commercial Grade Items." Revision 1, dated December 18, 2011, describes the authority, responsibilities, and methods to NTS implements to dedicate and control CGIs in safety-related applications. The NRC inspection team noted that NOR NUC 04 provides adequate controls for dedication activities, including CGI evaluation criteria, procurement controls, acceptance and rejection criteria consistent with safety function, material traceability controls, and controls for receipt inspection and test activities. The NRC inspection team confirmed that NTS implements the methods contained in the Electric Power Research Institute (EPRI) 5652, "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety-Related Applications," issued June 1988, for dedication activities. EPRI 5652 provides four methods of accepting a CGI for use in safety-related applications: Method 1, "Special Tests and Inspection;" Method 2, "Commercial Grade Survey of Supplier;" Method 3, "Source Verification;" and Method 4, "Acceptable Supplier/Item Performance Record." NTS implements Methods 1, 2, and 3 for the verification of critical characteristics in during the dedication process.

The NRC inspection team performed a sample review of dedication packages to verify adequate implementation of NTS's dedication process. It reviewed the following dedication packages:

- NTS Procedure TP63686-13N,"Dedication Test Procedure of Honeywell Limit Micro Switch P/N BZE6-2RN for use at Pilgrim Nuclear Power Station," Revision 0
- NTS Procedure TP-63680-12N,"Dedication Procedure 8210G88 ASCO Solenoid Valves for First Energy Corporation," Revision 0

During the review of the dedication package for the Honeywell Limit Micro Switch, the NRC inspection team noted that the dedication plans did not provide adequate traceability to the items selected for testing. During discussions with NTS personnel, the NRC inspection team learned that NTS used sampling plans for the verification of critical characteristics in the majority of its dedication plans. The NRC inspection team reviewed the procedural guidance related to the use of sampling plans for dedicated items and noted that NOR NUC 04 referred to EPRI 7218, "Guideline for Sampling in the Commercial-Grade Item Acceptance Process," dated January 1999, for the lot or batch formation and selection of the sampling plan methodology. The NRC inspection team also noted that Section 7, "Sampling," of NOR NUC 04 only provided reference to EPRI 7218. NOR NUC 04 provides a table as guidance for the use of normal, reduced, or tightened sampling plans based on the established traceability of items supplied by one or multiple manufacturers. However, during the review of several dedication packages and the discussion of their content with responsible NTS personnel, the NRC inspection team determined that the use of this table by itself was not adequate and needed to be supplemented with other qualitative factors to ensure adequate selection and implementation of the sampling plans. Specifically, the NRC inspection team noted the following:

- The selection of a specific sampling plan did not consider factors such as safety significance of the item, adequacy of supplier controls, complexity of the item, and performance history of the item.
- Sampling plans did not establish their applicability to destructive tests or inspections or nondestructive tests or inspections, nor did it refer to the respective tables in EPRI 7218 that provide recommendations for sampling plan sample size.

- There is no guidance to provide an engineering justification in cases where a lot or batch is rejected and the dedication plan needs to be revised to change the sampling plan. This is important to ensure that the basis for the selection of a sampling plan remains valid after rejection of a lot or batch has occurred.

NTS's sampling practice for dedicating CGIs needs to include appropriate engineering involvement, provide adequate qualitative factors, and should be consistent with the guidance described in EPRI 7218 to ensure that all parts supplied as basic components for use in nuclear safety-related applications conform to the applicable procurement specification requirements. The NRC inspection team identified this issue as an example of Nonconformance 99900923/2012-201-02 for NTS's failure to adopt an effective dedication program. NTS initiated CPAR No. 12-40 to address this issue.

During the review of the dedication package for the ASCO solenoid valves, the NRC inspection team identified an example in which NTS's dedication process failed to select critical characteristics that would provide reasonable assurance that the item would perform its intended safety function. During the development of the dedication plan, NTS failed to verify specific requirements imposed in the procurement document from First Energy Corporation. Specifically, First Energy Corporation requested NTS to provide a safety-related ASCO solenoid valve with the following specific requirements: (1) 3/4-inch national pipe thread (NPT) tapered thread (NPT), (2) 5/8-inch orifice, (3) normally close, (4) 120 volts alternating current, (5) 2-way, (6) pilot operated, and flow rated to be between 3-8 standard cubic foot/feet per minute, and (7) stainless steel. NTS's dedication plan failed to identify and verify the following as critical characteristics: (1) 3/4-inch NPT, (2) 5/8-inch orifice, and (3) stainless steel. Additional engineering evaluation is needed to ensure that the critical characteristics selected for acceptance (which could include design, material, and performance characteristics) provide reasonable assurance that the item will perform its intended safety function. The NRC inspection team identified this issue as another example of Nonconformance 99900923/2012-201-02 for NTS's failure to adopt an effective dedication program. NTS initiated CPAR No. 12-43 to address this issue.

The NRC inspection team also noted that NTS uses a commercial supplier to calibrate all of its M&TE used in safety-related applications. The NRC inspection team proceeded to ask NTS to provide the dedication packages for the dedication of commercial calibration services for the M&TE provided by the commercial calibration supplier. NTS stated that it does not dedicate commercial calibration services based on the fact that the commercial calibration supplier they use is accredited by the American Association for Laboratory Accreditation (A2LA). A2LA accreditation may not be used as the basis for qualifying safety-related calibration services. The NRC staff has determined that, for procurement of commercial-grade calibration services for safety-related applications, laboratory accreditation programs administered by A2LA or any other accreditation service provided by a domestic accrediting body, as recognized through the mutual recognition arrangement of the International Laboratory Accreditation Program (ILAC), are acceptable in place of a commercial-grade survey as part of the commercial-grade dedication process when all of the requirements described in the Arizona Public Service (APS) Company safety evaluation report (SER) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML052710224) are met. The NRC expanded this guidance to include the use of domestically accredited calibration laboratories by suppliers and sub-suppliers in a letter from the agency to Ms. Sherry Grier, Nuclear Procurement Issues Committee (NUPIC) Chairman, dated June 6, 2006 (ADAMS Accession No. ML061580350). This letter provides the same guidance for augmenting the laboratories' domestic accreditation

when using their services in activities governed by the requirements of Appendix B to 10 CFR Part 50, and 10 CFR Part 21.

The requirements for invoking this alternative are:

- The alternative method is documented in the quality assurance description
- Accreditation is provided by one of the six ILAC domestic accrediting bodies
- The scope of the accreditation covers the contracted services
- Purchase documents should: (1) require the use of the laboratory's ISO 17025, "General Requirements for the Competence of Testing and Calibration Laboratories" accredited quality program, (2) impose additional technical requirements identified in the evaluation, (3) require reporting of as-found calibration data when calibrated items are found to be out-of-tolerance, and (4) require identification of the laboratory equipment and standards used.

Even though the NRC inspection team verified that NTS had met most of the conditions described in the APS SER for using A2LA accreditation in lieu of commercial-grade surveys as part of a commercial-grade dedication process, NTS failed to perform a technical evaluation to identify any additional critical characteristics for the specific M&TE being calibrated, and it did not review the calibration records (e.g., as part of receipt inspection) to verify that the critical characteristics had been met and would perform their intended safety function. In addition, NTS's Quality Assurance Manual did not contain a description of the alternative for using the calibration laboratory accreditation provided by one of the domestic accrediting bodies in lieu of performing a commercial-grade survey as required by the APS SER. The NRC inspection team identified this issue as another example of Nonconformance 99900923/2012-201-02 for NTS's failure to adopt an effective dedication program. NTS initiated CPAR No. 12-36 to address this issue.

During the observation of dedication activities at the NTS facility, the NRC inspection team noted that NTS verified the critical characteristics in accordance with written instructions, procedures, and drawings. The NRC inspection team also noted that qualified personnel performed these activities using calibrated equipment. The NRC inspection team did not identify any issues with NTS's activities related to the verification of critical characteristics.

c. Conclusion

The NRC inspection team issued Nonconformance 99900923/2012-201-02 in association with NTS's failure to implement the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-02 cites NTS for failing to adopt an effective dedication program. Specifically, NTS failed to conduct a technical evaluation to identify additional technical requirements for the specific M&TE being calibrated, and did not review the calibration records (e.g., as part of receipt inspection) to verify that the critical characteristics had been met and would perform their intended safety function. It also failed to perform an engineering evaluation to document the sample population identified for the control of critical characteristics used for material verification, failed to verify that the supplier had lot and batch control to ensure traceability of material, and failed to identify and verify the

following critical characteristics as specified in the customer's purchase order: (1) valve material, (2) orifice size, and (3) size and thread type.

4. Oversight of Contracted Activities

a. Inspection Scope

The NRC inspection team reviewed NTS's policies and implementing procedures that govern the implementation of NTS's oversight of contracted activities to verify compliance with the regulatory requirements of Criterion IV, "Procurement Document Control," Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of POs and receipt inspection records associated with the seismic testing to evaluate compliance with NTS's program and technical requirements. In addition, the NRC inspection team discussed the oversight of contracted activities with NTS's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

b.1 Procurement Document Control

During discussions with the NTS personnel, the NRC inspection team identified that NTS did not procure any safety-related items related to the seismic qualification testing of the tension bolt and position switch of the AP1000 squib valves. The NRC inspection team increased the scope of the inspection to include other safety-related POs issued by NTS. The NRC inspection team found that the POs adequately documented the procurement requirements as established by NTS's governing policies and implementing procedures which include (1) task definitions and responsibilities, (2) imposition of appropriate quality, technical, and regulatory requirements, and (3) identification of applicable codes and standards. The NRC inspection team also found that these POs adequately defined contract deliverables, disposition of nonconformances, access rights to sub tier suppliers, and extension of contractual requirements to subcontractors.

b.2 Maintenance of the Approved Vendors List

The NRC inspection team reviewed the approved suppliers list (AVL) to ensure that qualified and approved suppliers were listed, that authorized personnel maintained, distributed, and periodically updated the list, and that any revisions to the list be implemented following the applicable procedures. The NRC inspection team confirmed that the AVL documented (1) the vendor name, (2) the scope of qualification, (3) limitations and restrictions, if necessary, (4) the date that re-approval is due, and (5) the vendor's quality program.

However, during the review of the NTS's Quality Assurance Procedure COR 03, "Vendor Assessment," Revision 3, dated November 3, 2006; the NRC inspection team noted that this procedure does not require suppliers of domestic calibration services to be evaluated before acceptance of material, equipment, or services. Specifically, Note 2, Section 6.0 of QAP COR 03 states, in part, that "For nuclear-related projects requiring 10 CFR Part 21 and/or Part 50, Appendix B; calibration vendors may be approved via ISO/IEC 17025 accreditation by A2LA or an accreditation body mutually recognized by A2LA." As discussed in Section 2.b of this report, A2LA accreditation may not be used as the basis for qualifying safety-related calibration services. A2LA accreditation 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 APS SER are met. The NRC inspection team identified this issue as an example of Nonconformance 99900923/2012-201-03 for NTS's failure to adequately control its suppliers. NTS initiated CPAR No. 12-36 to address this issue.

b.3 External Audits

The NRC inspection team reviewed a sample of external audits to verify the implementation of the NTS audit program. The NRC inspection team confirmed that the audit reports contained a review of the relevant QA criteria in Appendix B to 10 CFR Part 50 for the activities that individual suppliers performed as well as documentation of pertinent supplier guidance associated with each criterion. For audits that resulted in findings, the NRC inspection team verified that the supplier had established a plan for corrective action and that NTS had reviewed and approved the corrective action and verified its satisfactory completion and proper documentation.

b.4 Receiving Inspection

NTS Procedure No. TP63528-11N, "Seismic Qualification Test Plan for 8" and 14" Squib Valve Tension Bolt," dated June 4, 2012, and Procedure No. TP63714-13N, "Seismic Qualification Test Plan for 14" Squib Valve Switch Pin & Bracket Assembly," dated June 4, 2012, required NTS to perform a visual inspection of the test specimens for signs of damage as a result of shipment to NTS. In addition, NTS was required to verify the part number of the equipment received. The NRC inspection team reviewed the receipt inspection report generated as a result of the receipt inspection of the test specimens and verified that no damage occurred to the test specimens during shipment.

b.5 Commercial-Grade Surveys

During the review of the dedication packages, the NRC inspection team noted that for the dedication of the Honeywell Limit Micro Switch, NTS improperly took credit for a material analysis test. NTS took credit for the test performed by Specialized Technology Resources (STR), a commercial-grade testing supplier. NTS's dedication procedure states, in part, that "Method 2 should be used when the Project Manager desires to accept a commercial-grade item based on the merits of a supplier's commercial quality controls. These controls may constitute quality programs, and procedures that have been or can be verified by performance of a Commercial-Grade Survey in accordance with the Quality Assurance Procedure for Commercial Grade Surveys." The NRC inspection team identified that NTS had not performed a commercial-grade survey of STR to ensure that STR's quality assurance program and processes are adequate to provide reasonable assurance that the specified critical characteristics will be maintained in the item, and therefore incorrectly took credit for STR's material analysis test. The NRC inspection team identified this issue as another example of Nonconformance 99900923/2012-201-03 for NTS's failure to adequately control its suppliers. NTS initiated CPAR No. 12-37 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99900923/2012-201-03 in association with NTS's failure to implement the regulatory requirements of Criterion VII of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-03 cites NTS for failing to adequately control its suppliers. Specifically, NTS placed its commercial calibration suppliers on its safety-related approved suppliers list based on the accreditation provided via ISO/IEC 17025 and failed to

perform a commercial-grade survey of a commercial supplier's testing program to verify the supplier's control of critical characteristics necessary to provide reasonable assurance that the commercial-grade items to be used as basic components will perform their intended safety function.

5. Test Control and Configuration Management

a. Inspection Scope

The NRC inspection team reviewed NTS's policies and implementing procedures that govern the implementation of NTS's test control program to verify compliance with the regulatory requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The NRC inspection team observed various testing activities associated with the 8-inch and 14-inch squib valve tension bolts, and the 14-inch squib valve position switch. The NRC inspection team conducted interviews with responsible NTS personnel, and reviewed testing documents to determine if NTS performed activities in accordance with the applicable design, quality, and technical requirements imposed in the WEC POs and industry standard requirements of the Institute of Electrical and Electronics Engineers (IEEE). The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

b.1 Test Plan

WEC document APP-GW-G1-002, "AP1000 Plant Equipment Qualification Methodology," Revision 3, issued February, 2012, is a top-tier document that contains the overall guidelines for equipment qualifications, including criteria, methods, and codes for the seismic testing for the AP1000 design. This document provides the test criteria for the vibration and seismic qualification for the AP1000 squib valves. Section 6.4.6, "Seismic Testing of AP1000 Line Mounted Equipment," describes the methodology for seismic qualification for line-mounted equipment by multiple and single frequency testing.

WEC developed the seismic qualification test program for the AP1000 squib valves. WEC documents EQ-TP-222-APP, "AP1000 Squib Valve Equipment Qualification Test Plan," Revision 1, issued June 2012, and WEC EQ-TP-49-APP, APP-PV95-VPH-002, Appendix B, "RIM Seismic Testing Guidelines," Revision 1, dated August 18, 2009, contain the specific requirements for seismic qualification testing of the AP1000 squib valves. Since seismic qualification testing of a complete squib valve cannot be performed because of its size and weight, supplemental seismic qualification testing of important-to-function parts of the squib valve is required to demonstrate their ability to function properly after a seismic event. The important-to-function parts which seismic qualification does not cover by either IEEE testing or ASME QME-1, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants," testing are the 8-inch and 14-inch squib valves' tension bolts and the 14-inch squib valve's position indication device. The seismic qualification tests are performed to demonstrate that the squib valves meet or exceed their capability to withstand the effects of earthquakes and be able to perform their intended safety function.

The test samples for each tension bolt consist of a piston with an outside diameter and weight identical to the production piston mounted in a seismic test fixture, one representing the 14-inch squib valve and the other representing the 8-inch squib valve, fabricated to design specifications and drawings D-403972, "8-inch Squib Valve Functional Testing 8" Tension Bolt Vibration Test

Fixture Welding/Assembly,” Revision 2, dated January 30, 2012, and D-407009, “14-inch Squib Valve Testing Tension Bolt Vibration Test Fixture Welding, Revision 2, dated June 1, 2011, by SPX/Copes Vulcan Corporation (SPX), the manufacturer of the squib valves.

The 14-inch squib valve position indication switch test sample consists of an assembly of standoff piece, internal parts, and the Topworx switch, installed into a seismic test fixture that replicates the bottom of the 14-inch squib valve, as described in SPX drawing No. D-409861, “14-inch Switch Pin & Bracket Seismic Test Assembly,” Revision 0, dated March 13, 2012.

b.2 Test Procedures

NTS Test Procedure No. TP63528-11N, “Seismic Qualification Test Plan for 8” and 14” Squib Valve Tension Bolt,” Revision 0, dated June 4, 2012, and NTS Test Procedure No. TP-63714-13N, “Seismic Qualification Test Plan for 14” Squib Valve Switch Pin & Bracket Assembly,” Revision 0, dated June 4, 2012, describe the test methodology for the seismic qualification testing on the 8-inch and 14-inch squib valve tension bolts and on the 14-inch squib valve position indication switch assembly, and include the requirements for qualification contained in EQ-TP-222-AP. The NRC inspection team verified that the NTS test procedures adequately included the technical, quality and regulatory requirements identified in the WEC PO. The NRC inspection team also verified that the NTS test procedures provided an adequate description of the test objectives, test sequences, test instructions, test parameters, M&TE usage, acceptance criteria, post-test activities, and that they meet the requirements of the following standards:

- IEEE 323-1974, “IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations”
- IEEE 344-1987, “IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations”
- IEEE 382-1996, “IEEE Standard for Qualification of Actuators for Power-Operated Valve Assemblies with Safety-Related Functions for Nuclear Power Plants”

b.3 Test Program Implementation

Each squib valve test sample is subjected to the following testing sequences as described in the NTS test procedures:

- resonance survey search
- vibration aging
- required input motion (RIM) testing
 - low cycle fatigue testing
 - sine beat testing
- multi-frequency testing

Low Cycle Fatigue Testing on the 8-inch and 14-inch Squib Valve Tension Bolt and 14-inch Squib Valve Position Indication Switch Test Samples

The NRC inspection team observed the test setup and the low cycle fatigue seismic qualification testing on the 8-inch and 14-inch squib valve tension bolt test samples and on the 14-inch squib

valve position indication switch test sample. Each test sample was subjected to a simulated operating basis earthquake (OBE) vibratory motion by exposing the test sample to two sinusoidal cycles at two-thirds of the RIM SSE (6.6 acceleration due to gravity). Each cycle was from 2 to 64 to 2 hertz (Hz) at a rate of 1 octave/minute in each of the three principal orthogonal directions per the requirements of APP-GW-G1-002. In addition, the NRC inspection team observed that the WEC representative performed visual and dimensional inspections on each tension bolt test sample during pre- and post-OBE testing for each 8-inch and 14-inch squib valve tension bolt test sample in each orthogonal direction. The WEC representative also performed a functional test on the 14-inch squib valve position indication switch test sample after the OBE test in each orthogonal direction, documenting the inspection results in the WEC datasheet, as part of the requirements of EQ-TP-222-AP.

The NRC inspection team 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) test instrument range, accuracy, and uncertainty appropriate for the test, (e) current calibration, and (f) proper procedure sequence followed and any deviations documented and evaluated.

Sine Beat Testing on the 8-inch and 14-inch Squib Valve Tension Bolts and 14-inch Squib Valve Position Indication Switch Assembly

The NRC inspection team observed the test setup and the sine beat seismic qualification testing on the 14-inch squib valve position indication switch test sample, and a portion of the sine beat seismic qualification testing on the 14-inch squib valve tension bolt test sample. Each test sample was subjected to a simulated SSE by exposing each test sample to a series of single frequency sine beats spaced at 1/3rd octave intervals from 2 to 32Hz and at 1/6th octave over 32 Hz to 64Hz plus any defined resonances up to 100Hz in each of the orthogonal axes per the requirements of APP-GW-G1-002.

During the sine beat seismic qualification testing on the 14-inch squib valve position indication switch test sample in the horizontal Y-axis direction at the resonance frequency of 75.6Hz, a chatter noise was identified with one of the two electrical contacts in the position switch. The seismic test was immediately stopped with the NTS Project Manager (PM) requesting the WEC representative to verify if there was any damage to the test specimen. The WEC representative reviewed the test data, and performed a visual inspection. Based on satisfactory inspection results and lack of any visual damage to the test sample, the test was resumed at a different response time setting on the position switch. The NTS PM documented the test deviation and initiated a "Notice of Deviation," (NOD) No. 001 for Job No.63714-13N and submitted it to the WEC representative for review, and disposition and recommendation. The NRC inspection team verified that NOD 001 documented the deviation, test requirements, root- cause evaluation and disposition approved by the WEC representative.

In addition, during the sine beat seismic qualification testing on the 14-inch squib valve position indication switch test sample in the X-axis direction (perpendicular to the length of the test fixture) at a resonance frequency between 2 and 2.5Hz, the test technician identified a test deviation resulting from an erroneous data output from one of the signal channels of the tri-axial accelerometer. The NTS PM documented the test deviation and initiated NOD No. 002 for Job No. 63714-13N. The NRC inspection team verified that NOD No. 002 documented the deviation, test requirements, root- cause evaluation and disposition approved by the WEC representative. Furthermore, during the sine beat seismic qualification testing on the 14-inch squib valve position indication switch test sample in the horizontal X-axis direction at the

resonance frequency of 75.6Hz, the test technician noted that the locknut and washer for the switch became loose during testing and was discovered in the erroneous data output from one of the tri-axial accelerometer channels during investigation. The NTS PM documented the test deviation and initiated NOD No. 003 for Job No. 63714-13N. The NRC inspection team verified that NOD No. 003 documented the deviation, test requirements, evaluation and disposition approved by the WEC representative. At WEC's request, NTS repeated the sine beat testing at the previous frequencies of 50.8, 57.02, 64, and 75.6Hz.

Another test deviation occurred during the first sine beat testing RIM simulation testing in the horizontal X-axis on the 14-inch squib valve tension bolt test specimen. At approximately 50.8 Hz frequency, a loud rattling noise from the test specimen was heard in the middle of the 15-second test run and was confirmed by NTS test personnel by spiking noted in the accelerometer test data. NTS immediately stopped the test upon request of the WEC representative. The WEC representatives reviewed the accelerometer data, and performed visual and dimensional inspection to determine the cause and to assess for a broken tension bolt. Based on satisfactory inspection results, the WEC representative recommended NTS management to rerun the test at the same frequency and the same rattling noise was heard upon rerun of the test, except this time it was earlier in the 15-second test run.

The WEC test representative decided to continue the testing at the next test frequency of 57.02 Hz to ensure that this was not an issue with a single frequency. A single sine pulse at 57.02 Hz was introduced into the test specimen and a similar rattling noise was heard. The WEC representative halted all the testing activity by providing a verbal stop work order to NTS, informing NTS to discontinue testing on both the 8-inch and 14-inch squib valve tension bolt test specimens until the cause of the test anomaly was analyzed. The NTS PM documented the test deviation and initiated NOD No. 001 for Job No. 63528-11N. The NRC inspection team verified that NOD No. 001 documented the test deviation, test requirements, and was evaluated by the WEC representative.

Concurrently, WEC documented the test deviation by initiating WEC Issue Report No. 12-165-M042 to address this issue. The NRC inspection team participated in a teleconference held between the SPX and WEC personnel where SPX discussed its analysis for the potential cause of the test deviation and recommended that testing continue. SPX decided to send a representative to NTS's facility to conduct a visual and dimensional inspection, and to observe the rest of the testing.

b.4 Test Results and Data Reduction

The NRC inspection team verified that NTS implemented suitable requirements for recording data during testing and had established a process with functional responsibilities for effective evaluation of test results. The NRC inspection team reviewed NTS's controls applicable to test log documentation and data acquisition software to assess the completeness of the requirements with regards to traceable and verifiable data, and documenting the accuracy of instruments used to collect data.

The NRC inspection team reviewed NTS's process of verifying and validating software used for the acquisition, processing, recording, reporting, and storage or retrieval of test data used during seismic qualification testing of the 8-inch and 14-inch squib valve tension bolts and 14-inch squib valve position switch assembly. NTS uses a Commercial-Off-the-Shelf Software, "VibrationVIEW," developed by Vibration Research Corporation, to generate the vibration signals, control the seismic qualification testing, and collect response data. NTS always

performs calibration and verification of the software before use for safety-related applications. The NRC inspection team reviewed documentation associated with VibrationVIEW, Revision 10.0.06, to verify that the process implemented by NTS was consistent with the applicable regulatory requirements and relevant industry standards. The NRC inspection team also interviewed NTS personnel management related to software verification and software dedication for safety-related test application. The NRC inspection team verified that the software reduces test data to a format that facilitates qualification of the components being tested.

During discussions with NTS's personnel, the NRC inspection team identified that during an audit of NTS by NUPIC, NTS was issued an audit finding related to the use commercial software in safety-related applications for NTS's failure to perform a technical evaluation under NTS's dedication program. The NRC inspection team reviewed NTS's response to the NUPIC audit finding which consisted of developing NTS Procedure SOP NOR CAL 15, "Commercial-Grade Dedication of Vibration Research Software Verification," that NTS submitted to the NUPIC team lead for review and approval.

The NRC inspection team did not identify any issues related to the process for verifying and validating the software, however, it identified several discrepancies in the verification test report. Among the discrepancies: the preparer and reviewer of the verification report was the same individual, the test technician did not sign the verification results, and some of the test plots did not have the correct frequency band range. The NRC inspection team discussed these discrepancies with the NTS personnel who acknowledged them and initiated CPAR No. 12-39 to address this issue.

b.5 Control of Measuring and Test Equipment

For a sample of M&TE used in the seismic qualification testing, the NRC inspection team verified that the M&TE used had appropriate calibration stickers and current calibration dates, including calibration due dates, and that the associated calibration records were current and available for review. The calibration records reviewed by the NRC inspection team also indicated the as-found or as-left conditions, accuracy required, calibration results, calibration dates, due date for recalibration and the applicable National Institute of Standards and Technology reference for the equipment used in the calibration. The NRC inspection team also verified that the selected M&TE was calibrated using procedures traceable to known industry standards.

During discussions about the M&TE activities with NTS personnel, the NRC inspection team was informed that NTS does not have an M&TE program on-site, but rather it subcontracts the calibration services to Tektronix Service Solutions (hereafter referred to as Tektronix). Tektronix is a commercial supplier of M&TE and is accredited to ISO/IEC 17025 to perform calibrations.

While the NRC inspection team concluded that NTS adequately controlled the M&TE, the NRC inspection team issued Nonconformance 99900923/2011-201-02 to NTS for failing to review the suitability of the application of commercially procured calibration services of the calibration laboratory that calibrated the instruments and generated the calibration records.

c. Conclusion

The NRC inspection team concluded that NTS is implementing its test control program consistent with the regulatory requirements of Criterion XI of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined

that NTS is implementing its policies and procedures associated with its test control program. The NRC inspection team identified no findings of significance.

6. Nonconforming Material, Parts or Components and Corrective Action

a. Inspection Scope

The NRC inspection team reviewed NTS's policies and implementing procedures that govern the implementation of NTS's nonconforming materials, parts, or components and corrective action programs to verify compliance with Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of nonconformance reports (NCRs), NODs and CPARs and discussed the nonconforming materials, parts, or components and the corrective action programs with NTS management and staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

b.1 Implementation of the Nonconforming Materials, Parts or Components Program

NTS's program for nonconforming materials, parts or components defines a nonconformance as an item or activity that does not meet the technical or quality requirements. NTS applies the nonconformance process to test activities as well as purchased items and services. All nonconformances are documented in a NCR and tracked in a Nonconformance Report Log. Nonconformances associated with testing activities are documented in an NOD and are treated in the same way as an NCR.

The NRC inspection team verified that NTS processes and procedures guidelines for the identification, documentation, segregation, evaluation and disposition of nonconforming items. The NRC inspection team also verified that SPX's nonconformance process provides guidance to evaluate nonconformances for reportability under NTS's 10 CFR Part 21 program. The nonconformance process is also linked to the corrective action program.

The NRC inspection team walked down NTS's commercial-grade dedication laboratory and testing areas and verified that nonconforming materials were properly identified, marked, and segregated when practical to ensure that they were not reintroduced into the dedication and testing activities. The NRC inspection team also verified that NTS had adequate controls for segregation of in-process nonconforming materials. The NRC inspection team reviewed items in the hold area and verified that everything was physically tagged with a QA Hold Tag and that the document package clearly identified the issue and status.

During the review of the dedication package for the Honeywell Limit Micro Switch, the NRC inspection team noted that on February 24, 2012, NTS identified a material analysis test anomaly related to an internal gasket. NTS evaluated the test deviation and dispositioned it as "use-as-is." NTS proceeded to send the micro switch to the licensee as a conforming item on March 5, 2010, without objective evidence of how the NOD was dispositioned. During a quality review, NTS identified that the PM failed to initiate and document the disposition of the NOD in accordance with NTS's procedures. The PM then proceeded to initiate and document the disposition of the NOD on November 8, 2011. The NRC inspection team identified this issue as an example of Nonconformance 99900923/2012-201-04 for NTS's failure to document an NOD in a timely manner. NTS initiated CPAR No. 12-41 to address this issue.

b.2 Implementation of the Corrective Action Program

NTS's program for corrective actions clearly defines the roles and responsibilities of NTS personnel, the identification and documentation requirements (e.g., CPAR forms, CPAR Log), identifies a process for periodic review of NCRs for initiation of a CPAR form, and establishes the process for initiating actions to correct the condition and prevent its reoccurrence. NTS's processes and procedures for corrective action describe the process for identifying, evaluating, reporting, and correcting nonconformances and deviations. The NRC inspection team noted that NTS's corrective action procedures lead them to evaluate conditions under NTS's 10 CFR Part 21 program for potential reportability, as required.

The NRC inspection team noted that NTS's corrective action program does not differentiate between conditions adverse to quality and significant conditions adverse to quality. In accordance with Criterion XVI of Appendix B to 10 CFR Part 50, all conditions adverse to quality must be promptly identified and corrected. For significant conditions adverse to quality, Criterion XVI requires that the cause of the condition be determined (root cause analysis), corrective action be taken to preclude repetition, and the appropriate level of management be notified. NTS treats all nonconformances and deviations the same and performs all the actions required for significant conditions adverse to quality.

The NRC inspection team reviewed a sample of CPARs resulting from a variety of issues (e.g., external and internal audits, customer complaints or returns) and verified that each contained a detailed description of the nonconformance, justification for the disposition of the condition that led to the nonconformance or deviation, root cause analysis, corrective action to prevent further recurrence and documenting NTS's verification of implementation of corrective actions taken to ensure its effectiveness before closing the CPAR. In relation to Nonconformance 99900923/2012-201-04 identified in Section 6.b.1 of this report, the NRC inspection team asked NTS for a copy of the CPAR initiated in response for NTS's failure to initiate and document the disposition of the NOD in a timely manner as required by NTS Procedure COR 16, "Control of Non-Conforming Items," Revision 3, dated November 5, 2004. NTS indicated that they had not generated a CPAR documenting NTS's failure in initiating and documenting an NOD in a timely manner. The NRC inspection team identified this issue as an example of Nonconformance 99900923/2012-201-05 for NTS's failure to promptly identify and correct conditions adverse to quality. NTS initiated CPAR No. 12-41 to address this issue.

In addition, during the review of a sample of CPARs, NTS had generated CPAR 11-77 on August 22, 2011, in response to an external audit finding for its failure to review calibration certificates. NTS's response to the CPAR was to ensure that all calibration certificates for M&TE are reviewed; however, as described in Nonconformance 99900923/2012-201-02 in Section 3.b of this report, the NRC inspection team determined that the review of calibration certificates was not performed in accordance with CPAR 11-77. The NRC inspection team identified this issue as another example of Nonconformance 99900923/2012-201-05 for NTS's failure to adequately implement corrective actions. NTS initiated CPAR No. 12-42 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99900923/2012-201-04 in association with NTS's failure to implement the regulatory requirements of Criterion XV of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-04 cites NTS for failing to document an NOD in

a timely manner. Specifically, NTS failed to initiate and document the disposition of an NOD related to a test anomaly for an internal gasket in a timely manner.

The NRC inspection team issued Nonconformance 99900923/2012-201-05 in association with NTS's failure to implement the regulatory requirements of Criterion XVI of Appendix B to 10 CFR Part 50. Nonconformance 99900923/2012-201-05 cites NTS for failing to promptly identify and correct conditions adverse to quality and for failing to adequately implement corrective actions. Specifically, NTS failed to initiate a CPAR related to NTS's failure to document the disposition of an NOD related to a test anomaly for an internal gasket in a timely manner and failed to adequately implement corrective actions related to the review of calibration certificates.

7. Quality Assurance Records

a. Inspection Scope

The NRC inspection team reviewed NTS's policies and implementing procedures that govern the implementation of NTS's quality assurance records program to verify compliance with the regulatory requirements of Criterion XVII, "Quality Assurance Records," of Appendix B to 10 CFR Part 50. In addition, the NRC inspection team discussed the quality assurance records program with NTS's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

NTS Quality Assurance Procedure COR 09, "Control of Quality Records," Revision 6, dated June 13, 2008, provides the requirements and guidelines for the collection, storage, maintenance, and retrieval of quality records.

For nuclear safety-related activities, NTS classifies records as nuclear lifetime records and nuclear nonpermanent records. Lifetime records are required to be retained for the lifetime of the component while nonpermanent records are retained for 3 years.

Once a job is completed, the entire file is scanned and saved as an electronic file. Electronic records are backed up regularly per the requirements of NTS Standard Operating Procedure SOP COR IT 05, "Server Replication and Archival," Revision 1, dated October 1, 2009, which states, in part, that "All file servers are replicated on a daily basis to two separate geographical locations."

The NRC inspection team reviewed a sample of several NTS quality assurance records, including training and qualification records, calibration records, audit records, PO records, CPAR records, NOD records, test data records, and vendor audit records. During its review, the NRC inspection team verified that NTS had implemented a quality assurance records program that provided adequate measures for the identification, classification, validation, and distribution controls of records. The NRC inspection team noted that NTS's policies and implementing procedures provided the necessary guidance for the administration, identification, receipt, storage, preservation, safekeeping, and disposition of all records. For the sample of quality records reviewed, the NRC inspection team verified that the records were legible, adequate, retrievable, adequately protected, and traceable.

c. Conclusion

The NRC inspection team concluded that NTS is implementing its quality assurance records program consistent with the regulatory requirements of Criterion XVII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that NTS is implementing its policies and procedures associated with its quality assurance records program. The NRC inspection team identified no findings of significance.

8. Entrance and Exit Meetings

On June 11, 2012, the NRC inspection team discussed the inspection scope during an entrance meeting with Mr. Dwight D. Moore, PE, NTS's Chief Operating Officer, and other NTS personnel. On June 15, 2012, the NRC inspection team presented the inspection results during an exit meeting with Mr. Moore and other NTS personnel.

ATTACHMENT

1. PERSONS CONTACTED

Name	Title	Affiliation	Entrance	Exit	Interviewed
Dwight D. Moore	Chief Operating Officer	NTS	X	X	
Steve Eisenberg	General Manager	NTS	X	X	X
Charles R. Pilotte	Program Manager	NTS	X	X	X
Jonathan Mendoza	Engineering Supervisor	NTS	X	X	X
Ron Kelly	Quality Assurance Manager	NTS	X	X	X
Nathan Lowe	Engineer	NTS			X
Robert Wood	Master Technician	NTS			X
Ken LeSage	Test Technician	NTS			X
Stephen Feder	Test Engineer	Westinghouse	X		X
John Kearns	Test Engineer	Westinghouse	X		X
Yamir Diaz-Castillo	Team Lead	NRC	X	X	
Jonathan Ortega-Luciano	Reactor Operations Engineer	NRC	X	X	
Raju Patel	Reactor Operations Engineer	NRC	X	X	
Andrea Keim	Reactor Operations Engineer	NRC	X	X	
John Bartleman	Senior Construction Inspector	NRC	X	X	
Richard Rasmussen	Branch Chief	NRC		X	

2. INSPECTION PROCEDURES USED

Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated April 25, 2011.

IP 43002, "Routine Inspections of Nuclear Vendors," dated April 25, 2011.

IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated April 25, 2011.

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Type</u>	<u>Description</u>
99900923/2012-201-01	Open	NOV	10 CFR 21.21(b)
99900923/2012-201-02	Open	NON	Criterion III
99900923/2012-201-03	Open	NON	Criterion VII
99900923/2012-201-04	Open	NON	Criterion XV
99900923/2012-201-05	Open	NON	Criterion XVI

4. INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

The NRC inspection team identified the following inspections, tests, analyses, and acceptance criteria (ITAAC) related to the squib valves. These ITAAC are referenced in this section for future use by the NRC staff during the ITAAC closure process and by no means constitute that the ITAAC have been met and closed.

AP1000 Design Control Document, Tier 1, Revision 19	Table 2.1.2-4 ITAAC 5.a	ITAAC 2.01.02.5aii
AP1000 Design Control Document, Tier 1, Revision 19	Table 2.2.3-4 ITAAC 5.a	ITAAC 2.02.03.5aii

5. DOCUMENTS REVIEWED

- NTS "Corporate Quality Policy Manual," Revision 6, dated October 14, 2011
- NTS Quality Assurance Procedure (QAP), Corporate (COR) 02, "Management Reviews," Revision 3, dated November 5, 2004
- NTS QAP COR 03, "Vendor Assessment," Revision 3, dated November 3, 2006
- NTS QAP COR 05, "Control of Measuring, Inspection & Test Equipment," Revision 9, dated May 12, 2011
- NTS QAP COR 08, "Purchasing of Services and Supplies," Revision 5, January 7, 2005
- NTS QAP COR 09, "Control of Quality Records," Revision 6, dated June 13, 2008
- NTS QAP COR 12, "Customer Feedback," Revision 4, dated June 2, 2009
- NTS QAP COR 14, "Vendor Audits," Revision 2, October 27, 2008
- NTS QAP COR 15, "Internal Audits," Revision 4, June 21, 2010
- NTS QAP COR 16, "Control of Nonconforming Items," Revision 3, dated November 5, 2004

- NTS QAP COR 17, "Corrective and Preventive Action," Revision 1, dated January 24, 2003
- NTS QAP COR 18, "Personnel Training and Qualification," Revision 2, dated November 2, 2001
- NTS QAP COR 19, "Auditor Training and Qualification," Revision 1, dated October 27, 2008
- NTS QAP COR 20, "Final Inspection," Revision 1, dated January 24, 2003
- NTS QAP COR 21, "Data Recording Requirements," Revision 3, dated March 15, 2005
- NTS QAP COR 23, "Test Control," Revision 4, dated March 15, 2005
- NTS QAP COR 24, "Commercial Grade Surveys," Revision 1, dated January 24, 2003
- NTS QAP COR 25, "Reporting Requirements Per 10 CFR Part 21, Revision 2, dated July 22, 2009
- NTS QAP COR 29, "Receiving of Purchased Items and Services," Revision 2, dated October 24, 2009
- NTS QAP COR 30, "Evaluation and Client Notification of Nonconforming Work," Revision 0, dated November 5, 2004
- NTS Standard Operating Procedure (SOP) COR Information Technology (IT) 05, "Server Replication and Archival," Revision 1, dated October 1, 2009
- NTS SOP COR IT 10, "Electronic Data Filing," Revision 3, dated October 1, 2009
- NTS Form COR 5.1, "Out-of-Tolerance Report," for Monopole Antenna, ID No. BX-EMI-ANTENA-30283, dated April 24, 2012
- NTS Form COR 21.0, "General Log Sheet," for NTS Master Job Order (MJO) No. TP63714-13N for 14-inch Squib Valve Position Indication Switch Subjected to Vibration Aging, dated June 6, 2012
- NTS Form COR 21.2, "Seismic Test Equipment List," for NTS MJO No. TP63714-13N, dated June 12, 2012
- NTS Form COR 28.0, "Software Notice and Evaluation Form," for PUMA software NTS ID No. BX1772, Model No. Analyzer Version 4.0 Patch 1.E, dated January 27, 2007
- NTS Procedure Northeast (NOR) CAL 15, "Vibration Research Software Verification," Revision 2, dated October 10, 2008
- NTS Form NOR 23.1, "Pre-Test Inspection Checklist," for MJO No. 63528-11N, with General Review, Data Acquisition System, Dynamics/Seismic, and Nuclear performed by Test Technician, dated June 4, 2012

- NTS SOP NOR CAL 15, "Commercial Grade Dedication of Vibration Research Software Verification," Revision 3, dated March 5, 2012
- NTS Test Procedure No. TP63528-11N, "Seismic Qualification Test Plan for 8" and 14" Squib Valve Tension Bolt," Revision 0, dated June 4, 2012
- NTS Procedure No. TP63714-13N, "Seismic Qualification Test Plan for 14 Squib Valve Switch Pin & Bracket Assembly," Revision 0, dated June 4, 2012
- NTS Change of Procedure No. 001 for NTS Procedure No. TP63714-13N, "Seismic Qualification Test Plan for 14: Squib Valve Switch Pin & Bracket Assembly, " Revision 0, June 12, 2012
- NTS Notice of Deviation (NOD) No. 001 for Job No. 63528-11N, "Audible Noise Anomaly was Observed during Seismic Testing on 14" Squib Valve," dated June 13, 2012
- NTS NOD No. 001 for MJO No. 63714-13N, "Spurious Actuation of Normally Closed Contact on 14" Squib Valve Position Switch During Seismic Testing," dated June 12, 2012
- NTS NOD No. 002 for MJO No. 63714-13N, "WEC 14 Squib Valve Switch & Bracket Assembly for Erroneous Data During the Sine Beat Testing in X Axis," dated June 13, 2012
- NTS NOD No. 003 for MJO No. 63714-13N, "Locknut for the 14" Squib Valve Position Switch Loosened During Seismic Testing," dated June 13, 2012
- NTS MJO No. 63714-13N for the Seismic Testing on the 14" Squib Valve Indication Switch Assembly for the Westinghouse Electric Company (WEC) Purchase Order (PO) No. 4500362611, C/O No. 2
- NTS MJO No. 63528-11N for the Seismic Testing on the 8" & 14" Squib Valve Tension Bolts Assembly for the WEC PO No., 4500362610 C/O No. 2
- NTS MJO No. 63679-12N, "Dedication of Agastat Timing Relay Part No. E70242PC004," for Entergy-Pilgrim Station PO No. 10337475
- NTS MJO No. 63680-12N, "Dedication of 3/4-inch 120VAC Solenoid Valve P/N 8210G88, " for First Energy Beaver Valley PO No. 45384209
- NTS MJO No. 63515-11N, "Dedication of GE Relay P/N CR120B02202, 120VAC Coil, " for Next Era Energy, Seabrook Station PO No. 002261585
- NTS Software Verification Test Report No. AC-DYN-SOFWRE-1890, "Control of Test Related Software Report No. AC-DYN-SOFWRE-1890 - Vibration Controller Software Revision 10.0.6," Revision 9, dated October 18, 2011
- NTS Procedure TP63686-13N, "Dedication Test Procedure of Honeywell Limit Micro Switch P/N BZE6-2RN for use at Pilgrim Nuclear Power Station," Revision 0
- NTS Procedure TP-63680-12N,"Dedication Procedure 8210G88 ASCO Solenoid Valves for First Energy Corporation," Revision 0

- NRC Reactor Plant Event Notification Work Sheet EN# 47395
- NTS Report TR63656-12N, "Failure Evaluation on CR120B02201 GE Relays," Revision 0, dated February 9, 2012
- NTS Report TR63656-12N Addendum, "Failure Evaluation Summary Report on CR120B02202 GE Relays," Revision 0, dated May 3, 2012
- SBK-L-1 1232, Seabrook Station 10 CFR Part 21 Notification General Electric CR-120B Relays (120 VAC), dated November 17, 2011
- Part 21 Report 2011-38-00 ABB, Inc. "Defective Capacitors Cause Under-Frequency Trip Set point Drift In ABB KF Protective Relays," dated July 22, 2011
- TP63515-11N, "Dedication Test Procedure of General Electric Industrial Relay for NextEra Energy Seabrook station," Revision 2
- PO No. 59178N from NTS to STR to Perform Testing of the Material (Activation Energy),
- PO No. 436551 from Calvert Cliffs Nuclear Power Plant to NTS for Honeywell Limit Micro Switch P/N BZE6-2RN
- PO 10340630 from Pilgrim Station to NTS for Honeywell Limit Micro Switch P/N BZE6-2RN,
- PO No. 10263966 from Pilgrim Station to NTS for Honeywell Limit Micro Switch P/N BZE6-2RN
- PO No. 58204N to STR to Perform Testing of the Material (Activation Energy)
- PO No. 45384209 from Beaver Valley Nuclear Power Plant to NTS for an ASCO Solenoid Valve
- PO No 59032N from NTS to Washburn & Garfield for the ASCO Solenoid Valve
- PO No. B51936 from NTS to Tektronix for Calibration Services, dated January 24, 2012
- WEC PO No.4500363610 to NTS to Perform Seismic Testing of Tension Bolts, dated October 5, 2010
- WEC PO No.4500363610 to NTS to Perform Seismic Testing of Tension Bolts, dated October 5, 2010, Change Notice No. 1, dated May 23, 2012
- WEC PO No.4500363611 to NTS to Perform Seismic Testing of Position Indicating Switch, dated October 5, 2010
- WEC PO No.4500363611 to NTS to Perform Seismic Testing of Position Indicating Switch, October 5, 2010, Change Notice No. 1, dated May 23, 2012
- WEC PO No.4500363611 to NTS to Perform Seismic Testing of Position Indicating Switch, October 5, 2010, Change Notice No. 2, dated June 4, 2012

- WEC APP-GW-GI-002, "AP1000 Plant Equipment Qualification Methodology," Revision 3, issued February, 2012
- WEC EQ-TP-222-APP, APP-PV70-VPH-001, "AP1000 Squib Valve Equipment Qualification Test Plan," Revision 1, issued June 2012
- WEC EQ-TP-49-APP, APP-PV95-VPH-002, Appendix B, "RIM Seismic Testing Guidelines," Revision 1, dated August 18, 2009
- WEC File Code APP-144-MISC-3, "Guidelines for RIM Seismic Testing of Safety Related Valve and Valve Appurtenances for Westinghouse Electric Company for use in AP1000 Nuclear Power Plants," dated, August 18, 2009
- WEC Issue Report #12-165-M042, "Test Anomaly during Seismic Testing of 14-inch Squib Valve Tension Bolt," dated June 13, 2012
- NTS Audit Report No. NTS/A-V-17025-11-01, XXXX, audit date January 24, 2011
- NTS Audit Report No. NTS/A-V-10CFR50-11-03, ABB, dated February 9, 2011
- NTS Audit Report No. NTS/A-V-10CFR50-10-07, Magnatrol International, dated September 29, 2010
- NTS Audit Report No. NTS/A-V-10-CFR50-10-11, Tyco, dated January 19, 2011
- SPX Drawing No. D-402377, "14-inch Squib Valve Body Finish Machining ASME Code Class 1," Revision 7, dated March 22, 2010
- SPX Drawing No. D-402706, "14-inch Squib Valve Functional Testing Tension Bolt Vibration Test Fixture Assembly/Layout," Revision 1, dated February 23, 2012
- SPX Drawing No. D-402707, "8-inch Squib Valve Testing Tension Bolt Vibration Test Fixture Assembly/Layout," Revision 2, dated May 31, 2011
- SPX Drawing No. D-409861, "14-inch Switch Pin & Bracket Seismic Test Assembly," Revision 0, dated March 13, 2012
- SPX Drawing No. D-403097, "8-inch HP Piston Machining," Revision 5, dated April 15, 2010
- SPX Drawing No. D-403357, "14-inch Piston Finish Machining," Revision 2, dated April 6, 2010
- SPX Drawing No. D-403677, "14-inch ADS Squib Valve Assembly," Revision 4, dated June 19, 2010
- SPX Drawing No. D-403678, "8-inch HP-R Squib Valve Assembly," Revision 5, dated May 12, 2010
- SPX Drawing. No. D-403687, "8-inch HP-R Squib Valve Body Finish Machining ASME Code Class 1," Revision 7, dated May 7, 2010

- SPX Drawing No. D-403972, "8-inch Squib Valve Functional Testing 8" Tension Bolt Vibration Test Fixture Welding/Assembly, Revision 2, dated January 30, 2012
- SPX Drawing. No. D-407009, "14-inch Squib Valve Testing Tension Bolt Vibration Test Fixture Welding," Revision 2, dated June 1, 2011
- Tektronix Service Solutions, "ACCLASS Certificate of Accreditation to ISO/IEC 17025: 2005," valid March 30, 2011 thru March 30, 2013
- Tektronix Certificate of Calibration for Accelerometer, NTS ID No. AC0751, Calibration Range 1 to 4KHz, Calibration Date March 14, 2014
- Tektronix Certificate of Calibration for Vibration Controller, NTS ID No. AC1871, Calibration Range 1-20 KHz, Calibration Date August 10, 2011
- Tektronix Certificate of Calibration for Mass Flow Meter, NTS ID No. AC3264, Calibration Range 0 to 50 SCFM, Calibration Date March 23, 2012
- Tektronix Certificate of Calibration for Tri-Axial Accelerometer, NTS ID No. AC2914 Calibration Date May 11, 2012
- Tektronix Certificate of Calibration for Mitutoyo Digital Caliper, NTS ID No. AC2012, calibration range 0 to 12", calibration date October 20, 2011
- Tektronix Certificate of Calibration for Multimeter, NTS ID No. AC0757, Calibration Range 0 to 10000 Volts, Calibration Date March 27, 2012
- IEEE Standard 323-1974, "IEE Standard for Qualifying Class IE Equipment for Nuclear Generating Stations,"
- IEEE Standard 344-1987, "IEEE Recommended Practice for Seismic Qualification of Class IE Equipment for Nuclear Generating Stations,"
- IEEE Standard 382-1996, "IEEE Standard for Seismic Qualification of Actuators for Power-Operated Valve Assemblies With Safety-Related Functions for Nuclear Power Plants,"
- Corrective/Preventive Actions: 11-06, 11-37, 11-78, 11-81, 11-84, 12-08, 12-09, 12-20, 12-22, 12-38
- Nonconformance Reports: 12-02, 12-03, 12-05, 12-07