

March 21, 2013

Mr. Brian D. Sullivan
Quality Assurance Director
Weir Valves & Controls USA, Inc.
29 Old Right Road
Ipswich, MA 01938

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT
NO. 99900746/2013-201, AND NOTICE OF NONCONFORMANCE

Dear Mr. Sullivan:

From February 4-7, 2013, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Weir Valves & Controls USA, Inc. (hereafter referred to as Weir), facility in Ipswich, MA. The purpose of this limited scope routine inspection was to assess Weir's compliance with 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 the implementation of Weir's quality assurance activities associated with the design, fabrication, assembly, and testing of safety-related gate, butterfly, and air-operated control valves for U.S. nuclear power plants with a focus on the valves provided for the Westinghouse Electric Company AP1000 reactor design. Some of the activities observed by the NRC inspection team are associated with, or directly affect, the closure of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) from Revision 19 to the certified AP1000 design. The NRC inspection team did not identify any findings associated with the ITAAC in Section 4 of the attachment to this report. Currently, the combined licenses of Vogtle Electric Generating Plant Units 3 and 4, and Virgil C. Summer Nuclear Station Units 2 and 3, incorporate these ITAAC. The enclosed report presents the results of this inspection. This NRC inspection report does not constitute the agency's endorsement of Weir's overall quality assurance or 10 CFR Part 21 programs.

The NRC inspection team found that the implementation of your quality assurance program did not meet certain regulatory requirements imposed on you by your customers or NRC licensees. Specifically, the NRC inspection team determined that Weir was not fully implementing its quality assurance program in the areas of design control; instructions, procedures, and drawings; control of purchased equipment, materials, and services; control of special processes; test control; and corrective action. The enclosed notice of nonconformance (NON) to this letter identifies specific findings and references to the pertinent requirements, and the enclosed inspection report describes, in detail, the circumstances surrounding it.

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 and Procedure," the NRC will make available electronically for public inspection a copy of this letter, its enclosure, and your response through the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System, which is accessible at <http://www.nrc.gov/reading-rm/adams.html>.

To the extent possible (and if applicable), your response should not include any personal privacy, proprietary, or Safeguards Information so that the NRC can make it 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 Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

Sincerely,

/RA/

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

Docket No. 99900746

Enclosures:

1. Notice of Nonconformance
2. Inspection Report No. 99900756/2013-201
and Attachment

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice and Procedure," the NRC will make available electronically for public inspection a copy of this letter, its enclosure, and your response through the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System, which is accessible at <http://www.nrc.gov/reading-rm/adams.html>.

To the extent possible (and if applicable), your response should not include any personal privacy, proprietary, or Safeguards Information so that the NRC can make it 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 Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

Sincerely,

/RA/

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

Docket No. 99900746

Enclosures:

1. Notice of Nonconformance
2. Inspection Report No. 99900756/2013-201
and Attachment

Docket No. 99900746

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NRC-001

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NAME	YDiaz-Castillo	SCrane	BClarke	GNewman	LWheeler
DATE	03/19/2013	03/20/2013	03/19/2013	03/19/2013	03/19/2013
OFFICE	RII/DCI/CIB3	NRO/DCIP/CITB	NRO/DCIP/CAEB	NRO/DCIP/CMVB	
NAME	DFailla	MKowal	TFrye	ERoach	
DATE	03/19/2013	03/20/2013	03/21/2013	03/21/2013	

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NOTICE OF NONCONFORMANCE

Weir Valves & Controls USA, Inc.
29 Old Right Road
Ipswich, MA 01938

Docket No. 99900746
Report No. 2013-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the Weir Valves & Controls USA, Inc. (hereafter referred to as Weir), facility in Ipswich, MA, from February 4, 2013, through February 7, 2013, it appears that Weir did not conduct certain activities in accordance with NRC requirements that were contractually imposed upon Weir by its customers or NRC licensees:

- A. Criterion III, "Design Control," of Appendix B, "Quality Assurance Program 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 also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components."

Weir's procedure CP-E-18, "Control of Commercial Grade Items To Be Dedicated for Use in Nuclear Safety-Related Applications," Revision 6, dated August 29, 2012, states, in part, that "the design engineer will determine the critical characteristics that will ensure each safety-related function is maintained, and all identified critical characteristics must have a corresponding verification." In addition, the procedures states, in part, that "the justification for the selection of a lot size is documented by Weir Engineering [...] and filed with the Quality Records for the Customer Order."

Contrary to the above, as of February 7, 2013, Weir failed to establish adequate measures for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of certain structures, systems, and components.

Specifically:

1. Weir failed to adequately identify the acceptance methods (i.e., commercial-grade survey) to appropriately verify two of the critical characteristics (e.g., traceability and certificates of conformance) for the seat rings of a 20-inch gate valve.
2. Weir failed to perform an adequate engineering evaluation to document the sample population identified for the control of critical characteristics for a packing ring and a gasket spiral of a check valve and did not conduct a commercial-grade survey to verify that the supplier had lot and batch control to ensure traceability of material.
3. Weir failed to identify the appropriate critical characteristics (e.g., material composition) and the associated acceptance methods for a packing ring and a gasket spiral of a check valve and an actuator of a fuel-handling valve.

These issues have been identified as Nonconformance 99900746/2013-201-01.

- B. Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50, states, in part, that "activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

Contrary to the above, as of February 7, 2013, Weir failed to prescribe activities that affect quality in appropriate procedures and to accomplish activities that affect quality in accordance with instructions and procedures.

Specifically,

1. Weir failed to include the appropriate definitions from 10 CFR 21.3, "Definitions," applicable to the dedication of commercial-grade items in CP-E-18. CP-E-18 did not include the correct definitions for "commercial-grade item," "critical characteristic," and "dedication." Additionally, CP-E-18 allows for the dedication of commercial grade items even if one or more critical characteristics of the item cannot be verified, and it does not restrict the conduct of commercial-grade surveys as the basis for accepting commercial-grade items.
2. Weir failed to evaluate the use of out-of-calibration measuring and test equipment (M&TE) in accordance with Step 10.2.3 of QC-C-1, "Control of Measuring and Test Equipment," Revision 32, dated August 7, 2012, which states that "when M&TE are found to be nonconforming or defective, the Quality Technician generates a Nonconformance Report (NCR) for the piece of equipment, describing the nonconformance or nature of the defect. The NCR is forwarded to the Director, Quality Assurance, who shall review the M&TE logbook to identify items that have been accepted using this equipment since the last valid calibration date." Weir failed to generate an NCR for an outside micrometer (1M36) that was found to be out of calibration when the calibration vendor received it for calibration.
3. Weir failed to calibrate pressure gauges in accordance with its procedure CP-M-22 "Instruction for Calibration for Pressure Gauges with Dead Weight Tester," Revision 1, dated March 22, 2007, which states that "the pressure measured is the sum of the weights plus the Piston Weight Carrier." Weir incorrectly summed the weight of the piston weight carrier as 2 pounds per square inch (psi) instead of 3 psi, which could cause a 10-percent error in a 10-psi gauge.
4. Weir's quality assurance engineers failed to review and sign the test reports as required by Section 11, "Test Control," of Weir's Quality Assurance Manual, Revision 7, dated August 7, 2012, which states, in part, that "the QA Engineer signs and dates the Test Report to indicate that the pressure gauge has been recalibrated after the test. The QA Engineer monitors test performance to verify compliance with requirements. The QA engineer and ANI [authorized nuclear inspector] sign and date in the remarks portion of the Test Report for those tests that they witness."

These issues have been identified as Nonconformance 99900746/2013-201-02.

- C. 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."

Westinghouse Electric Company (WEC) design specifications APP-PV11-Z0-001, "Butterfly Valves, ASME Boiler and Pressure Vessel Code Section III, Class 2 and 3," Revision 7, dated May 25, 2012 and APP-PV14-Z0-001, "Air Operated Globe and Stop Check Valves, ASME Boiler and Pressure Vessel Code, Section III, Class 1, 2, and 3," Revision 5, dated May 25, 2012, define Regulatory Guide (RG) 1.28, "Quality Assurance Program Requirements (Design and Construction)," Revision 3, issued August 1985, as a quality requirement.

Section C.3.2 of RG 1.28, "Quality Assurance Program Requirements (Design and Construction)," Revision 3, dated August 1985, states that "the applicant or licensee should perform or arrange for annual evaluations of suppliers. This evaluation should be documented and should take into account, where applicable, (1) review of supplier furnished documents and records, such as certificates of conformance, nonconformance notices, and corrective actions, (2) results of previous source verifications, audits, and receiving inspections, (3) operating experience of identical or similar products furnished by the same supplier, and (4) results of audits from other sources, e.g., customer, ASME, or NRC audits."

Contrary to the above, as of February 7, 2013, Weir failed to verify the effectiveness of the control of quality by contractors and subcontractors. Specifically, Weir failed to perform annual evaluations of suppliers holding certificates of authorization from the American Society of Mechanical Engineers (ASME) Accreditation Program in accordance with the guidance in RG 1.28.

This issue has been identified as Nonconformance 99900746/2013-201-03.

- D. Criterion IX, "Control of Special Processes," of Appendix B, to 10 CFR Part 50 states, in part, that "measures shall be established to assure that special processes, including welding, heat treating, and nondestructive testing, are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements."

Subsection NC-4427, "Shape and Size of Fillet Welds," of Section III, "Rules for Construction of Nuclear Power Plants Components," of the ASME Boiler and Pressure Vessel (B&PV) Code, 1998 Edition, 2000 Addenda, states, in part, that "a fillet weld in a single continuous weld may be less than the specified fillet weld dimension by not more than 1/16 in., provided that the total undersize portion of the weld does not exceed 10% of the length of the weld. Individual undersize weld portions shall not exceed 2 in. in length."

Contrary to the above, as of February 7, 2013, Weir failed to ensure that nondestructive testing was controlled and accomplished in accordance with applicable codes. Specifically, Weir failed to perform visual inspections of the fillet welds to verify that they met the requirements in Subsection NC-4427 of Section III of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

This issue has been identified as Nonconformance 99900746/2013-201-04.

- E. Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50, states, in part, that "test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions. Test results shall be documented and evaluated to assure that test requirements have been satisfied."

Step 2.1.1 of Weir's Test Procedure No. 321-54536, "Manual Valves," Revision 6, dated September 6, 2012, states, in part, that "water quality for testing shall comply with the following requirements," and proceeds to list the acceptance criteria for chloride ion, fluoride, conductivity, and pH.

Contrary to the above, as of February 7, 2013, Weir failed to verify that all test requirements have been satisfied. Specifically, Weir failed to verify that the water quality for the test fluid met the specification requirements for chloride ion, fluoride, conductivity, and pH in accordance with Test Procedure 321-54536. Weir was unable to determine chloride ion and fluoride concentration, and did not identify that conductivity and pH were out of tolerance.

This issue has been identified as Nonconformance 99900746/2013-201-05.

- F. 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."

Contrary to the above, as of February 7, 2013, Weir failed to ensure that conditions adverse to quality were promptly identified and corrected.

Specifically,

1. Weir failed to enter the following issue into its corrective action program as committed in the NRC's response to Weir's letter dated February 17, 2009, which states, in part, "As discussed with Mr. Webb of your staff on February 3, 2009, we find that your actions to determine the scope of the NON may have been too limiting. Although our finding articulated in the NON was limited to one example, WVC certificates of compliance (CofCs) received from other suppliers may also have been inadequately verified by WVC receipt inspectors. Mr. Webb committed to identifying other suppliers who provided CofCs to WVC, and committed to determine whether similar discrepancies were found. Your staff also committed to process any findings within WVC's corrective action process."
2. Weir failed to perform an extent of condition to evaluate the effect of improperly dedicated commercial testing services for items that had already been shipped. In

response to an audit finding associated with the inadequate dedication of commercial grade testing services procured from Kalsi Engineering, Weir issued Corrective Action Report (CAR) No. 12-36A; revised the dedication procedure to address commercial services, surveys, and technical evaluations; and then reviewed open orders to verify that they included sufficient dedication plans with technical evaluations. However, CAR No. 12-36A did not direct the Weir staff to perform an extent of condition.

3. Weir failed to perform an extent of condition to evaluate how the inadequate dedication would affect the M&TE, where this equipment might have been used, and how it would affect safety-related components. In response to an audit finding associated with critical characteristics for the performance of a commercial-grade survey of Ledford Gage Laboratory Inc., Weir issued CAR No. 12-36B and revised the approved suppliers list (ASL) to identify those suppliers that were approved as commercial-grade suppliers in addition to those approved as ASME suppliers and suppliers under Appendix B to 10 CFR Part 50. In addition, Weir committed to conducting commercial-grade surveys on suppliers that required them. However, CAR No. 12-36B did not direct the Weir staff to perform an extent of condition. Furthermore, although Weir did revise its ASL by removing the commercial-grade calibration laboratories from the list, it did not complete the dedication of the affected M&TE and continued to use that equipment.

These issues have been identified as Nonconformance 99900746/2013-201-06.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, 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 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 further noncompliance; and (4) the date when 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 Documents Access and Management System, which is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or Safeguards Information so that the NRC can make it available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material be withheld, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information would create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards

Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements"

Dated this 21nd day of March 2013.

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

Docket No.: 99900746

Report No.: 99900746/2013-201

Vendor: Weir Valves & Controls USA Inc.
29 Old Right Road
Ipswich, MA 01938

Vendor Contact: Mr. Brian D. Sullivan
Quality Assurance Director
Telephone: 978-825-2531
Brian.Sullivan@weirgroup.com

Nuclear Industry Activity: Weir Valves & Controls USA Inc. is under contract to fabricate gate, butterfly and air-operated control valves for the Westinghouse Electric Company AP1000 reactor design that will be constructed at the Vogtle Electric Generating Plant, Units 3 and 4, and Virgil C. Summer Nuclear Station, Units 2 and 3.

Inspection Dates: February 4-7, 2013

Inspectors: Yamir Diaz-Castillo NRO/DCIP/CMVB Team Leader
Samantha Crane NRO/DCIP/CMVB
Brent Clarke NRO/DCIP/CMVB
Garrett Newman NRO/DCIP/CEVB
Larry Wheeler NRO/DSRA/BPTS
David Failla RII/DCI/CIB3

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

EXECUTIVE SUMMARY

Weir Valves & Controls USA Inc.
99900746/2013-201

The U.S. Nuclear Regulatory Commission (NRC) conducted this inspection to verify that Weir Valves & Controls USA Inc. (hereafter referred to as Weir), had implemented an adequate quality assurance (QA) program that complies with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." In addition, the NRC inspection also verified that Weir implemented a program under 10 CFR Part 21, "Reporting of Defects and Noncompliance," that met the NRC's regulatory requirements. The NRC inspection team conducted the inspection at the Weir facility in Ipswich, MA, from February 4-7, 2013.

This technically focused inspection evaluated the implementation of Weir's QA program activities associated with the design, fabrication, assembly, and testing of the gate, butterfly and air-operated valves for the Westinghouse Electric Company (WEC) AP1000 reactor design. Some of the activities observed by the NRC inspection team are associated with or directly affect closure of inspections, tests, analyses, and acceptance criteria (ITAAC) from Revision 19 of the certified AP1000 design. The NRC inspection team did not identify any findings associated with the ITAAC contained in Section 4 of the attachment to this report. Currently, the combined licenses of Vogtle Electric Generating Plant (hereafter referred to as Vogtle), Units 3 and 4, and Virgil C. Summer Nuclear Station (hereafter referred to as V.C. Summer), Units 2 and 3, incorporate these ITAAC.

The NRC inspection team observed by the following specific activities:

- a Weir production meeting
- an O-ring dedication
- liquid penetrant examination of the hardfaced portion of a check valve disk for Susquehanna Steam Electric Station (hereafter referred to as Susquehanna) Unit 2
- final dimensional inspection of a swing check valve disc for Susquehanna Unit 2
- calibration check of 100, 500, and 900 pounds per square inch pressure gauges
- hydrostatic testing of a 6-inch motor-operated butterfly valve for Vogtle Units 3 and 4
- diagnostic stroke testing of a 3-inch motor-operated butterfly valve for Vogtle Units 3 and 4
- receipt inspection of body ring castings from PRL Industries, Inc.

In addition to observing these activities, the NRC inspection team verified that measuring and test equipment (M&TE) was properly identified, marked, calibrated, and used within its calibrated range. Furthermore, the NRC inspection team walked down Weir's assembly floor

and verified that nonconforming components were properly identified, marked, and segregated when practical, to ensure that they were not reintroduced into the manufacturing processes.

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

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

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

This NRC inspection was the second one conducted at Weir's facility in Ipswich, MA. The NRC conducted an inspection in December 2008 and documented the results of the inspection in Inspection Report 99900746/2008-201, dated December 17, 2008. The report documents one violation of NRC requirements and one nonconformance to NRC requirements that were contractually imposed on Weir by its customers. This inspection report documents the NRC's followup on Weir's implementation of corrective actions for these issues.

With the exception of the nonconformances described below, the NRC inspection team concluded that Weir's QA policies and procedures comply with the applicable requirements in 10 CFR Part 21 and Appendix B to 10 CFR Part 50, and that Weir's personnel are implementing these policies and procedures effectively. The results of this inspection are summarized below.

10 CFR Part 21 Program

The NRC inspection team concluded that Weir is implementing its 10 CFR Part 21 program in accordance with the regulatory requirements in 10 CFR Part 21. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the 10 CFR Part 21 program. No findings of significance were identified.

Design Control and Commercial Grade Dedication

The NRC inspection team issued Nonconformance 99900746/2013-201-01 for Weir's failure to implement the regulatory requirements in Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-01 cites Weir for failing to establish adequate measures for the selection and review for suitability of application of equipment that is essential to the safety-related functions of certain structures, systems, and components. Specifically, Weir (1) failed to adequately identify the acceptance methods (i.e., commercial-grade survey) to appropriately verify two of the critical characteristics (e.g., traceability and certificates of conformance) for the seat rings of a 20-inch gate valve, (2) failed to perform an adequate engineering evaluation to document the sample population identified for the control of critical characteristics for a packing ring and a gasket spiral of a check valve and did not verify through the performance of a commercial-grade survey that the supplier had lot and batch control to ensure traceability of material, and (3) failed to identify the appropriate critical characteristics (e.g., material composition) and the associated acceptance methods for a packing ring and a gasket spiral of a check valve and an actuator of a fuel-handling valve.

The NRC inspection team issued Nonconformance 9990746/2013-201-02 for Weir's failure to implement the regulatory requirements in Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-02 cites Weir for failing to prescribe activities that affect quality in appropriate procedures. Specifically, Weir failed to provide adequate procedural guidance in CP-E-18, "Control of Commercial-Grade Items To Be Dedicated for Use in Nuclear Safety-Related Applications," Revision 6, dated August 29, 2012, for the dedication of commercial-grade items.

Oversight of Contracted Activities

The NRC inspection team concluded that Weir is implementing its oversight of contracted activities consistent with the regulatory requirements in Criterion IV, "Procurement Document Control," and Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with its procurement document control and audits program. No findings of significance were identified.

The NRC inspection team issued Nonconformance 99900746/2013-201-03 for Weir's failure to implement the regulatory requirements in Criterion VII, "Control of Purchased Material, Equipment, Services," of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-03 cites Weir for failing to adequately control its suppliers. Specifically, Weir failed to perform annual evaluations of suppliers holding certificates of authorization from the American Society of Mechanical Engineers Accreditation Program.

Control of Special Processes

The NRC inspection team issued Nonconformance 99900746/2013-201-04 for Weir's failure to implement the regulatory requirements in Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-04 cites Weir for failing to ensure that nondestructive testing was controlled and accomplished in accordance with applicable codes. Specifically, Weir failed to perform visual inspections of the fillet welds to verify that they met the requirements in Subsection NC-4427, "Shape and Size of Fillet Welds," of Section III, "Rules for Construction of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, 1998 Edition, 2000 Addenda.

Inspection

The NRC inspection team concluded that Weir is implementing its inspection program in accordance with the regulatory requirements in Criterion X, "Inspection," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the inspection program. No findings of significance were identified.

Test Control

The NRC inspection team issued Nonconformance 99900746/2013-201-05 for Weir's failure to implement the regulatory requirements in Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-05 cites Weir for failing to verify that all test requirements have been satisfied. Specifically, Weir failed to verify that the water quality for the test fluid met the specification requirements for chloride, fluoride, conductivity, and pH in

accordance with Test Procedure 321-54536, "Manual Valves," Revision 6, dated September 6, 2012.

The NRC inspection team issued Nonconformance 9990746/2013-201-02 for Weir's failure to implement the regulatory requirements in Criterion V of Appendix B to 10 CFR Part 50. Nonconformance 9990746/2013-201-02 cites Weir for failing to accomplish activities that affect quality in accordance with the procedures. Specifically, Weir's QA engineers did not review and sign the test reports as required by its Quality Assurance Manual.

Control of Measuring and Test Equipment

The NRC inspection team concluded that Weir is implementing its M&TE program in accordance with the regulatory requirements in Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the M&TE program. No findings of significance were identified.

The NRC inspection team issued Nonconformance 9990746/2013-201-02 for Weir's failure to implement the regulatory requirements in Criterion V of Appendix B to 10 CFR Part 50. Nonconformance 9990746/2013-201-02 cites Weir for failing to accomplish activities that affect quality in accordance with the procedures. Specifically, Weir did not calibrate pressure gauges in accordance with CP-M-22, "Instruction for Calibration of Pressure Gauges with Dead Weight Tester," Revision 1, dated March 22, 2007, and did not evaluate the use of out-of-calibration M&TE in accordance with Step 10.2.3 of QC-C-1, "Control of Measuring and Test Equipment," Revision 32, dated August 7, 2012.

Nonconforming Materials, Parts, or Components

The NRC inspection team concluded that Weir is implementing its nonconforming materials, parts, or components program in accordance with the regulatory requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," in Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the control of nonconforming materials, parts, or components. No findings of significance were identified.

Corrective Action

The NRC inspection team issued Nonconformance 9990746/2013-201-06 for Weir's failure to implement the regulatory requirements in Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Nonconformance 9990746/2013-201-06 cites Weir for failing to ensure that conditions adverse to quality were promptly identified and corrected. Specifically, Weir failed to promptly identify and correct conditions adverse to quality as committed to in its response to NRC's inspection report 9990746/2008-201, dated February 17, 2009, and as identified during two external audits.

REPORT DETAILS

The U.S. Nuclear Regulatory Commission (NRC) inspection team observed various activities related to the Weir Valves & Controls USA, Inc. (hereafter referred to as Weir), quality assurance (QA) program. These activities include the design, fabrication, assembly, and testing of the butterfly and air-operated valves for the Westinghouse Electric Company (WEC) AP1000 pressurized water reactor design. Some of the activities observed by the NRC inspection team are associated with, or directly affect, the closure of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) from Revision 19 to the certified AP1000 design. The NRC inspection team did not identify any findings associated with the ITAAC in Section 4 of the attachment to this report. Currently, the combined licenses of Vogtle Electric Generating Plant (hereafter referred to as Vogtle), Units 3 and 4, and Virgil C. Summer Nuclear Station (hereafter referred to as V.C. Summer), Units 2 and 3, incorporate these ITAAC.

The NRC inspection team observed the following specific activities:

- a Weir production meeting
- an O-ring dedication
- liquid penetrant examination of the hardfaced portion of a check valve disk for Susquehanna Steam Electric Station (hereafter referred to as Susquehanna), Unit 2
- final dimensional inspection of a swing check valve disc for Susquehanna, Unit 2
- calibration check of 100, 500, and 900 pound per square inch (psi) pressure gauges
- hydrostatic testing of a 6 inch motor operated butterfly valve for Vogtle, Units 3 and 4
- diagnostic stroke testing of a 3 inch motor operated butterfly valve for Vogtle, Units 3 and 4
- receipt inspection of body ring castings from PRL Industries, Inc.

In addition to observing these activities, the NRC inspection team verified that measuring and test equipment (M&TE) was properly identified, marked, calibrated, and used within its calibrated range. In addition, the NRC inspection team walked down Weir's assembly floor and verified that nonconforming components were properly identified, marked, and segregated, when practical, to ensure that they were not reintroduced into the manufacturing processes.

1. 10 CFR Part 21 Program

a. Inspection Scope

The NRC inspection team reviewed Weir's policies and implementing procedures that govern its 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 postings under 10 CFR Part 21 and a sample of Weir's purchase orders (PO) for compliance with the requirements in 10 CFR 21.6, "Posting Requirements"; 10 CFR 21.21, "Notification of Failure To Comply or Existence of a Defect and

Its Evaluation”; and 10 CFR 21.31, “Procurement Documents.” Furthermore, the NRC inspection team discussed the 10 CFR Part 21 program with Weir’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 10 CFR Part 21 Policies and Procedures

Weir’s procedure CP-E-20, “Reporting of Defects and Noncompliance under 10 CFR Part 21,” Revision 3, dated August 1, 2012, establishes the requirements for compliance with the regulatory requirements in 10 CFR Part 21. The NRC inspection team verified that the procedure defines the process for reporting defects; the posting requirements; the responsibilities, timelines, actions for identifying and evaluating deviations and failures to comply; and the records retention requirements. The NRC inspection team also verified that the processes to control nonconformances and corrective actions directly connect to the requirements in 10 CFR Part 21.

In addition, the NRC inspection team also reviewed a sample Weir POs and verified that each procurement document specified, when applicable, that the vendor must report defects and noncompliances in accordance with 10 CFR Part 21.

b.2 10 CFR Part 21 Evaluations

For a sample of five evaluations under 10 CFR Part 21, the NRC inspection team verified that Weir had effectively implemented the requirements for evaluating deviations and failures to comply. In addition, the NRC inspection team reviewed a sample of corrective action reports (CAR) and nonconformance reports (NCR) to verify that Weir had appropriately determined that an evaluation of the reported issues was not necessary in accordance with 10 CFR Part 21.

b.3 10 CFR Part 21 Postings

The NRC inspection team verified the content of Weir’s postings under 10 CFR Part 21 and the location of each posting. The NRC inspection team verified that Weir included the information required by 10 CFR 21.6 on the postings distributed throughout the Ipswich, MA, complex. The NRC inspection team walked down each of the locations and also verified that Weir posted the required documents in conspicuous locations in accordance with 10 CFR 21.6(2).

c. Conclusion

The NRC inspection team concluded that Weir is implementing its 10 CFR Part 21 program in accordance with the regulatory requirements in 10 CFR Part 21. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the 10 CFR Part 21 program. No findings of significance were identified.

2. Design Control

a. Inspection Scope

The NRC inspection team reviewed Weir's policies and implementing procedures that govern the design control program to verify compliance with the regulatory requirements in Criterion III, "Design Control," 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," and the requirements in Subsection NCA, "General Requirements for Division 1 and Division 2"; Subsection NC, "Class 2 Components"; and Subsection ND, "Class 3 Components," of Section III, "Rules for Construction of Nuclear Facility Components," of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, 1998 Edition, 2000 Addenda. The NRC inspection team also reviewed a sample of assembly drawings, part drawings, bills of materials, applicant reports, design reports, engineering change notices (ECNs), and associated WEC POs.

In addition, the NRC inspection team reviewed Weir's program for the dedication of commercial-grade items for use in safety-related applications to verify compliance with the applicable regulatory requirements. The NRC inspection team reviewed several dedication packages, including dedication plans, the criteria for the selection of critical characteristics, the basis for the sampling plan selection, and the selection of verification methods to verify effective implementation of Weir's dedication process for commercial-grade items. Furthermore, the NRC inspection team also discussed the dedication program with Weir'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 Implementation of Weir's Design Control Process

Revision 7 to Weir's Quality Assurance Manual (QAM) describes Weir's design control process in accordance with the applicable regulatory and ASME B&PV Code requirements. The NRC inspection team confirmed that Weir's design control process provides controls for design inputs, outputs, analyses, records, reports, and interface between WEC and Weir.

Weir's design control process includes the development of the certified design specifications, design reports, and design review reports. In addition, Weir's engineering organization prepares assembly drawings, detailed drawings, and associated bills of materials. ECNs control engineering changes.

The NRC inspection team verified that the WEC AP1000 procurement specifications were properly translated into Weir's bills of materials, drawings, specifications, procedures, analyses, calculations, reports, and instructions and that engineering data supported this information. The NRC inspection team verified material specifications, applicable ASME B&PV Code construction requirements, qualification reports, test requirements, and test reports. All documents reviewed contained the appropriate technical details and met the WEC AP1000 procurement specifications.

Specifically, the NRC inspection team performed a detailed review of two valves designed and manufactured in accordance with the requirements in Section III of the ASME B&PV Code. The valves reviewed were PV11-Z0D-121 (ASME Section III, Class 2, 6-inch Class 150 Tricentric

Butterfly Valve with Limitorque Operator) and PV14-Z0D-190 (ASME Section III, Class 1, Class 1850 Stop Check with Air Operator). The NRC inspection team reviewed Weir's bill of materials and assembly drawings, compared them to the applicable WEC design specifications and valve data sheets, and confirmed that the design requirements were adequately translated into the vendor's documents. The NRC inspection team also reviewed Weir's assembly drawings against its procedure CP-E-04, "Guide for Classification of Valve Parts," Revision 3, dated September 22, 2011, and verified that the drawings and the bill of materials for the valves had the proper pressure retaining and safety-related classification.

In addition, the NRC inspection team reviewed ECN 24236 for PV11-Z0D-132. The ECN was associated with a torque value for the valve seating. The NRC inspection team verified that the design change request received a level of review commensurate with that applied to the original design by a qualified design engineer. The review included an analysis of the acceptability of the change request in regard to the associated requirements in the ASME B&PV Code and Appendix B to 10 CFR Part 50. The NRC inspection team verified that Weir's design change process was implemented into the vendor's affected documentation. Specifically, the Weir design engineer identified the applicable procedures, analyses, reports, drawings, and components affected by the design change request and verified that the revised design documentation continued to meet the necessary requirements.

Weir's nonconformance process captures any deficiencies identified during the design and fabrication process. A material review board determines the disposition of nonconformances. For a sample of NCRs, the NRC inspection team verified that engineering provides technical justification for "use as is" or for weld repair dispositions through a repair manufacturing order.

The NRC inspection team confirmed that (1) design documents specified and included the appropriate technical and quality requirements, (2) WEC and Weir coordinated sufficiently on the design of the AP1000 components, (3) Weir integrated independent verifications and checks into the process and performed these activities, and (4) Weir effectively controlled and implemented design changes.

b.2 Commercial Grade Item Dedication Policies and Procedures

Weir's procedure CP-E-04 identifies the safety classification of typical valve parts and the engineering rationale behind the classifications.

Weir's procedure CP-E-18, "Control of Commercial-Grade Items To Be Dedicated for Use in Nuclear Safety-Related Applications," Revision 6, dated August 29, 2012, describes the methods used to determine the classification of parts for valve assemblies and to determine and verify critical characteristics of commercial-grade items and services intended for safety-related applications. CP-E-18 requires the design engineer to perform a technical evaluation to determine the safety-related functions of the item and to determine the critical characteristics that will ensure that each safety-related function is maintained. CP-E-18 is based on Electric Power Research Institute (EPRI) guideline NP-5652, "Guideline for the Utilization of Commercial-Grade Items in Nuclear Safety-Related Applications (NCIG-07)," issued June 1988. NP-5652 provides a generic procedure for the acceptance of commercial-grade items through the following four acceptance methods: (1) special tests and inspections, (2) surveys of vendors that supply commercial-grade components, (3) source verification, and (4) the recording of acceptable supplier/item performance.

For each item or service dedicated by Weir, an engineer prepares a technical evaluation form that identifies the item or service's safety function, performance requirements, functional classification, and applicable service conditions. The technical evaluation also includes the critical characteristics and dedication methods and determines whether the item or service has been provided before. The engineer then prepares a dedication page that lists the critical characteristics, the required value, acceptance criteria, dedication method, and sampling plan.

During the review of CP-E-18, the NRC inspection team noted some inconsistencies with the regulations. Weir supplies components to nuclear power plants licensed under 10 CFR Part 50 and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." The regulations at 10 CFR Part 21 define a commercial-grade item, applied to nuclear power plant licensees, as a structure, system, or component, or part thereof that affects its safety function, that was not designed and manufactured as a basic component. Commercial-grade items do not include items for which the design and manufacturing process requires in-process inspections and verifications to ensure that defects or failures to comply are identified and corrected (i.e., verification of one or more critical characteristics of the item cannot be done). The regulations at 10 CFR Part 21 define a critical characteristic as the important design, material, and performance characteristics of a commercial-grade item that, once verified, will provide reasonable assurance that the item will perform its intended safety function. In addition, 10 CFR Part 21 defines dedication, in part, as an acceptance process undertaken to provide reasonable assurance that a commercial-grade item that will be used as a basic component will perform its intended safety function and is therefore deemed equivalent to an item designed and manufactured under a QA program in accordance with Appendix B to 10 CFR Part 50. The licensee can achieve this assurance by identifying the critical characteristics of the item and by verifying their acceptability.

The NRC inspection team noted that CP-E-18 contains the definition for a commercial-grade item that applies to licensees other than nuclear power plant licensees. Therefore, Weir did not identify that commercial-grade items do not include items for which verification of one or more critical characteristics of the items cannot be done and allows the design engineer to provide a technical justification for explaining why not verifying a critical characteristic is acceptable if it cannot be monitored. In addition, Weir's definitions for critical characteristic and dedication do not provide a connection to the item's safety function.

Furthermore, CP-E-18 is based on EPRI NP-5652. This document provides a generic procedure for acceptance of commercial-grade items by four acceptance methods: (1) special tests and inspections, (2) surveys of vendors that supply commercial-grade components, (3) source verification, and (4) the recording of acceptable supplier/item performance. The NRC conditionally endorsed this approach in Generic Letter 89-02, "Actions To Improve the Detection of Counterfeit and Fraudulently Marketed Products," dated March 21, 1989, but it prohibits the use of commercial-grade surveys and supplier performance as the sole basis for acceptance. CP-E-18 allows the use of commercial-grade surveys as the sole basis for acceptance. The NRC inspection team identified the issues with CP-E-18 as an example of Nonconformance 99900746/2013-201-02 for Weir's failure to prescribe activities that affect quality in appropriate procedures. Weir initiated CAR No. 13-41 to address this issue.

b.3 Implementation of Weir's Commercial-Grade Item Dedication Program

The NRC inspection team observed dedication activities and reviewed completed dedication packages to verify that Weir properly developed and implemented a plan for the dedication of commercial-grade items. For safety-related valves manufactured by Weir for the WEC AP1000

reactor design and for the current fleet of operating nuclear power plants, the NRC inspection team reviewed a sample of dedication packages to verify that Weir appropriately identified basic components and their critical characteristics. Specifically, the NRC inspection team selected a sample of valve subcomponents (e.g., maximum torque actuators, packing rings, spiral gaskets, O-rings, wiper rings, and seat rings) that Weir procured as commercial-grade items and dedicated for use in safety-related applications. The NRC inspection team reviewed the dedication packages, associated drawings, and inspection reports to confirm that the critical characteristics and verification methods were correctly specified on the dedication documentation, that the drawings and material specifications that contain the associated acceptance criteria for each critical characteristic were referenced, and that the inspection reports adequately documented the acceptance of the critical characteristics.

During the review of the dedication package for seat rings for a gate valve for Browns Ferry Nuclear Plant, the NRC inspection team verified that the technical evaluation and associated dedication documents identified the design, material, and performance characteristics relevant to the safety function and that it demonstrated that the critical characteristics are met through the use of appropriate acceptance methods. However, the NRC inspection team identified that the dedication documents identified traceability and a certificate of conformance as critical characteristics and listed the conduct of special tests and inspections as the verification method used for these critical characteristics. Although documentation that attests to traceability and a certificate of conformance could be verified by special tests and inspections, the conduct of special tests and inspections is not a suitable method to verify that the supplier has controls for traceability and for the creation of a certificate of conformance. These controls would have to be verified through the performance of a commercial-grade survey or source verification, not through special tests and inspections. The NRC inspection team identified this issue as an example of Nonconformance 99900746/2013-201-01 for Weir's failure to establish adequate measures for the selection and review for suitability of application of equipment. Weir initiated CAR No. 13-43 to address this issue.

During the review of the dedication package for a packing ring and a gasket spiral for a check valve for Browns Ferry Nuclear Plant, the NRC inspection team verified that the technical evaluations and associated dedication documents identified the design, material, and performance characteristics relevant to the safety function and that they demonstrated that the critical characteristics are met through the use of appropriate acceptance methods. The sampling methodology in CP-E-18 is based on EPRI Technical Report (TR) 017218, "Guideline for Sampling in the Commercial-Grade Item Acceptance Process," Revision 1, issued January 1999. The sample and lot sizes listed in the dedication documents for destructive and nondestructive testing of the packing ring and gasket spiral correlate to sampling plans in EPRI TR 017218 that assume that line item or single product manufacturer traceability exists and that the lot has sufficient homogeneity that a randomly selected sample will represent the whole. The NRC inspection team noted that Weir did not perform an adequate engineering evaluation to document the sample population identified for the control of critical characteristics and that it did not conduct commercial-grade survey to verify that the supplier had lot and batch control to ensure traceability of material. The NRC inspection team identified this issue as another example of Nonconformance 99900746/2013-201-01 for Weir's failure to establish adequate measures for the selection and review for suitability of application of equipment. Weir initiated CAR No. 13-42 to address this issue.

During the review of the dedication documents for the same packing ring and gasket spiral described above, the NRC inspection team noted that Weir listed one of the critical characteristics as graphite and listed the acceptance method as material verification. The NRC

inspection team also noted that the acceptance criteria was listed only as “graphite” and did not include any range of acceptance or allowable impurities. The associated test report identifies that the material is 95% graphite. When the NRC inspection team asked Weir to provide a technical justification as to whether 95% graphite was an acceptable composition, it was not able to provide the technical justification. In addition, Weir neither specified the type of material verification that would be performed nor identified whether it should be a quantitative or qualitative test.

Similarly, during the review of the dedication documents for an actuator for the AP1000 FH06 fuel-handling valve, the NRC inspection team noted that Weir listed the critical characteristic as “cover material” and “case material” and listed the acceptance criteria as “per drawing,” which only stated “316SS.” The acceptance method is listed as material verification. The acceptance criteria do not identify whether the material has to be a 316-type stainless steel (e.g., 316, 316L, 316Ti, and 316H) or a specific type of 316 stainless steel that must meet the chemical composition requirements in a specification. In addition, Weir neither specified the type of material verification that would be performed nor identified whether it should be a quantitative or qualitative test. The NRC inspection team identified this issue as another example of Nonconformance 99900746/2013-201-01 for Weir’s failure to establish adequate measures for the selection and review for suitability of application of equipment. Weir initiated CAR No. 13-43 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99900746/2013-201-01 in association with Weir’s failure to implement the regulatory requirements in Criterion III of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-01 cites Weir for failing to establish adequate measures for the selection and review for suitability of application of equipment that is essential to the safety-related functions of certain structures, systems, and components. Specifically, Weir (1) did not adequately identify the acceptance methods (i.e., commercial-grade survey) to appropriately verify two of the critical characteristics (e.g., traceability and certificates of conformance) for the seat rings of a 20 inch gate valve, (2) did not perform an adequate engineering evaluation to document the sample population identified for the control of critical characteristics for a packing ring and a gasket spiral of a check valve and did not conduct a commercial-grade survey to verify that the supplier had lot and batch control to ensure traceability of material, and (3) did not identify the appropriate critical characteristics (e.g., material composition) and the associated acceptance methods for a packing ring and a gasket spiral of a check valve and an actuator of a fuel-handling valve.

The NRC inspection team issued Nonconformance 9990746/2013-201-01 for Weir’s failure to implement the regulatory requirements in Criterion V, “Instructions, Procedures, and Drawings,” of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-02 cites Weir for failing to prescribe activities that affect quality in appropriate procedures. Specifically, Weir did not provide adequate procedural guidance in CP-E-18 for the dedication of commercial-grade items.

3. Oversight of Contracted Activities

a. Inspection Scope

The NRC inspection team reviewed Weir’s policies and implementing procedures that govern the oversight of contracted activities to verify compliance with the requirements of Criterion IV,

“Procurement Document Control,” Criterion VII, “Control of Purchased Material, Equipment, and Services,” and Criterion XVIII, “Audits,” of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of POs, and external and internal audits to evaluate Weir’s compliance with its program and technical requirements. In addition, the NRC inspection team reviewed the disposition of corrective actions to resolve deficiencies that audit findings identified for adequacy and timeliness. Furthermore, the NRC inspection team discussed the oversight of contracted activities with Weir’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

The NRC inspection team reviewed a sample of POs that Weir issued in support of the WEC AP1000 design to determine whether the requirements identified in the procedures were imposed on the applicable purchasing documents. The NRC inspection team found that the POs adequately documented the procurement requirements as established by Weir’s governing policies and implementing procedures, which include (1) imposition of appropriate quality, technical, and regulatory requirements and (2) identification of the applicable codes and standards. The NRC inspection team also found that these POs adequately defined contract deliverables, instructions for the disposition of nonconformances, access rights, and provisions for the extension of contractual requirements to subcontractors. The NRC inspection team also verified that when changes to approved procurement documents were necessary, Weir applied the same level of review and approval to these documents as it did to the original documents. In addition, the NRC inspection team confirmed that all the safety-related POs reviewed included clauses that invoke the provisions of 10 CFR Part 21 and that require the vendor or supplier to conduct safety-related work under its approved QA program.

b.2 Maintenance of the Approved Suppliers List

The NRC inspection team reviewed the approved suppliers list (ASL) to ensure that qualified and approved suppliers were listed; that the lists were maintained, distributed, and periodically updated by authorized personnel; and that any revisions to the lists were implemented following the applicable procedures. The NRC inspection team confirmed that the suppliers performing work for Weir were appropriately listed on the ASL. In addition, the NRC inspection team confirmed that the scope of supply was documented and consistent for the activities contracted.

b.3 External and Internal Audits

The NRC inspection team reviewed a sample of external and internal audits to verify the implementation of Weir’s audit program. The NRC inspection team verified that Weir had prepared and approved plans that identify the audit scope, focus, and applicable checklist criteria before the initiation of the audit activity. 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 and 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 Weir had reviewed and approved the corrective action and verified its satisfactory completion and proper documentation.

Weir is a member of the Nuclear Industry Assessment Committee (NIAC), which consists of companies that supply goods and services to the nuclear industry based on a quality program that meets the requirements in Appendix B to 10 CFR Part 50 and that accept 10 CFR Part 21. NIAC develops and maintains procedures and processes necessary to plan, guide, and share supplier evaluations (audits) with its members. Weir uses NIAC audits to support the qualification and maintenance of suppliers. Once an NIAC audit is received, Weir's QA Director reviews the audit for completeness and adequacy, evaluates the audit report in accordance with Weir's QA program and the appropriateness of the scope, and approves the audit report as the basis for including the vendor on the ASL.

Weir's audit program includes the performance of annual assessments of the vendor's suppliers to ensure that they are effectively implementing their approved QA programs. During the review of a sample of annual performance assessments, the NRC inspection team noted that Weir had not performed annual assessments of suppliers that hold certificates of authorization from the ASME Accreditation Program.

WEC design specifications APP-PV11-Z0-001, "Butterfly Valves, ASME Boiler and Pressure Vessel Code Section III, Class 2 and 3," Revision 7, dated May 25, 2012, and APP-PV14-Z0-001, "Air-Operated Globe and Stop Check Valves, ASME Boiler and Pressure Vessel Code, Section III, Class 1, 2, and 3," Revision 5, dated May 25, 2012, define Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)," Revision 3, issued August 1985, as a quality requirement with which Weir must comply during the fabrication of the butterfly and air-operated valves for the AP1000 reactor design.

Regulatory Guide 1.28 states that "the applicant or licensee should perform or arrange for annual evaluations of suppliers. This evaluation should be documented and should take into account, where applicable, (1) review of supplier-furnished documents and records, such as certificates of conformance, nonconformance notices, and corrective actions, (2) results of previous source verifications, audits, and receiving inspections, (3) operating experience of identical or similar products furnished by the same supplier, and (4) results of audits from other sources, e.g., customer, ASME, or NRC audits."

Furthermore, as described in Information Notice 86-21, "Recognition of American Society of Mechanical Engineers Accreditation Program for N Stamp Holders," dated March 31, 1986 (and its supplements), the NRC recognized the ASME Accreditation Program and associated certificates of authorization as evidence that the holder of the certificate of authorization has a documented QA program that meets the requirements in Appendix B to 10 CFR Part 50. However, recognition of the ASME Accreditation Program applies only to the programmatic aspects of the QA programs. Licensees, construction permit holders, and their subcontractors are still responsible for ensuring that the supplier is effectively implementing its approved QA program. The NRC inspection team identified this issue as an example of Nonconformance 99900746/2013-201-03 for Weir's failure to adequately control its suppliers. Weir initiated CAR No. 13-47 to address this issue.

b.4 Qualification and Training of Auditors and Lead Auditors

The NRC inspection team reviewed a sample of the training and qualification records of Weir's lead auditors and auditors and confirmed that auditing personnel had completed all required training and had maintained qualification and certification in accordance with Weir's policies and procedures. The NRC inspection team also verified that audit teams that Weir selected were sufficiently qualified to evaluate areas within the scope of the audit.

c. Conclusion

The NRC inspection team concluded that Weir is implementing its oversight of contracted activities consistent with the regulatory requirements in Criterion IV and Criterion XVIII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with its procurement document control and audits program. No findings of significance were identified.

The NRC inspection team issued Nonconformance 99900746/2013-201-03 for Weir's failure to implement the regulatory requirements in Criterion VII of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-03 cites Weir for failing to adequately control its suppliers. Specifically, Weir failed to perform annual evaluations of suppliers' holding certificates of authorization from the ASME Accreditation Program.

4. Control of Special Processes

a. Inspection Scope

The NRC inspection team reviewed Weir's policies and implementing procedures that govern the control of special processes to verify compliance with the regulatory requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50, Section III, Section V, "Nondestructive Examination," and Section IX, "Welding and Brazing Qualification," of the ASME B&PV Code, 1998 Edition, 2000 Addenda. The NRC inspection team also observed liquid penetrant testing on valve components and reviewed a sample of weld travelers and nondestructive test reports. In addition, the NRC inspection team discussed the control of special processes program with Weir'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 Welding Process

At the time of the inspection, Weir did not perform any welding activities. Therefore, the NRC inspection team proceeded to review a sample of welding records associated with welding performed during the fabrication of the butterfly valves for the WEC AP1000 reactor design. Specifically, the NRC inspection team verified that Welding Procedure Specification (WPS) 90-64-176, "Gas Tungsten Arc Welding of Stainless Steel Material to Carbon Steel," Revision 5, dated April 26, 2011, and its accompanying Procedure Qualification Record (PQR) PQ-99-012, Revision 0, dated August 27, 1999, and WPS 504-54536, "Plasma Arc Hardfacing Alloy [No.] 6 on Stainless Steel," Revision 1, dated August 10, 2012, and its accompanying PQR PQ-99-08A, Revision 1, dated August 10, 2012, were prepared in accordance with the requirements in Section IX of the ASME B&PV Code, 1998 Edition, 2000 Addenda, and the applicable Weir policies and procedures.

In addition, the NRC inspection team verified that, for a sample of welding records associated with a 10-inch butterfly valve (APP-PV11-Z0D-124) and a 16 inch butterfly valve (APP-PV11-Z0D-133) for the AP1000 reactor design, the information contained in these records (e.g., the procedures used and the type of weld filler material) met the requirements in Subsection NC of Section III of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

The NRC inspection team determined that qualified welders perform welding on ASME B&PV Code materials and fabrication of ASME B&PV Code items in accordance with approved WPS. The NRC inspection team also confirmed that, for a sample of certified material test reports, the reports complied with the chemical composition and mechanical properties, as required by Subsection NC of Section III of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

b.2 Control of Weld Material

The NRC inspection team walked down the welding material storage and welding material issue areas and verified that welding material was adequately controlled and that covered weld electrodes were stored in hermetically sealed containers and were kept in ovens held at specified temperatures to control moisture, as applicable, in accordance with Section IX of the ASME B&PV Code.

b.3 Nondestructive Examination

The NRC inspection team observed a liquid penetrant examination on the hardfaced portion of a disk of a check valve for Susquehanna, Unit 2. The NRC inspection team confirmed that Weir performed the liquid penetrant testing using qualified procedures, certified nondestructive examination (NDE) inspectors, approved NDE materials, and calibrated M&TE.

The NRC inspection team verified that, for a sample of NDE procedures and liquid penetrant test reports for valve data records APP-PV11-Z0D-120, APP-PV11-Z0D-124, and APP-PV11-Z0D-133, the procedures and reports were in compliance with the requirements in Subsection NC of Section III of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

During the review of Weir's procedure CP-Q-38, "Performing Visual Inspection of Materials and Items," Revision 0, dated October 8, 2003, the NRC inspection team noted that the procedure does not include visual examination or acceptance criteria for fillet welds. Weir's valve design specifies a fillet weld for joining the seat ring to the valve body for butterfly valves. Subsection NC-4427, "Shape and Size of Fillet Welds," of Section III of the ASME B&PV Code, 1998 Edition, 2000 Addenda, describes the requirements for the shape and size of fillet welds. Specifically, Subsection NC-4427 states, in part, that "a fillet weld in a single continuous weld may be less than the specified fillet weld dimension by not more than 1/16 in., provided that the total undersize portion of the weld does not exceed 10% of the length of the weld. Individual undersize weld portions shall not exceed 2 in. in length." During discussions with Weir staff, the NRC inspection team found that Weir had not been performing visual inspections of the fillet welds to verify that these welds met the requirements in Subsection NC-4427. The NRC inspection team identified this issue as an example of Nonconformance 99900746/2013-201-04 for Weir's failure to control special processes in accordance with applicable codes. Weir initiated CAR No. 13-46 to address this issue.

b.4 Qualification and Training of Welding Personnel

The NRC inspection team reviewed a sample of training and qualification records for welding personnel and confirmed that they had met all the required training and had maintained qualification and certification in accordance with Weir's policies and procedures and that the welding personnel were qualified in accordance with the applicable requirements in Sections III and IX of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

b.5 Qualification and Training of Nondestructive Testing Personnel

The NRC inspection team selected a sample of training and qualification records for Weir's Level I and Level II NDE personnel. The NRC inspection team confirmed that Weir's personnel were trained and qualified in accordance with American Society for Nondestructive Testing SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing," 1992 Edition, and the applicable requirements of Subsection NB-5520, "Personnel Qualification, Certification, and Verification," of Section III of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

c. Conclusion

The NRC inspection team issued Nonconformance 99900746/2013-201-0X for Weir's failure to implement the regulatory requirements in Criterion IX of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-04 cites Weir for failing to ensure that nondestructive testing was controlled and accomplished in accordance with applicable codes. Specifically, Weir failed to perform visual inspections of the fillet welds to verify that they met the requirements in Subsection NC-4427 of Section III of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

5. Inspection

a. Inspection Scope

The NRC inspection team reviewed Weir's policies and implementing procedures that govern the inspection program to verify compliance with the requirements in Criterion X, "Inspection," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of receipt and final inspection records and observed receipt inspection of a body ring casting. In addition, the NRC inspection team discussed the inspection program with Weir'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 Implementation of Weir's Inspection Process

Weir's procedure CP-Q-33, "Receiving and Receiving Inspection," Revision 1, dated January 14, 2013, describes the process for the performance of receipt inspection activities at Weir, including routing and the review of travelers, POs, drawings, specifications, inspections, and documentation. The procedure also contains provisions for generating an NCR when materials do not conform to the inspection requirements.

The NRC inspection team observed the receipt of the inspection of three body ring castings from PRL Industries, Inc. The NRC inspection team observed the Weir inspector review documentation, confirm the PO information, conduct a review for any obvious damage, verify the quantity received, verify dimensional aspects of the castings, and compare measurements to the drawing.

CP-Q-19, "Final Inspection of Parts and Valve Assemblies," Revision 4, dated June 11, 2012, describes the conduct and documentation of the final inspection of valve parts and valve assemblies. The NRC inspection team observed in-process inspection activities and documentation for a swing check valve disc destined for Susquehanna Steam Electric Station.

The NRC inspection team observed the Weir inspector using various M&TE during the inspections and confirmed that the inspector was knowledgeable about the proper use and configuration of each instrument. The NRC inspection team verified that the Weir inspector compared the finished product to the production documentation, which listed the required dimensional checks. The Weir inspector identified that one of the dimensions was out of specification and generated an NCR.

The NRC inspection team also reviewed receipt inspection documentation for six machined valve bodies and seats and verified that the inspection record sheets were completed in accordance with the procedures.

b.2 Qualification and Training of Inspection Personnel

The NRC inspection team verified that Weir had established and implemented a training and qualification program for the training and qualification of inspection personnel. Weir's procedures CP-Q-44, "Indoctrination and Training of Inspection Personnel," Revision 2, dated February 25, 2009, and CP-Q-45, "Training and Qualification of Inspection Personnel," Revision 3, dated March 3, 2009, contain the requirements for selection, training, qualification, and administration of inspection personnel.

The NRC inspection team reviewed sample training and qualification records for inspection personnel and confirmed that the qualification records of the inspection and test personnel were complete and current and were in accordance with Weir's procedural requirements.

c. Conclusion

The NRC inspection team concluded that Weir is implementing its inspection program in accordance with the regulatory requirements in Criterion X of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the inspection program. No findings of significance were identified.

6. Test Control

a. Inspection Scope

The NRC inspection team reviewed Weir's policies and implementing procedures that govern the test control program to verify compliance with the requirements in Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. In addition, the NRC inspection team discussed the test control program with Flowserve's management and technical staff. The NRC inspection team also reviewed a sample of test plans and test procedures and observed a sample of testing activities. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

b.1 Test Plan and Procedures

Weir's procedure CP-Q-06, "Test Control," Revision 7, dated July 25, 2012, describes the controls for testing and for the preparation of test records that are used as evidence of conformance for the finished product to the specified requirements.

The NRC inspection team evaluated the following Weir test procedures:

- Test Procedure 321-54536, "Manual Valves," Revision 6, dated October 23, 2012
- Test Procedure 322-54536, "Air-Operated Valves," Revision 6, dated June 8, 2012
- Test Procedure 323-54536, "Motor-Operated Valves," Revision 6, dated September 6, 2012

The NRC inspection team verified that Weir's test procedures adequately included the technical, quality, and regulatory requirements identified in the associated customer POs and technical specifications. The NRC inspection team also verified that Weir's test procedures provided an adequate description of the test responsibilities, objectives, sequences, instructions, parameters, M&TE usage, acceptance criteria, and posttest activities and that they also met the requirements in CP-Q-06 and Subsections NC and ND of the ASME B&PV Code, 1998 Edition, 2000 Addenda.

b.2 Test Program Implementation

The NRC inspection team observed and interviewed Weir's test personnel during the performance of shell, packing, closure, and seat leakage hydrostatic testing and pneumatic seat leakage testing for a 6 inch motor-operated Tricentric butterfly valve for Vogtle, Units 3 and 4. The NRC inspection team noted that all tests were manually controlled and that the test technician manually recorded and interpreted results at the time of the test in accordance with the test procedures. The NRC inspection team also observed the performance of diagnostic testing for a 3 inch motor-operated Tricentric butterfly valve for Vogtle, Units 3 and 4.

The NRC inspection team verified that the test instrumentation used in the performance of these tests were within its allowed calibration period and range. The NRC inspection team confirmed that the test personnel performing the tests were knowledgeable about the testing procedures and that they adequately implemented Weir's testing control requirements. In addition, the NRC inspection team verified that the test technician qualification documentation met Weir's requirements for the observed testing. The NRC inspection team compared the observed testing activities and the final test records to the associated test procedures to confirm that they were performed correctly and that the test results were adequately evaluated.

Test Procedure 323-54536, which governs the observed motor-operated valve test, contains quality requirements for the test medium (i.e., water) that is necessary to meet the purchase specification. The quality requirements included acceptable ranges for chloride ion, fluoride, conductive, and pH. While observing the valve testing, the NRC inspection asked the test technician and assembly/test supervisor how the water quality was controlled because it was not included on the test record. Weir stated that there was no formal procedure to control water quality testing; however, the vendor was able to provide the NRC inspection team with water quality test records. The NRC inspection team reviewed the water quality test records and noted that the test water pH and conductivity were outside the acceptable ranges and that the testing company was unable to determine the chloride and fluoride concentrations because of the rust inhibitor that Weir had added to the water. The NRC inspection team identified this issue as an example of Nonconformance 99900746/2013-201-05 for Weir's failure to verify that it had satisfied all test requirements. Weir initiated CAR No. 13-52 to address this issue.

b.3 Test Results and Data Evaluation

The NRC inspection team reviewed a sample of test records for the shell, packing, closure, and seat leakage hydrostatic testing; pneumatic seat leakage testing; and diagnostic testing for the following valves:

- 6 inch motor-operated Tricentric butterfly valve 1-55023-G
- 28 inch motor-operated Tricentric IC butterfly valve 2-55023-S
- 8 inch air-operated Tricentric butterfly valve 3-54536-P
- 8 inch air-operated Tricentric butterfly valve 2-54537-P

The NRC inspection team confirmed that the format and content of the test documentation was representative of other completed test reports and that a qualified test technician appropriately recorded and evaluated required test data in accordance with the PO, CP-Q-06, and the test procedure requirements.

During the review of a sample of test records, the NRC inspection team noted that the test reports were only signed by the test technician and, if required, by the authorized nuclear inspector (ANI). Section 11, "Test Control," of Weir's QAM, states, in part, that "the QA Engineer signs and dates the Test Report to indicate [that] the pressure gauge has been recalibrated after the test. The QA Engineer monitors test performance to verify compliance with requirements. The QA Engineer and ANI sign and date in the remarks portion of the Test Report for those tests which they witness." During discussions with Weir staff, the NRC inspection team found that a QA engineer was not present during the conduct of the observed tests and that only the test technician and ANI, if present, signed the test reports. Therefore, a Weir QA engineer did not sign the reviewed test reports. The NRC inspection team identified this issue as another example of Nonconformance 99900746/2013-201-02 for Weir's failure to accomplish activities that affect quality in accordance with the procedures. Weir initiated CAR No. 13-52 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99900746/2013-201-0X for Weir's failure to implement the regulatory requirements in Criterion XI of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-0X cites Weir for failing to verify that it had satisfies all test requirements. Specifically, Weir failed to verify that the water quality for the test fluid met the specification requirements for chloride, fluoride, conductivity, and pH in accordance with Test Procedure 323-54536.

The NRC inspection team issued Nonconformance 9990746/2013-201-01 for Weir's failure to implement the regulatory requirements in Criterion V of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-02 cites Weir for failing to accomplish activities that affect quality in accordance with the procedures. Specifically, Weir's QA engineers did not review and sign the test reports as required by the QAM.

7. Control of Measuring and Test Equipment

a. Inspection Scope

The NRC inspection team reviewed Weir's policies and implementing procedures that govern the M&TE program to verify compliance with the requirements in Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. The NRC inspection team also reviewed a sample of calibration records for various M&TE and observed the calibration of pressure gauges. In addition, the NRC inspection team discussed the M&TE program with Weir's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team verified that the M&TE requirements in Weir's QAM and associated procedures provide a system for the control of M&TE. The M&TE program ensures that devices used in activities that affect quality are of the proper range, type, and accuracy to verify conformance with the established requirements.

The NRC inspection team also performed a visual sample inspection of several M&TE devices. The NRC inspection team found that the sampled M&TE had the appropriate calibration stickers and current calibration dates, including the calibration due date. In addition, the calibration records reviewed by the NRC inspection team indicated the as-found or as-left conditions, accuracy required, calibration results, calibration dates, and the due date for recalibration. The NRC inspection team also verified that the selected M&TE was calibrated using procedures traceable to known industry standards.

The NRC inspection team observed the calibration of pressure gauges that will be used for hydrostatic testing in accordance with CP-M-22, "Instruction for Calibration of Pressure Gauges with Dead Weight Tester," Revision 1, March 22, 2007. Weir calibrated the pressure gauges with a deadweight tester, which is an oil-filled machine that uses a piston cylinder and a set of traceable weights to determine the accuracy of the gauge's pressure reading. For a 100 psi gauge, the NRC inspection team observed the quality technician add weights to the piston to observe equilibrium. The NRC inspection team noted that the quality technician added the number of weights indicated by a printed spreadsheet matrix at the workstation—one 60 psi weight, three 10 psi weights, one 5 psi weight, and three 1 psi weights totaling 98 psi. CP-M-22 states that "the pressure measured is the sum of the weights plus the Piston Weight Carrier." The NRC inspection team examined the deadweight tester and noted that the piston weight carrier was 3 psi, which would cause the pressure measured to equal 101 psi, not 100 psi. The NRC inspection team noted that the spreadsheet matrix was used for pressure gauges as low as 10 psi, which could lead to a 10% error. The NRC inspection team identified this issue as another example of Nonconformance 99900746/2013-201-02 for Weir's failure to accomplish activities that affect quality in accordance with the procedures. At the time of the inspection, Weir had not written a CAR to address this issue.

During the review of a sample of calibration records, the NRC inspection team noted that the calibration record for outside micrometer 1M36 indicated that it was out of calibration when the calibration vendor received it. The NRC inspection team proceeded to ask Weir whether it had generated an NCR, as required by Step 10.2.3 of QC-C-1, "Control of Measuring and Test Equipment," Revision 32, dated August 7, 2012. QC-C-1 states, "When M&TE are found to be nonconforming or defective, the Quality Technician generates an NCR for the piece of

equipment, describing the nonconformance or nature of the defect. The NCR is forwarded to the Director, Quality Assurance, who shall review the M&TE logbook to identify items that [have] been accepted using this equipment since the last valid calibration date.” During further discussions with the Weir staff, the NRC inspection team found that Weir had not generated an NCR for the out-of-tolerance condition. The NRC inspection team also noted that blade-depth micrometer 1M23 and inside micrometer 1M32 were both missing a rod at the time of calibration. Such a condition would warrant an evaluation. The NRC inspection team identified this issue as another example of Nonconformance 99900746/2013-201-02 for Weir’s failure to accomplish activities that affect quality in accordance with the procedures. Weir initiated CAR No. 13-48 to address this issue.

c. Conclusion

The NRC inspection team concluded that Weir is implementing its M&TE program in accordance with the regulatory requirements in Criterion XII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the M&TE program. No findings of significance were identified.

The NRC inspection team issued Nonconformance 99900746/2013-201-02 for Weir’s failure to implement the regulatory requirements in Criterion XII of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-02 cites Weir for failing to accomplish activities that affect quality in accordance with the procedures. Specifically, Weir did not calibrate pressure gauges in accordance with CP-M-22 and did not evaluate the use of out-of-calibration M&TE in accordance with Step 10.2.3 of QC-C-1.

8. Nonconforming Materials, Parts, or Components

a. Inspection Scope

The NRC inspection team reviewed Weir’s policies and implementing procedures that govern the control of nonconformances to verify compliance with the requirements in Criterion XV, “Nonconforming Materials, Parts, or Components,” of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of NCRs, attended a daily production meeting, and observed the segregation areas. In addition, the NRC inspection team discussed the nonconformance program with Weir’s management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team verified that Weir’s processes and procedures provide for the identification, documentation, segregation, evaluation, and disposition of nonconforming items. These processes also apply the principles of accepted, rework, scrap, on-hold, or “use as is” and provide for the applicable justifications that will be adequately supported and properly documented. Because Weir performs work under Section III of the ASME B&PV Code, the nonconformance authorizes the ANI to review work performed under the ASME B&PV Code. The NRC inspection team also verified that Weir’s nonconformance process provides guidance to evaluate nonconformances for reportability under Weir’s 10 CFR Part 21 program. The nonconformance process is also linked to the corrective action program.

The NRC inspection team walked down Weir's assembly floor and verified that nonconforming materials were properly identified, marked, and segregated, when practical, to ensure that they were not reintroduced into the production processes. The NRC inspection team also verified that Weir had adequate controls for segregation of in-process nonconforming materials.

The NRC inspection team verified that, for the sample nonconformances reviewed, Weir had (1) dispositioned identified nonconformances in accordance with Weir's approved procedures, (2) presented an appropriate technical justification for each disposition, (3) taken adequate action in regard to the nonconforming material or item, and (4) subjected all identified nonconformances (as appropriate) to an assessment or evaluation under 10 CFR Part 21.

c. Conclusion

The NRC inspection team concluded that Weir is implementing its nonconforming materials, parts, or components program in accordance with the regulatory requirements in Criterion XV of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that Weir is implementing its policies and procedures associated with the control of nonconforming materials, parts, or components. No findings of significance were identified.

9. Corrective Action

a. Inspection Scope

The NRC inspection team reviewed the current status of the corrective actions implemented in response to the findings from the 2008 NRC inspection at Weir. The NRC inspection team also reviewed Weir's policies and implementing procedures that govern the corrective action program to verify compliance with the requirements in Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of CARs, and discussed the corrective action program with Weir'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 Corrective Action Associated with Violation 99900746/2008-201-01

The NRC issued Violation 99900746/2008-201-01 for Weir's failure to properly evaluate a deviation associated with the Constellation Energy PO 6603289 (Weir Job No. 53797), dated August 16, 2007. Specifically, the PO required Weir to provide a "weak link analysis" as part of the technical deliverables. After the valve failed in service, the NRC determined that Weir did not include a contributing factor in the weak link analysis. However, a subsequent Weir review incorrectly determined that all contract documents had been met and that no deviation existed that required an evaluation under 10 CFR Part 21. As a result of the incorrect conclusion, Weir had not completed the evaluation under 10 CFR Part 21 and had not informed its customer, Constellation Energy, so that the end user could perform an evaluation in accordance with 10 CFR 21.21(a).

In its response to the NRC, Weir stated that it continued its evaluation and concluded that it did not have the capability to determine whether a substantial safety hazard could be created. The evaluation determined that the condition affected two customers. These affected customers were notified of the deviation in accordance with 10 CFR Part 21.21(b). Weir included this

information in its evaluations under 10 CFR Part 21 and performed a training session for the responsible parties on the violation and the associated corrective action.

The NRC inspection team reviewed the documentation that provided objective evidence for the completion of the corrective actions. The NRC inspection team determined that Weir's corrective actions were adequate to address the identified finding. Based on its review, the NRC inspection team closed Violation 99900746/2008-201-01.

b.2 Corrective Action Associated with Nonconformance 99900746/2008-201-02

The NRC issued Nonconformance 99900746/2008-201-02 for Weir's failure to identify that the certificate of compliance provided by Flowserve and accepted by Weir's staff (Job No. 53797, dated April 9, 2008) did not include the required information to verify material certification. The certificate of compliance did not contain item numbers, quantities, material identification (heat numbers), or material specification, grade class, or condition.

In its response to the NRC, Weir stated that it had issued a CAR to address the nonconformance. Weir performed a review of the 19 nuclear safety-related POs issued to Flowserve over the past 2 years to determine whether there were any additional instances for which it had submitted and accepted incomplete certificates of compliance. Two additional instances of this condition were found. Corrected certificates of compliance were obtained, reviewed, and approved. Weir performed a training session with the purchasing and QA personnel to emphasize that reviews of certificates of compliance must ensure that applicable PO requirements have been met.

The NRC inspection team reviewed the documentation that provided objective evidence for the completion of the corrective actions. The NRC inspection team determined that Weir's corrective actions were adequate to address the identified finding. Based on its review, the NRC inspection team closed Nonconformance 99900746/2008-201-02.

b.3 Implementation of Weir's Corrective Action Program

The NRC inspection team reviewed a sample of CARs and verified that each contained a detailed description of the nonconformance and a justification for the disposition, which usually included the corrective action that would be taken to prevent a recurrence, when applicable. The NRC inspection team noted that Weir's policies and implementing procedures provide the necessary guidance to adequately document, evaluate, correct, report, and verify resolution of conditions adverse to quality. The NRC inspection team also verified that the corrective action process provides a connection to Weir's 10 CFR Part 21 program and that Weir had established a management system for the overview of CARs and identification of trends for significant conditions adverse to quality.

The NRC inspection team also conducted discussions with Weir's staff to verify that all personnel are aware of the CAR process, that they recognize when and how to enter into the process, and that they understand the types of dispositions that can result from a CAR. The NRC inspection team concluded that all personnel interviewed have adequate knowledge of Weir's CAR program.

While reviewing the correctives actions taken by Weir in response to an NRC inspection in 2008, the NRC inspection team noted that the agency's response to Weir's letter dated February 17, 2009, states, in part, "As discussed with Mr. Webb of your staff on

February 3, 2009, we find that your actions to determine the scope of the Notice of Nonconformance (NON) may have been too limiting. Although our finding articulated in the NON was limited to one example, Weir certificates of compliance (CofCs) received from other suppliers may also have been inadequately verified by WVC receipt inspector. Mr. Webb committed to identifying other suppliers who provided CofCs to Weir and committed to determine whether similar discrepancies were found. Your staff also committed to process any findings within Weir's corrective action process." The NRC inspection team identified that Weir failed to enter this issue into its corrective action program. The NRC inspection team identified this issue as an example of Nonconformance 99900746/2013-201-06 for Weir's failure to ensure that conditions adverse to quality were promptly identified and corrected. Weir initiated CAR No. 13-51 to address this issue.

In response to an audit finding associated with the inadequate dedication of commercial-grade testing services procured from Kalsi Engineering, Weir issued CAR No. 12-36A; revised the dedication procedure to address commercial services, surveys, and technical evaluations; and then reviewed open orders to verify that they included sufficient dedication plans with technical evaluations. During the review of the implementation of corrective actions associated with CAR No. 12-36A, the NRC inspection team noted that Weir did not perform an extent of condition to evaluate the effect of improperly dedicated commercial testing services for items that had already been shipped. The NRC inspection team identified this issue as another example of Nonconformance 99900746/2013-201-06 for Weir's failure to ensure that conditions adverse to quality were promptly identified and corrected. Weir initiated CAR No. 12-36A to address this issue.

In response to an audit finding associated with critical characteristics for the performance of a commercial-grade survey of Ledford Gage Laboratory, Inc., Weir issued CAR No. 12-36B and revised the ASL list to identify those suppliers that were approved as commercial-grade suppliers in addition to those approved as ASME suppliers and suppliers under Appendix B to 10 CFR Part 50. In addition, Weir committed to performing commercial-grade surveys on suppliers that required them. During the review of the implementation of corrective actions associated with CAR No. 12-36B, the NRC inspection team noted that Weir did not perform an extent of condition to evaluate how the inadequate dedication would affect the M&TE, where this equipment might have been used, and how it would affect safety-related components. Furthermore, although Weir did revise its ASL by removing the commercial-grade calibration laboratories from that list, Weir did not complete the dedication of the affected M&TE and continued to use that equipment. The NRC inspection team identified this issue as another example of Nonconformance 99900746/2013-201-06 for Weir's failure to ensure that conditions adverse to quality were promptly identified and corrected. Weir initiated CAR No. 13-35 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99900746/2013-201-06 for Weir's failure to implement the regulatory requirements in Criterion XVI of Appendix B to 10 CFR Part 50. Nonconformance 99900746/2013-201-06 cites Weir for failing to ensure that conditions adverse to quality were promptly identified and corrected. Specifically, Weir failed to promptly identify and correct conditions adverse to quality as committed to in its response to NRC's inspection report 99900746/2008-201, dated February 17, 2009, and as identified during two external audits.

10. Entrance and Exit Meetings

On February 4, 2013, the NRC inspection team discussed the scope of the inspection with Mr. Shawn Grizzell, Weir's President, and other members of the vendor's management and technical staff. On February 7, 2012, the NRC inspection team presented the inspection results and observations during an exit meeting with Mr. Brian Sullivan, Director, Quality Assurance, at Weir and other members of the vendor's management and technical staff. The attachment to this report lists the entrance and exit meeting attendees and those individuals who were interviewed by the NRC inspection team.

ATTACHMENT

1. ENTRANCE/EXIT MEETING ATTENDEES

Name	Title	Affiliation	Entrance	Exit	Interviewed
Sean J. Grizzell	President	Weir Valves & Controls, Inc. (Weir)	X		
Michael Ferrucci	Vice-President (VP) Finance and Administration	Weir	X	X	
Don Bowers	Sales VP	Weir	X	X	
Jeff LeBlane	Supplier Development Director	Weir	X		
Arthur Butters	Engineering Director	Weir	X	X	X
Brian D. Sullivan	Quality Assurance (QA) Director	Weir	X	X	X
Todd McKinney	QA Manager	Weir	X	X	X
Ernest Robbio	Nuclear Business Unit Manager	Weir	X	X	
John M. Wilkins	Supply Chain Manager	Weir	X	X	
Vincent Titone	Project Management Manager	Weir	X	X	
Andy Johnson	Assembly/Test Supervisor	Weir			X
Chris Venn	Assistant Shop Supervisor	Weir			X
Larry Quinn	Plant Superintendent	Weir			X
Tim Gates	QA Engineer	Weir			X
Jason Gallant	Test Technician	Weir			X

Name	Title	Affiliation	Entrance	Exit	Interviewed
Chris Major	Test Engineer	Weir			X
Ken Krochaml	Nondestructive Examination (NDE) Level II	Weir			X
James Collins	NDE Level I	Weir			X
Yamir Diaz-Castillo	Inspection Team Leader	NRC	X	X	
Samantha Crane	Inspector	NRC	X	X	
Brent Clarke	Inspector	NRC	X	X	
Garrett Newman	Inspector	NRC	X	X	
Larry Wheeler	Inspector	NRC	X	X	
David Failla	Inspector	NRC	X	X	

2. INSPECTION PROCEDURES USED

Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 13, 2012.

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

Item Number	Status	Type	Description	Applicable ITAAC from the AP1000 Design Control Document, Tier 1, Revision 19
99900746/2008-201-01	Closed	NOV	10 CFR Part 21	N/A
99900746/2008-201-02	Closed	NON	Criterion VII	N/A
99900746/2013-201-01	Opened	NON	Criterion III	N/A

Item Number	Status	Type	Description	Applicable ITAAC from the AP1000 Design Control Document, Tier 1, Revision 19
99900746/2013-201-02	Opened	NON	Criterion V	N/A
99900746/2013-201-03	Opened	NON	Criterion VII	N/A
99900746/2013-201-04	Opened	NON	Criterion IX	N/A
99900746/2013-201-05	Opened	NON	Criterion XI	N/A
99900746/2013-201-06	Opened	NON	Criterion XVI	N/A

4. INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA

At the time of the inspection, Weir was involved in manufacturing ASME Code Section III safety-related butterfly and air-operated control valves for the AP1000 reactor design. The NRC inspection team noted that depending on the system where the valves will be installed, the inspections, tests, analyses, and acceptance criteria's (ITAAC) design commitment as described below will apply. The NRC inspection team reviewed Weir's QA controls in the areas of design control, procurement, training, inspection, testing, and measuring and test equipment. The ITAAC's design commitment referenced below are for future use by the NRC staff during the ITAAC closure process; the listing of these ITAAC design commitments does not constitute that they have been met and closed. The NRC inspection team did not identify any findings associated with the ITAAC identified below.

Appendix C from the combined license for Vogtle Electric Generating Plant (Vogtle) Units 3 and 4 and V.C. Summer Nuclear Station (V.C. Summer) Units 2 and 3	Pressure boundary welds in components identified as ASME Code Section III meet ASME Code Section III Non-destructive examination requirements.
Appendix C from the combined license for Vogtle Units 3 and 4 and V.C. Summer Units 2 and 3	Components identified as ASME Code Section III retain their pressure boundary integrity at their design pressure.

5. DOCUMENTS REVIEWED

- Weir's Quality Assurance Manual, Revision 7, dated August 7, 2012
- CP-E-01, "Design Control," Revision 9, dated May 1, 2007

- CP-E-04, "Guide for Classification of Valve Parts," Revision 3, dated September 22, 2011
- CP-E-10, "Assembly Procedure for Tricentric Butterfly," Revision 0, dated March 27, 2000
- CP-E-12, "Preparation, Review, Approval, and Certification of Design Specifications," Revision 2, dated May 1, 2007
- CP-E-18, "Control of Commercial Grade Items To Be Dedicated for Use in Nuclear Safety Related Applications," Revision 6, dated August 29, 2012
- CP-E-20, "Reporting of Defects and Noncompliance under 10 CFR Part 21," Revision 3, dated August 1, 2012
- CP-E-21, "Bolting Torque Procedure," Revision 0, dated May 14, 2003
- CP-E-22, "Controlling Design of Products under ASME, Section III and 10 CFR [Part] 50 Division 1 Appendix B," Revision 6, dated August 1, 2012
- CP-E-50, "Suspect Counterfeit Items," Revision 0, dated April 2, 2009
- CP-M-07, "First Piece and In-Process Inspection," Revision 2, dated March 22, 2007
- CP-M-22, "Instruction for Calibration of Pressure Gauges with Dead Weight Tester," Revision 1, dated March 22, 2007
- CP-P-01, "Purchasing," Revision 10, dated April 25, 2011
- CP-Q-02, "Corrective Action Program," Revision 10, dated January 15, 2013
- CP-Q-03, "Internal Audit Program," Revision 11, dated January 14, 2013
- CP-Q-04, "Auditor Qualification Program," Revision 3, dated June 21, 2012
- CP-Q-05, "Preparing and Processing the Nonconformance Report [NCR]," Revision 6, dated October 12, 2012
- CP-Q-06, "Test Control," Revision 7, dated July 25, 2012
- CP-Q-19, "Final Inspection of Part and Valve Assemblies," Revision 4, dated June 11, 2012
- CP-Q-24, "Management Involvement in the Corrective Action Program," Revision 3, dated January 30, 2012
- CP-Q-25, "Management Improvement," Revision 0, dated December 10, 2003
- CP-Q-26, "Performance Assessment for Suppliers of Materials/Items," Revision 1, dated May 14, 2012

- CP-Q-29, "Procedure for Supplier Audits/Surveys," Revision 4, dated December 17, 2012
- CP-Q-30, "Lead Auditor Training and Qualification," Revision 5, dated April 30, 2012
- CP-Q-31, "Preparing, Maintaining, and Distribution of the Approved Suppliers List for CMS and ASME Code Materials and Services," Revision 5, dated June 11, 2012
- CP-Q-33, "Receiving and Receiving Inspection," Revision 2, dated January 14, 2013
- CP-Q-38, "Performing Visual Inspection of Materials and Items," Revision 0, dated October 8, 2003
- CP-Q-43, "NDE Training, Examination and Certification Manual Written Practice in Accordance with SNT-TC-1A 1992 Code Section III," Revision 5, dated September 30, 2011
- CP-Q-44, "Indoctrination and Training of Inspection Personnel," Revision 2, dated February 25, 2009
- CP-Q-45, "Training and Qualification of Inspection Personnel," Revision 3, dated March 20, 2009
- CP-Q-47, "Continual Improvement," Revision 0, dated December 10, 2003
- CP-S-04, "Customer Complaints and Warranty Administration," Revision 10, dated July 31, 2012
- P-66-026, "Procurement Specification for ASME Code Pressure Retaining Material and Services," Revision 5, dated December 17, 2012
- P-66-027, "Procurement Specification for 10 CFR 50 Appendix B Items and Services," Revision 4, dated January 20, 2013
- P-66-029, "Procurement Specification for Complete Valves Purchased by Weir Valves & Controls USA Inc.," Revision 2, dated January 16, 2012
- Work Instruction (WI)-Q-05-01, "NCR Process - Quality Assurance," Revision 2, October 12, 2012
- WI-Q-05-02, "NCR Process - Engineering," Revision 1, dated October 12, 2012
- WI-Q-05-03, "NCR Process - Manufacturing," Revision 1, dated October 12, 2012
- 501-55106, "Cleaning Procedure for In-Process Components, Final Assembled Carbon, Low Alloy and Stainless Steel Valves per Westinghouse Cleaning Specification APP-GW-Z0-602," Revision 5
- 403-54536, "Water Washable Liquid Penetrant Examination Procedure ASME Sections III and V," Revision 2, dated August 12, 2011

- 90-67-028, "Liquid Penetrant Examination Procedure in Accordance with ASME Sections III and V," Revision 9, dated April 27, 2011
- 90-67-029, "Water Washable Liquid Penetrant Examination Procedure ASME Sections III and V," Revision 11, dated April 27, 2011
- 90-67-031, "Magnetic Particle Examination Procedure in Accordance with ASME Sections III and V," Revision 3, dated April 24, 2007
- Welding Procedure Specification (WPS) 90-64-179, "Gas Tungsten Arc Welding of Stainless Steel Material to Carbon Steel," Revision 5, dated April 26, 2011 and associated Procedure Qualification Record (PQR) PQ-99-012
- WPS 504-54536, "Plasma Arc Hardfacing Alloy #[No.] 6 on Stainless Steel," Revision 1, August 10, 2012 and associated PQR PQ-99-08A, Revision 1
- Drawing No. 54776-B, "3-inch Class 1850 SPL Stop Check Valve (ASME Class 1)," Revision 0
- Drawing No. 55170-A, "Gate Valve 30-inch Class 150 (ASME Class 3)," Revision 4
- Drawing No. APP-PV14-Z0D-190, "3-inch Class 1850 SPL (ASME Class 1)," Revision 9
- Drawing No. APP-PV11-Z0D-132, "8-inch CL 150 Tricentric Valve General Arrangement (ASME Class 2)," Revision 3
- Drawing No. APP-PV11-Z0D-121, "6-inch CL 150 Tricentric Valve General Arrangement (ASME Class 2)," Revision 7
- Drawing No. APP-PV11-Z0D-121, C-32281-315, "Clamp Ring 6-inch 150 TCBV Machining," Revision 1
- Drawing No. APP-PV11-Z0D-121, D-32475-264 "Disc 6-inch 150 TBV," Revision 2
- Drawing No. APP-PV11-Z0D-121, D-41733-103, "Body 6-inch 150 TBV," Revision 1
- Drawing No. APP-PV11-Z0D-121, C-34573-124, "Drive Shaft 6-inch 150 TBV," Revision 0
- Drawing No. APP-PV11-Z0D-107, "6-inch Class 150 Carbon Steel Tricentric Valve General Arrangement," Revision 7, dated August 4, 2011
- Drawing No. APP-PV11-Z0D-129, "3-inch Class 150 Tricentric Valve General Arrangement," Revision 3, dated June 14, 2011
- Drawing No. D-31732-208, "Body Machining 3-150 TCBV," Revision 2, dated April 6, 2010
- Drawing No. D-41733-103, "Body 6-150 TCB Nuclear Service," Revision 1, dated December 18, 2009
- Bill of Materials for APP-PV11-Z0D-121, 6" CL 150 Tricentric Valve General Arrangement (ASME Class 2), Revision 7

- Bill of Materials for 55170-A, Gate Valve 30-inch Class 150 (ASME Class 3), Revision 4
- Bill of Materials for 54776-B, "3-inch Class 1850 SPL Stop Check Valve (ASME Class 1), Revision 0
- Engineering Change Notice (ECN) 23913 for PV11-Z0D-132, dated July 18, 2011
- ECN 24236 for PV11-Z0D-132, dated July 3, 2012
- ECN 23492 for PV11-Z0D-132
- Reconciliation Record Sheet for PV11-Z0D-132, Revision 3
- Design Review Check List for PV11-Z0D-132
- Actuator Drawing No. 60599 for PV11-Z0D-132, Revision 4
- Design/Seismic Report for PV11-Z0D-132, Revision 4
- Weak Link Analysis for PV11-Z0D-132, Revision 3
- Design Torque Values for PV11-Z0D-132, Revision 1
- Weir Application Report No. 305-54536-P, "Tricentric NPS 8 Butterfly Valve for use in Westinghouse AP1000 Nuclear Power Plants (Vogtle/V.C. Summer PV-11-132)," Revision 1
- Westinghouse Electric Company (WEC) Design Specification (WEC) APP-GW-Z0-620, "AP1000 Requirements for Marking of Reactor Plant Components and Piping," Revision 1
- WEC Design Specification APP-PV11-Z0-001, "Butterfly Valves, ASME Boiler and Pressure Vessel Code Section III, Class 2 and 3," Revision 7, dated May 25, 2012.
- WEC Design Specification APP-PV14-Z0-001, "Air Operated Globe and Stop Check Valves, ASME Boiler and Pressure Vessel Code, Section III, Class 1, 2, and 3," Revision 5, dated May 25, 2012.
- WEC Design Specification APP-PV-Z0R-001, "Globe and Check Valves, ASME Boiler and Pressure Vessel Code, Section III, Class 1, 2 and 3," Revision 3
- WEC Document No. APP-GW-VLR-010, "AP1000 Supplemental Fabrication and Inspection Requirements," Revision 1, dated May 11, 2010
- WEC Document No. APP-PV11-Z5-001, "Appendix 3: Technical and Quality Requirements for the Procurement and Delivery of PV11 Butterfly Valves for AP1000 Projects," Revision 1, dated October 22, 2012
- AP1000 Valve Data Sheet APP-PV11-Z0D-121, Revision 3
- AP1000 Valve Data Sheet APP- PV11-Z0D-132, Revision 3

- AP1000 Valve Data Sheet APP-FH06-A001, Revision 3
- AP1000 Valve Data Sheet APP-PV14-Z0-001, Revision 5
- APP-PV11-Z0D-107, "PV11 Datasheet 107," Revision 3, dated February 14, 2012
- APP-PV11-Z0D-107, "PV11 Datasheet 123," Revision 3, dated October 12, 2011
- APP-PV11-Z0D-129, "PV11 Datasheet 129," Revision 3, dated October 3, 2012
- Technical Evaluation (TE) 000001 for Max Torque HSS3.5 SS Special for FH06 fuel Handling Valve for Customer Order No. 55170A, Revision 1, dated November 13, 2012
- TE-00002 and Associated Dedication Documents for Engineering Services dated September 13, 2012
- TE-00007 and Associated Dedication Documents for an O-ring Hydroline dated January 18, 2013
- TE-000005 and Associated Dedication Documents for a Packing Ring dated September 18, 2012
- TE-000006 and Associated Dedication Documents for a Gasket Spiral dated September 18, 2012
- TVA Sales Order (SO) No. 0020000754 for a Gasket for a Check Valve for Browns Ferry Nuclear Plant
- Evaluation of tolerances for a gasket for a 28-inch seal stack that could create higher than allowable leakage, completed December 30, 2011
- Evaluation of a gasket that was not procured and supplied in accordance with the customer's purchase order (PO), completed May 11, 2012
- Evaluation of inability of washers and a disc assembly to seat on the main steam isolation valves for Palisades Nuclear Plant, completed May 17, 2012
- Evaluation for not following the preheat and postheat treat requirements in accordance with Tables NX-4622.1-1 and 4622.7(b)-1, completed August 16, 2011
- Evaluation for a race bearing that contained a crack that propagated from the inside diameter to the outside diameter of the race and for balls within the bearing that appeared to be very loose completed July 24, 2012
- Penetrant Testing (PT) reports performed on valve data Report No. APP-PV11-Z0D-107
- PT reports performed on valve data Report No. APP-PV11-Z0D-120
- PT reports performed on valve Data Report no. APP-PV11-Z0D-124
- PT reports performed on valve Data Report no. APP-PV11-Z0D-123

- PT report performed on disc with Heat No. 12313
- Radiographic Testing (RT) Report No. 7012, "16-inch Disc, Heat No. 11130," dated July 13, 2011
- RT Report No. 6953, "16-inch Disc, Heat No. 11126," dated July 13, 2011
- Certificate of Compliance for ER309/309L, Heat No. 740383, Lot No. DT9344, for PO No. 111146, dated August 12, 2011
- Certificate of Certification for Spotcheck Developer, SKD-S2, Batch 12H05K, PO 6061545
- Certificate of Certification for Spotcheck, SKC-S, Batch 12C038, PO 2002036
- Certificate of Certification for Spotcheck Penetrant, SKL-SP1, Batch 02K028, PO 201134-20
- Certified Material Test Report (CMTR) 270789, 5½-inch plate used for valve data Report No. APP-PV11-Z0D-133
- CMTR 270657, 5-inch plate used for valve data Report No. APP-PV11-Z0D-133
- CMTR 270658, 5½-inch plate used for valve data Report No. APP-PV11-Z0D-124
- CMTR 269444, 5½-inch plate used for valve data Report No. APP-PV11-Z0D-124
- Weld records for a seat ring to body for valve data Report No. APP-PV11-Z0D-124
- Weld records for a seat ring to body for valve data Report No. APP-PV11-Z0D-133
- Weld records for a seat ring to body for valve data Report No. APP-PV11-Z0D-107
- "Receiving Inspection Report—Castings" for PO 2005231, dated February 7, 2013
- "Receiving Inspection Report—Castings" for PO 2005660, dated December 20, 2012
- Certificate of Conformance 100304-2 from Teledyne Technologies, Inc., for probes, position indicator, and transducers, dated December 4, 2012
- Certificate of Conformance 99982-2 from Teledyne Technologies, Inc., for its QUIKLOOK II, dated June 20, 2012
- Dimensional Inspection Report for Part No. 31732-208-4781-000QLA, SO No. 55022-M/55023-M, dated November 22, 2011, and November 19, 2011, SN 5-8
- Dimensional Inspection Report for Part No. 324436408A001, SO No. 20001656, dated February 5, 2013, SN AE187
- Dimensional Inspection Report for Part No. 417331039221000QLA, SO No. 55022G/55023G, dated September 9, 2011, and July 29, 2012, SN 3-4

- Form 90-67-040, "Min-Wall—Disc," completed February 5, 2013
- Gauge Certification for Instrument ID 1D56, dated September 4, 2012
- Gauge Certification for Instrument ID 1M23, dated September 4, 2012
- Gauge Certification for Instrument ID 1M36, dated September 4, 2012
- Gauge Certification for Instrument ID 1M36, dated September 4, 2012
- Gauge Certification for Instrument ID 1M50, dated September 4, 2012
- Gauge Certification for Instrument ID 1V06, dated September 4, 2012
- Gauge Certification for Instrument ID 2S20, dated September 4, 2012
- Memorandum entitled, "Nuclear Valves and Parts," from Brian Sullivan (Weir), dated February 6, 2013
- Pressure Gauge Calibration Record for Gauge No. 1KC, dated February 1, 2013
- Pressure Gauge Calibration Record for Gauge No. 5KB, dated January 9, 2013
- Procedure No. 321-54536, "Manual Valves," Revision 6, dated October 23, 2012
- Procedure No. 322-54536, "Air-Operated Valves," Revision 6, dated June 8, 2012
- Procedure No. 323-54536, "Motor-Operated Valves," Revision 6, dated September 6, 2012
- Test Report for Valve Job No. 1-55023-G, Valve Drawing No. APP-PV11-Z0D-245, Tricentric Butterfly
- Test Report for Valve Job No. 2-54537-P, Valve Drawing No. APP-PV11-Z0D-132, Tricentric Butterfly, dated April 17, 2012
- Test Report for Valve Job No. 2-54537-P, Valve Drawing No. APP-PV11-Z0D-132, Tricentric Butterfly, dated February 23, 2012
- Test Report for Valve Job No. 2-54537-P, Valve Drawing No. APP-PV11-Z0D-132, Tricentric Butterfly, dated April 17, 2012
- Test Report for Valve Job No. 2-55023-S, Valve Drawing No. APP-PV11-Z0D-245, Tricentric Butterfly
- Test Report for Valve Job No. 3-54536-P, Valve Drawing No. APP-PV11-Z0D-132, Tricentric Butterfly, dated January 29, 2012
- Test Report for Valve Job No. 3-54536-P, Valve Drawing No. APP-PV11-Z0D-132, Tricentric Butterfly, dated April 17, 2012

- Water analysis from Culligan/Cassidy Water Conditioning, dated April 15, 2011
- Water analysis from Culligan/Cassidy Water Conditioning, dated January 1, 2013
- American Society of Mechanical Engineers (ASME)/CMS QA internal audit schedule for fiscal year 2013
- Approved Suppliers List for ASME, CMS, and Commercial-Grade Materials and Services
- Approved Suppliers Listing Change Memorandum, Revision 1
- PO 2006554 to Ocean State Technical Services for welding services
- PO 2005002 to C&C Metals Engineering for machining services, Revision 2
- PO 20053366 to Ledford Gage Laboratory, Inc., for calibration services
- PO 2000968 to L.F. O'Leary Company, for calibration services, Revision 4
- PO 2005035 to ESSCO Calibration Laboratory for calibration services
- PO 2005587 to Patriot Forge Company for forging of a bonnet cover
- PO 2003624 to Carboline Company for protective coatings, Revision 1
- PO 2007101 to Ronson Manufacturing Company for ASME material
- External audit of Dubose National Energy Services, dated May 23, 2012
- External audit of Ocean State Technical Services, dated December 8, 2011
- External audit of Patriot Forge Company, dated August 4, 2011
- External audit of Carboline Company, dated March 16, 2012
- External audit of Consolidated Power Supply, dated March 14, 2011
- External audit of Continental Field Systems, dated February 22, 2011
- External audit of Draco Springs Manufacturing Company, dated February 18, 2010
- External audit of Fin-Tech, Inc., dated June 6, 2012
- External audit of Laboratory Testing, Inc., dated February 17, 2011
- Training records for the following lead auditors and auditors: Gilbert Valentine, Paul Watts, Todd McKinney, and Brian Sullivan
- ASME/CMS QA internal audit schedule for 2012 and 2013

- 2012 internal audits of the following areas: organization; QA program; design control procurement document control; written instructions; procedures and drawings; document control; supplier control; control of materials, parts, and components; control of special processes; inspection; test controls; control of measuring and testing equipment; controls for handling, packaging, storage, and shipping; indication of inspection and test status; control of nonconforming materials, parts, and components; corrective action; QA records; and audits
- NCRs 487782, 487788, 48944, 48989, 49109, 49110, 49111, 49112, 600029, 6000126, 6000133, and 6000142
- Corrective Action Report Nos. 11-21, 12-07, 12-31, 12-35, 13-35 (Revision 1), 12-36A, 12-36B, 12-38, 12-47, 13-10, 13-35, 13-36 (Revision 1), 13-37, 13-38, 13-39, 13-40, 13-41, 13-42, 13-43, 13-44, 13-45, 13-46, 13-47, 13-48, 13-49, 13-51, 13-52, and 13-54