

April 24, 2017

Mr. John DeBonis, Quality Assurance Manager  
Curtiss-Wright Flow Control Company  
Target Rock Division  
1966E Broadhollow Road  
East Farmingdale, NY 11735

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION OF CURTISS-WRIGHT  
FLOW CONTROL COMPANY TARGET ROCK DIVISION, REPORT  
NO. 99900060/2017-202 AND NOTICE OF NONCONFORMANCE

Dear Mr. DeBonis:

From March 6-9, 2017, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the Curtiss-Wright Flow Control Company Target Rock Division (hereafter referred to as TR) facility in East Farmingdale, NY. The enclosed report presents the results of the inspection.

The purpose of the limited-scope inspection was to assess TR's compliance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," and selected portions of Appendix B, "Quality Assurance 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 specifically evaluated TR's implementation of quality activities associated with the design, procurement, manufacture, and testing of valves with an emphasis on 6-inch by 10-inch relief valves. This NRC inspection report does not constitute NRC endorsement of TR's overall quality assurance (QA) program.

During this inspection, the team found that TR has established a QA program that adequately controls quality-affecting activities in accordance with the regulatory requirements of Appendix B to 10 CFR Part 50. However, implementation of the QA program did not meet certain NRC requirements contractually imposed on TR by its customers or NRC licensees. Specifically, the inspection team determined that TR was not implementing its commercial-grade dedication program in accordance with the requirements of Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. The specific findings and references to the pertinent requirements are identified in the enclosures to this letter. In response to the enclosed Notice of Nonconformance (NON), TR should document the results of the extent of condition and determine if there are any effects on other safety-related components.

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

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

Sincerely,

*/RA/*

John P. Burke, Chief  
Quality Assurance Vendor Inspection Branch-2  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Docket No.: 99900060

Enclosures:

1. Notice of Nonconformance
2. Inspection Report No. 99900060/2017-202  
and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION OF CURTISS-WRIGHT  
 FLOW CONTROL COMPANY TARGET ROCK DIVISION, REPORT  
 NO. 99900060/2017-202 AND NOTICE OF NONCONFORMANCE  
 Dated: April 24, 2017

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NRO-002

|               |              |           |          |          |
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| <b>OFFICE</b> | NRO/DE       | RI/DRS    | NRO/DCIP | NRO/DCIP |
| <b>NAME</b>   | JBillerbeck* | SPindale* | SSmith*  | JBurke   |
| <b>DATE</b>   | 04/14/17     | 04/20/17  | 04/24/17 | 04/24/17 |

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## NOTICE OF NONCONFORMANCE

Curtiss-Wright Flow Control Company  
Target Rock Division  
1966E Broadhollow Road  
East Farmingdale, NY 11735

Docket No. 99900060  
Inspection Report No. 99900060/2017-202

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted from March 6 to March 9, 2017, of activities performed at Curtiss-Wright Flow Control Company – Target Rock Division (hereafter referred to as TR), it appears that certain activities were not conducted in accordance with NRC requirements contractually imposed upon TR by its customers or NRC licensees.

- A. Criterion VII, “Control of Purchased Material, Equipment, and Services,” of Appendix B to Title 10 of the *Code of Federal Regulations* (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.”

Section 8.2 of Target Rock Report No. 5041, “Dedication Requirements for Commercial Grade Items,” Revision V, dated February 16, 2015, states, that, “Implementation of CG [commercial-grade] surveys requires confirmation that specified critical characteristics are being controlled under the scope of the supplier’s documented commercial quality system activities and that reasonable assurance is established that the commercial supplier’s activity adequately control the supplied CG items.” And further that, “Prior to conduct of a CGI [commercial-grade item] survey, the assigned quality engineer and when appropriate, the Assigned EP Project Engineer, shall prepare a survey check list which will include the specific (CCAV) [Critical Characteristic Attribute Verification sheet] characteristics to be verified and the method of verification. The results of the CG survey shall be documented by completing the above approved survey plan/check list which is reviewed and approved by Quality Assurance and shall include: 1) Item or items included in the scope of the survey, 2) Critical characteristics to be controlled by the supplier, 3) Supplier controls to be verified specific to the critical characteristics, 4) The methods used to survey or verify performed activities including results, 5) Conclusions attesting to the adequacy of the supplier controls, 6) Identification of selected critical characteristics which can also be verified at receipt inspection...”

Contrary to the above, as of March 9, 2017, TR failed to establish measures that included 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, or examination of products upon delivery. Specifically, TR failed to conduct commercial-grade surveys or use another verification method to verify the critical characteristics, that, when verified, provide reasonable assurance that items and services will perform their intended safety function. This issue

was identified as inadequate dedication of items and services procured from the following commercial suppliers:

- Skovira Machine Machining services
- Bannett Heat Treating and Brazing Heat treating and brazing services
- Suhm Spring Works Purchased springs

This issue has been identified as Nonconformance 99900060/2017-202-01.

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, Quality Assurance Vendor Inspection Branch-2, 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 noncompliances; and (4) the date when your corrective action will be completed. Where good cause is shown, the NRC will consider extending the response time.

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

Dated this the 24<sup>th</sup> day of April 2017.

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

Docket No.: 99900060

Report No.: 99900060/2017-202

Vendor: Curtiss-Wright Flow Control Company  
Target Rock Division  
1966E Broadhollow Road  
East Farmingdale, NY 11735-1768

Vendor Contact: Mr. John DeBonis, Quality Assurance Manager  
Phone: 631-396-4429  
jdebonis@curtisswright.com

Background: Target Rock, a business unit of Curtiss-Wright Flow Control Company, is an American Society of Mechanical Engineers certificate holder with its scope of supply including, but not limited to, commercial grade dedication, design, fabrication, assembly, and testing of valves for safety-related applications for the commercial operating fleet.

Inspection Dates: March 6-9, 2017

Inspection Team Leader: Brent Clarke NRO/DCIP/QVIB-2

Inspectors: Jonathan Ortega NRO/DCIP/QVIB-2  
Jermaine Heath NRO/DCIP/QVIB-3  
Catherine Nolan NRR/DIRS/IOEB  
John Billerbeck NRR/DE/EPNB  
Stephen Pindale RI/DRS/EB1  
Joung Gun Yeon KINS (Observer)  
Hoo Jin Lee NSSC (Observer)

Approved by: John P. Burke, Chief  
Quality Assurance Vendor Inspection Branch-2  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

## **EXECUTIVE SUMMARY**

Target Rock  
99900060/2017-202

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a vendor inspection at the Curtiss-Wright Flow Control Company – Target Rock Division (hereafter referred to as TR) facility to verify that it 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 team verified that TR implemented a program under 10 CFR Part 21, “Reporting of Defects and Noncompliance,” that met NRC’s regulatory requirements. The NRC inspection team conducted the inspection from March 6-9, 2017.

This technically-focused inspection specifically evaluated TR’s implementation of quality activities associated with the design, procurement, manufacture, and testing of valves with an emphasis on 6-inch by 10-inch relief valves.

Some of the specific activities observed by the NRC inspection team included:

- Receipt inspection of rod disks for solenoid valves
- Receipt inspection supporting commercial-grade dedication (CGD) of pan head screws for various valves
- Setpoint testing of a relief valve
- Hydrotesting of a valve body for a 1-inch solenoid-operated valve
- Hydrotesting of a bonnet for a 2-inch solenoid-operated valve
- Hydrotesting of a main disk for a universal 1-inch valve
- Final inspection of a relief valve
- Assembly of a solenoid-operated valve
- Calibration of a micrometer
- Control, inventory, and issuance of Measuring and Test Equipment (M&TE)
- Main disc hardsurface welding of a 2-inch by 3-inch power-operated relief valve (PORV)
- Body-to-bonnet seal welding of a 1-inch solenoid-operated valve
- Liquid Penetrant Inspection (LPI) of the body-to-bonnet seal weld of the same 1-inch solenoid-operated valve

These 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 January 27, 2017, IP 43004, “Inspection of Commercial-Grade Dedication Programs,” dated January 27, 2017, and IP 36100, “Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance,” dated February 13, 2012.

The last NRC inspection of TR occurred in April 2012.

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

Commercial-Grade Dedication

Contrary to the above, as of March 9, 2017, TR failed to establish measures that included 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, or examination of products upon delivery. Specifically, TR failed to conduct commercial-grade surveys or use another verification method to verify the critical characteristics, that, when verified, provide reasonable assurance that items and services will perform their intended safety function. This issue was identified as inadequate dedication of items and services procured from the following commercial suppliers:

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Skovira Machine</li> <li>• Bannett Heat Treating and Brazing</li> <li>• Suhm Spring Works</li> </ul> | <ul style="list-style-type: none"> <li>Machining services</li> <li>Heat treating and brazing services</li> <li>Purchased springs</li> </ul> |
|---|---|

Other Inspection Areas

The NRC inspection team determined that TR is implementing its programs for design control, test control, supplier oversight, control of M&TE, nonconforming material, parts and components, corrective action, internal audits, and manufacturing and special processes in accordance with the applicable regulatory requirements of Appendix B to 10 CFR Part 50. Additionally, the NRC inspection team determined that TR is implementing its programs for reporting defects and noncompliance in accordance with the requirements of 10 CFR Part 21. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team also determined that TR is implementing its policies and procedures associated with these programs.



## REPORT DETAILS

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

#### a. Inspection Scope

The NRC inspection team reviewed TR policies and implementing procedures that govern the 10 CFR Part 21, "Reporting of Defects and Noncompliance," program to verify compliance with the regulatory requirements. In addition, the NRC inspection team evaluated the 10 CFR Part 21 postings and a sample of TR purchase orders (PO) for compliance with the requirements of 10 CFR 21.21, "Notification of Failure to Comply or Existence of a Defect and its Evaluation," and 10 CFR Part 21.31, "Procurement Documents." The NRC inspection team also verified that TR's nonconformance and corrective action procedures provide a link to the 10 CFR Part 21 program.

The NRC inspection team also discussed the 10 CFR Part 21 program with TR management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

#### b. Observations and Findings

While inspecting all aspects of TR's 10 CFR Part 21 program, the NRC inspection team specifically concentrated on notifications involved with test-induced failures of 3-stage safety relief valves identified in Licensee Event Reports (LERs) from Brunswick Steam Electric Plant (Units 1 and 2) and Edwin I. Hatch Nuclear Plant. The NRC inspection team verified that TR provided interim and final reports (with periodic updates) that effectively informed NRC and the licensees of the identified defect and plans for correction that met regulatory requirements. The attachment to this inspection report lists all documents reviewed by the NRC inspection team including the LERs and 10 CFR Part 21 notifications. No findings of significance were identified.

#### c. Conclusion

The NRC inspection team concluded that TR is implementing its 10 CFR Part 21 program in accordance with the regulatory requirements of 10 CFR Part 21. Based on the limited sample of documents reviewed, the NRC inspection team also determined that TR is implementing its policies and procedures associated with the 10 CFR Part 21 program.

### **2. Commercial-Grade Dedication**

#### a. Inspection Scope

The NRC inspection team reviewed TR's implementation for commercial-grade items and commercial-grade calibration dedication activities for use in safety-related applications to verify compliance with applicable regulatory requirements of Criterion III, "Design Control" and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50.

This assessment included a review of the policies and procedures governing the implementation of commercial-grade dedication (CGD) activities, interviews with TR

personnel, observation of dedication activities, and review of related documentation. Specifically, the NRC inspection team reviewed dedication packages to assess the different elements of the CGD program, including purchase orders, the technical evaluation process, receipt inspection reports, certificates of compliance, quality control source inspection reports, design drawings, and supplied part technical information. The NRC inspection team evaluated the criteria for the identification of item functions, credible failure mechanisms/modes, selection of critical characteristics and acceptance criteria, and the identification of verification methods to verify effective implementation of the TR dedication process.

For a sample of suppliers, the NRC inspection team verified that the technical evaluations in the commercial-grade dedication plans appropriately identified the critical characteristics and technical attributes necessary to provide reasonable assurance that the items and services being dedicated would perform their intended safety function. The NRC inspection team also evaluated the basis for the selection of the sampling plan, and the selection and implementation of verification methods.

Additionally, the NRC inspection team reviewed implementation of the corrective actions from the previous NRC inspection. NON 99900060/2012-201-01, 02, and 03 were findings related to TR's CGD program.

The NRC inspection team also discussed the CGD program with TR 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 reviewed TR Report No. 5041, "Dedication Requirements for Commercial Grade Items," which provides the process for dedicating commercial-grade items and services for use in safety-related applications, including the development of critical characteristics (CCs), and identification of dedication methods and acceptance criteria. TR primarily uses Method 1, "Special Tests and Inspections," and Method 2, "Commercial-Grade Survey," to perform CGD. These methods are included in NRC endorsed industry guidance (Electric Power Research Institute EPRI NP-5652). The NRC inspection team requested a sample of CGD surveys performed by TR and the Approved Vendor List (AVL) for safety-related and commercial suppliers. The NRC inspection team reviewed the CGD surveys for Skovira Machine, Bennett Heat Treating and Brazing, and Suhm Spring Works. A commercial-grade survey provides the purchaser, in this case TR, with a method to take credit for the documented programmatic controls that the supplier applies to a CC for a given item or service. Guidance in EPRI NP-5652 states that the purchaser must confirm, as part of the CGD survey, that the selected commercial-grade item CCs are controlled under a documented quality program for the scope of the activity. The NRC inspection team found several instances in which TR performed limited-scope audits of the supplier's QA program rather than a CGD survey specific to the CCs of the item or service being dedicated.

During review of the TR CGD program, the NRC inspection team noted that CCs are documented in the Critical Characteristic Attribute Verification (CCAV) sheet as prepared by Engineering personnel. Most of the CCAVs reviewed by the NRC inspection team provided a list of CCs, but these CCs were not tied to the item or service safety function.

Instead most of the CCs in the CCAVs made reference to a procurement specification. Procurement specifications are instructions typically used by TR inspectors to perform test and verification of items or processes. During the review of several procurement specification documents, the NRC inspection noted that the CCs were not listed or easily identified for that particular item or process, instead the procurement specification described the necessary technical requirements and method to perform tests and/or inspections. This practice is contrary to the requirements listed in TR Report No. 5041, which was developed following the guidance in EPRI NP-5652. After discussing this issue with TR Engineering and QA staff, it was explained to the NRC inspection team that there was a misunderstanding on the CCs that Engineering provided to QA. Engineering staff explained that the CCs provided to QA staff were more of a quality control requirement than a list of CCs for a specific item or service. For the CGD surveys reviewed, the NRC inspection team was not able to find objective evidence to conclude that CGD surveys used by TR to take credit for the documented programmatic controls that the supplier applied to a critical characteristics, when verified would provide reasonable assurance that the item or service will perform its intended safety function. The NRC inspection team identified this issue as NON 99900060/2017-202-01 for the failure to assure that purchased material and services conformed to the procurement documents through source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, or examination of products upon delivery for the items or services provided by Skovira Machine, Bannett Heat Treating and Brazing, and Suhm Spring Works.

During discussions with TR, it was explained to the NRC inspection team that due to other issues previously identified by them, they initiated a corrective action to review all CCAVs to ensure that the correct CCs, as defined by 10 CFR Part 21, were properly identified. As a result of the NON identified above, TR generated CAR 17-035 to address the issue with CGD surveys and ensure that the CCs as documented in the revised CCAVs are listed in the revised checklist that will be used to conduct CGD surveys.

c. Conclusions

The NRC inspection team issued Nonconformance 99900060/2017-202-01 in association with TR's failure to implement the regulatory requirements of Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. Nonconformance 99900060/2017-202-01 cites TR for failing to assure that purchased material and services conformed to the procurement documents through source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, or examination of products upon delivery for the items or services provided by Skovira Machine, Bannett Heat Treating and Brazing, and Suhm Spring Works.

**3. Design Control**

a. Inspection Scope

The NRC inspection team reviewed the design control program, related procedures, and a sample of design documents related to redesign of the TR Model 0867F (6-inch by 10-inch) Main Steam Safety Relief Valve and interviewed related engineering personnel

to determine if TR design controls conform with the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50.

The NRC inspection team evaluated QMP-1004, "Design Control," which establishes the system to control and verify the design of products in order to ensure that the specified requirements are met; provides for the documented verification that the requirements of the specification have been incorporated into design, reports, drawings, procedures and instructions; and controls the release of engineering requirements and documents. The inspection team confirmed that the procedure clearly identifies and controls the design attributes associated with the TR Model 0867F Main Steam Safety Relief Valve redesign.

The NRC inspection team reviewed multiple design documents associated with the Model 0867F valves to confirm that regulatory requirements and design bases were correctly translated into specifications, drawings, procedures, and instructions including the specification of appropriate quality standards and measures for the selection and review for suitability of materials, parts, equipment, and processes that are essential to the safety-related functions of the components.

The NRC inspection team also interviewed TR design and management personnel associated with the redesign of the Model 0867F valve in order to understand the operational history of the valve including design and testing constraints and to gather information on legacy designs such as the earlier two-stage Model 7567F.

The design control activities and documents reviewed for the TR Model 0867F Series Main Steam Safety Relief Valve are considered representative of other components in the TR product lines.

The NRC inspection team also discussed the design control program with TR management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team determined that TR has established a program that adequately controls design in accordance with the regulatory requirements of Criterion III of Appendix B to 10 CFR Part 50. Based on the limited sample of design activities observed and documents reviewed, the NRC inspection team determined that TR is effectively implementing these control processes in support of safety-related valve manufacturing. No findings of significance were identified.

#### 4. Oversight of Contracted Activities

##### a. Inspection Scope

The NRC inspection team reviewed TR's policies and implementing procedures that govern the implementation of its oversight of contracted activities program to verify compliance with the requirements of Criterion VII, "Control of Purchased Material, Equipment, and Services" of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed TR's approved vendor list (AVL) to ensure that qualified and approved suppliers were listed; that authorized personnel maintained, distributed, and periodically updated the list; and that any revisions to the list were implemented following the applicable procedures. The NRC inspection team verified that the AVL documented (1) the vendor name, (2) the scope of work, (3) the approval date, and (4) the due date. The NRC inspection team also confirmed that the suppliers performing work for TR were appropriately listed on the AVL and that the scope of supply was documented and consistent for the activities contracted. In addition, the NRC inspection team reviewed a sample of external audits to evaluate compliance with TR program and technical requirements. The NRC inspection team confirmed that the audit reports contained objective evidence of the review of the relevant QA criteria of Appendix B to 10 CFR Part 50 and were performed by qualified lead auditors and auditors.

The NRC inspection team also reviewed a sample of training and qualification records of TR lead auditors and auditors and confirmed that auditing personnel had completed all the required training and had maintained qualification and certification in accordance with TR policies and procedures.

The NRC inspection team also discussed the oversight of contracted activities program with TR management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

##### b. Observations and Findings

No findings of significance were identified.

##### c. Conclusions

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

## 5. Special Processes

### a. Inspection Scope

The NRC inspection team reviewed TR policies and implementing procedures that govern the implementation of its oversight of contracted activities program to verify compliance with the requirements Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed special process control procedures, welding and nondestructive examination (NDE) records; and observed a sample of in-process welding and liquid penetrant inspection (LPI) activities to determine if TR special process controls complied with the regulatory requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50.

In addition, the NRC inspection team verified, by review of a sample of qualification and certification documentation for personnel performing welding and LPI activities, that the personnel met the applicable qualification and certification requirements.

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 special processes were properly controlled in accordance with TR requirements by interviewing welding and NDE personnel, observing in-process welding of a 1 inch solenoid-operated valve body-to-bonnet joint and hardsurfacing of a 3 inch x 3 inch power-operated relief valve main disc; and by observing the associated in-process LPI of the 1-inch solenoid valve body-to-bonnet weld. The NRC inspection team verified that welders were using the appropriate welding procedures, were cognizant of the prerequisite setup requirements, and had established setup conditions (amperage, voltage, deposition rate, pre-heat conditions) consistent with requirements. The NRC inspection team verified that measurement equipment, such as contact pyrometers, were within current calibration schedule and capable of measuring within the required temperature range.

No findings of significance were identified.

### c. Conclusions

The NRC inspection team determined that TR has established a program that adequately controls special processes in accordance with the regulatory requirements of Criterion IX of Appendix B to 10 CFR Part 50. Based on the limited sample of records reviewed and on the observation of in-process special processes, the NRC inspection team determined that TR is effectively implementing these control processes in support of safety-related valve manufacturing. No findings of significance were identified.

## **6. Identification and Control of Materials, Parts, and Components**

### **a. Inspection Scope**

The NRC inspection team reviewed TR policies and implementing procedures that govern the implementation of its identification and control of materials, parts, and components program to verify compliance with Criterion VIII, "Identification and Control of Materials, Parts and Components," of Appendix B to 10 CFR Part 50. The NRC inspection team discussed the program with TR personnel, reviewed documents and verified the identification and control of selected materials, parts and components to determine if the program adequately implemented the 10 CFR Part 50, Appendix B requirements.

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 identification controls were properly implemented by reviewing selected documents, such as drawings, assembly specifications, and special process procedures and work orders. The NRC inspection team reviewed these documents to confirm that specific materials, parts, and components were properly identified and referenced, and were traceable. In addition, the NRC inspection team selected specific parts from storage locations and confirmed that the parts were appropriately labelled.

No findings of significance were identified.

### **c. Conclusions**

The NRC inspection team determined that TR has established a program that adequately controls identification activities in accordance with the regulatory requirements of Criterion VIII, "Identification and Control of Materials, Parts and Components," of Appendix B to 10 CFR Part 50. Based on the limited sample of inspection activities observed and documents reviewed, the NRC inspection team determined that TR is effectively implementing its inspection programs in support of safety-related valve manufacturing. No findings of significance were identified.

## **7. Test Control**

### **a. Inspection Scope**

The NRC inspection team reviewed TR policies and implementing procedures that govern the implementation of its test control program to verify compliance with the regulatory requirements of Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed test procedures, a sample of test records, and observed in-process test activities with an emphasis on the 1-inch solenoid valve,

The NRC inspection team observed and interviewed TR test personnel during static and functional testing for a safety-related solenoid valve and a relief valve, and compared the observed testing activities to the related test procedures. The testing of these

components is considered representative of similar tests for solenoid and relief valves of other sizes. The NRC inspection team noted that all tests were manually controlled, and the test technician recorded and interpreted results at the time of the test. The NRC inspection team found that test personnel were knowledgeable about the testing procedures and their testing activities appropriately implemented TR test control requirements. Additionally, the NRC inspection team verified that test technician qualification documentation met TR requirements for the observed testing.

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

b. Observations and Findings

There were no findings of significance.

c. Conclusions

The NRC inspection team determined that TR has established a program that adequately controls testing in accordance with the regulatory requirements of Criterion XI of Appendix B to 10 CFR Part 50. Based on the limited sample of test activities observed and documents reviewed, the NRC inspection team determined that TR is effectively implementing these control processes in support of safety-related valve manufacturing. There were no findings of significance.

**8. Nonconforming Materials, Parts, or Components**

a. Inspection Scope

The NRC inspection team reviewed policies and implementing procedures that govern the control of nonconforming materials, parts, and components to verify compliance with Criterion XV, "Nonconforming Materials, Parts, or Components," of Appendix B to 10 CFR Part 50. The NRC inspection team verified that TR's processes and procedures include the identification, documentation, segregation, evaluation, and disposition of nonconforming items.

The NRC inspection team verified that TR's nonconformance process provides a link to the 10 CFR Part 21 program. The NRC inspection team performed walk-downs of material storage areas and fabrication and assembly areas to inspect the segregation of nonconforming materials, the control of nonconformance reports (NCRs) for ongoing work, and material conditions that could contribute to quality issues. The NRC inspection team observed ongoing craft work and inspection activities for the identification and control of NCRs. The NRC inspection team also 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 selected a sample of several NCRs and verified that TR: (1) dispositioned the nonconformances, (2) documented an appropriate technical justification for various dispositions, (3) took adequate action with regard to the nonconforming material or item, and (4) subjected any identified nonconformances, as appropriate, for 10 CFR Part 21 applicability. For those NCRs that were dispositioned as "repair" or "use as is," the NRC inspection team confirmed that the technical



justifications were documented to verify the acceptability of nonconforming items and had been reviewed and approved by TR's customer. Further, the NRC inspection team verified TR processed all customer- returned items under its nonconformance program by initiating a return material authorization (RMA) and an NCR.

The NRC inspection team discussed the nonconformance process with TR's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

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

**9. Measuring and Test Equipment**

a. Inspection Scope

The NRC inspection team reviewed policies and implementing procedures that govern TR's control of M&TE to verify compliance with the regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. In addition, the NRC inspection team verified the implementation of M&TE control through direct observation of inspection activities of TR personnel and review of certificates of calibration for a sample of M&TE.

The NRC inspection team evaluated a sample of M&TE and related documentation, including pressure gages used to perform hydro and nitrogen leak-rate testing on a 1-inch solenoid valve, and the calibration of a micrometer and weight scale for final inspection of a relief valve. The NRC inspection team confirmed the instruments were calibrated and appropriate for the range of operation for each inspection activity.

The NRC inspection team evaluated a sample of calibration discrepancy reports and verified that information, including instrument identification, description of out-of-tolerance condition, method of discovery, period of use, and determination if there was an impact on other products, was recorded. The NRC inspection team verified that all required information was recorded on the sampled reports.

Additionally, TR's supplier calibration services oversight process was evaluated. Specifically, the NRC inspection team reviewed calibration laboratory accreditation documentation and confirmed that the accreditation covered the ranges of parametric values for which these devices were used during testing. The NRC inspection team confirmed traceability to National Institute of Standards and Technology calibration

standards, and that all test and inspection equipment used for the observed inspection and test activities were controlled, documented, and current for calibration requirements.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

The NRC inspection team determined that TR has established a program that adequately controls calibration and use of M&TE in accordance with the regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. Based on the limited sample of calibration and measurement activities observed and documents reviewed, the NRC inspection team determined that TR is effectively implementing its M&TE program in support of safety-related valve manufacturing. No findings of significance were identified.

## **10. Internal Audits**

a. Inspection Scope

The NRC inspection team reviewed policies and implementing procedures that govern TR's implementation of the internal audit program to verify compliance with Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. Specifically, the NRC inspection team reviewed several TR internal audits conducted between 2015 and 2016 to verify that TR adequately documented QA-related findings from internal and external audit teams and entered these findings into TR's Corrective Action Program (CAP). The NRC inspection team also reviewed TR procedures on audit personnel training requirements, and sampled three TR auditor training records.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The NRC inspection team determined that TR has established a program that adequately controls internal audits in accordance with the regulatory requirements of Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. Based on the limited sample of audit documents reviewed, the NRC inspection team determined that TR is effectively implementing its internal audit program. No findings of significance were identified.

## **11. Corrective Action**

a. Inspection Scope

The NRC inspection team reviewed policies and implementing procedures that govern TR's implementation of the CAP to verify compliance with the requirements of Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of CARs to verify the adequacy of TR's implementation and control of the CAP. TR implements the CAP using Procedure

QMP1014, "Corrective and Preventative Actions." The NRC inspection team discussed the CAP status and effectiveness with TR's management and staff. In addition, the NRC inspection team reviewed TR's corrective actions for nonconformances associated with NRC inspection report number 99900060/2012-201," dated November 19, 2012, to evaluate the adequacy of corrective actions taken by TR to the NRC's findings.

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

b. Observations and Findings

Following the 2012 inspection, the NRC inspection team issued NON 99900060/2012-201-01, NON 99900060/2012-201-02, and NON 99900060-2012-201-03 for failures in the CGD program. While NON 99900060/2017-202-01 also cites TR for a failure in the CGD program, the NRC inspection team did not identify objective evidence that the root causes for NONs 99900060/2012-201-01, 02, and 03 were repeated. Consequently, and as reflected in the attachment to this report, NONs 99900060/2012-201-01, 02, and 03 remain closed.

c. Conclusions

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

## **12. Entrance and Exit Meetings**

On March 6, 2017, the NRC inspection team discussed the scope of the inspection with Mr. Michael Cinque, General Manager, and other members of TR's management and technical staff. On March 9, 2017, the NRC inspection team presented the inspection results and observations during an exit meeting with Mr. Cinque, and other members of TR's management and technical staff. The attachment to this report lists the attendees of the entrance and exit meetings as well as those individuals interviewed.

## ATTACHMENT

### 1. Persons Contacted and NRC Staff Involved:

| Name             | Title                                 | Affiliation | Entrance | Exit | Interviewed |
|------------------|---------------------------------------|-------------|----------|------|-------------|
| Michael Cinque   | General Manager                       | Target Rock | X        | X    |             |
| Michael Grant    | Director of Operations                | Target Rock | X        | X    |             |
| John DeBonis     | QA Manager                            | Target Rock | X        | X    | X           |
| Dave Bryan       | Senior QA Engineer                    | Target Rock | X        | X    |             |
| Joseph Simonetti | Energy Products Project Engineer      | Target Rock | X        | X    | X           |
| Brian Maher      | QC Manager                            | Target Rock | X        | X    | X           |
| Nick Campanelli  | Senior Manager, Defense Engineering   | Target Rock | X        | X    |             |
| Alex DiMeo       | Director of Quality Assurance         | Target Rock | X        | X    | X           |
| Robert Pellicci  | Customer Service Supervisor           | Target Rock | X        | X    |             |
| Sujith Kurian    | Quality Assurance Engineer            | Target Rock | X        | X    |             |
| David Neidig     | Assembly & Testing Supervisor         | Target Rock | X        |      |             |
| Zach Sanzo       | Welding Manager                       | Target Rock | X        | X    |             |
| Robert Peterson  | Manufacturing/Weld Technician Manager | Target Rock | X        | X    |             |
| Roger Many       | Quality Assurance Engineer            | Target Rock | X        | X    | X           |
| Scott Schoeps    | Manager, Assembly and Test            | Target Rock | X        | X    |             |
| Don Leatherman   | Senior Business Unit Controller       | Target Rock | X        |      |             |
| Ed Bradshaw      | Director of Program Management        | Target Rock | X        |      |             |
| Sheik Bacchus    | Quality Control Manager               | Target Rock | X        | X    | X           |
| Robert Lowery    | Design Engineer                       | Target Rock | X        | X    |             |
| Walter Opak      | Senior Project Engineer               | Target Rock | X        | X    |             |
| Greg Santi       | Manager Human Resources               | Target Rock |          | X    |             |
| Nick Palmiotto   | Production Control Supervisor         | Target Rock |          | X    | X           |

| <b>Name</b>      | <b>Title</b>  | <b>Affiliation</b> | <b>Entrance</b> | <b>Exit</b> | <b>Interviewed</b> |
|------------------|---|--------------------|-----------------|-------------|--------------------|
| Sean Kim         | Project Engineer  | Target Rock        |                 | X           | X                  |
| William Velkoff  | Project Engineer  | Target Rock        |                 | X           |                    |
| Mark McCain      | Plant Manager   | Target Rock        |                 | X           |                    |
| Jim Baccoli      | Materials Manager   | Target Rock        |                 | X           |                    |
| Dolores Fantz    | Contracts Supervisor  | Target Rock        |                 | X           |                    |
| Steve Schoepps   | Level III Inspector   | Target Rock        |                 |             | X                  |
| Marta Herrera    | Level I Inspector   | Target Rock        |                 |             | X                  |
| Al Dias          | Test Technician   | Target Rock        |                 |             | X                  |
| Adam Scheiber    | Test Technician   | Target Rock        |                 |             | X                  |
| Al Connelly      | Calibration Technician  | Target Rock        |                 |             | X                  |
| Dave Deroia      | Test Technician   | Target Rock        |                 |             | X                  |
| Hector Arana Jr. | Test Technician   | Target Rock        |                 |             | X                  |
| Georg Kalmbacher | Welder  | Target Rock        |                 |             | X                  |
| Steven Pauly     | Vice President – Nuclear  | Curtiss-Wright     |                 |             | X                  |
| Paul Krohn       | Deputy Director, Construction Inspection and Operational Programs | NRC                |                 | X           |                    |
| Brent Clarke     | Inspection Team Leader  | NRC                | X               | X           |                    |
| Jonathan Ortega  | Inspection Team Member  | NRC                | X               | X           |                    |
| Stephen Pindale  | Inspection Team Member  | NRC                | X               | X           |                    |
| Catherine Nolan  | Inspection Team Member  | NRC                | X               | X           |                    |
| Jermaine Heath   | Inspection Team Member  | NRC                | X               | X           |                    |
| John Billerbeck  | Inspection Team Member  | NRC                | X               | X           |                    |
| Joung-Gun Yeon   | Observer  | KINS               | X               | X           |                    |
| Hoo-Jin Lee      | Observer  | NSSC               | X               | X           |                    |

**2. Inspection Procedures Used:**

IP 43002, "Routine Inspections of Nuclear Vendors," dated January 27, 2017

IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated January 27, 2017

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

**3. Items Opened, Closed, And Discussed:**

| <u>Item Number</u>   | <u>Status</u> | <u>Type</u> | <u>Description</u>    |
|----------------------|---------------|-------------|-----------------------|
| 99900060/2012-201-01 | Closed        | NON         | App. B, Criterion III |
| 99900060/2012-201-02 | Closed        | NON         | App. B, Criterion VII |
| 99900060/2012-201-03 | Closed        | NON         | App. B, Criterion VII |
| 99900060/2017-202-01 | Opened        | NON         | App. B, Criterion VII |

**4. Documents Reviewed:**

Quality Management Procedures

- Procedure OP-QA-001, "Nonconformance Report System," Revision B, dated February 1, 2017
- QCP-1007, "X-Ray Fluorescence Spectroscopy Alloy Identify Testing," Revision B, dated June 29, 2005
- QCP-1010, "Supplier Certification Review & Raw Material Verification," Revision H, dated October 1, 2013
- QMP-1007, "Control of Customer Supplied Product," Revision F, dated March 6, 2014
- QMP-1008, "Product Identification and Traceability," Revision D, dated September 23, 2013
- QMP-1009, "Process Control," Revision B, dated September 30, 2016
- QMP-1010, "Inspection and Testing," Revision H, dated October 1, 2013
- QMP-1011, "Control of Inspection, Measuring, and Test Equipment," Revision H, dated April 11, 2016
- QMP-1012, "Inspection and Test Status," Revision C, dated October 1, 2013
- QMP-1013, "Control of Nonconforming Product," Revision L, dated April 1, 2016
- QMP-1014, "Corrective and Preventive Action," Revision H, dated February 4, 2015
- QMP-1017, "Quality Audits," Revision H, dated September 25, 2013
- QMP-1018, "Training," Revision E, dated October 3, 2016
- QMP-1020, "Company Objectives, Continuous Improvement and Statistical Techniques," Revision E, dated November 5, 2015

## Manufacturing/Testing Procedures

- A&T-001, "Organization and Operation of the Assembly and Test Department," Revision C, dated June 24, 2011
- JWP 11.263, "Joint Weld Procedure, Valve Disc, External Hardsurface," Revision A, dated December 13, 2011
- JWP 11.806, "PTA Powder Hardsurfacing, 6 x 10 Main Disc Shaft," Revision A, dated December 2, 2002
- JWP 12.1041, "GTAW Procedure for Seal Welding K-Monel to Inconel 600," Revision A, dated August 2, 2007
- PR-080, "Problem Report documenting test induced defect on 6 X 10 Safety Relief Valve 09J-001," dated April 27, 2015
- Report No. 9169, "Technical Manual – Safety/Relief Valve Model 0867F-001," Revision B, dated June 18, 2014
- TERI-081, "Technical Evaluation of 3-Stage 6 X 10 MS-SRV Upgrade to Address Limited Flow Test Induced Defect (Model 0867F)," Revision A, dated February 9, 2017
- TRP-1689, "Liquid Penetrant Inspection Procedure," Revision R, dated September 25, 2013
- TRP-2077, "Production Test Procedure Model 76H," Revision T, Project No. 76H
- TRP-2153, "Production Test Procedure Model 81B," Revision Y, Project 81B
- TRP-2297, "Liquid Penetrant Acceptance Criteria Requirements," Revision N, dated April 19, 2005
- TRP-5041, "Dedication Requirements for Commercial Grade Items," Revision V, dated February 16, 2015
- TRP-5087, "Sample Inspection Procedure," Revision E, dated July 19, 2001
- TRP-6357, "Engineering Release for Project: C-14Q," Revision 2001/03
- TRP-6471, "Leak Test," Revision F, spare 2 inch bonnet and spare main disc
- TRP-7162, "Project Technical Manual for Model 81B-003-1," Project No. 02Z-522
- TRP-7265, "Control of Special Processes, Welding and Hardsurfacing," Revision G, dated May 25, 2016
- TRP-9288, "M610 Machined Metallic Bellows Processing Procedure," Revision A, dated November 8, 2013
- TRP-9921, "Limited and Full Flow Test Report for the Modified Main Steam Safety Relief Valve Assembly 0867F-001," Revision A, dated January 23, 2017
- TRP-9925, "M610 (6 X 10) MS-SRV Valve Models Inflow/Outflow Comparison," dated January 31, 2017
- TRP-9926, "0867F-001 Main Stage CFD Analysis," dated January 31, 2017
- TRP 11.700, "GTAW Hardsurfacing Procedure Using Norem 02A or ERNiCr-B or ERNiCr-C for ASME Nuclear Valve Components," Revision E, dated July 3, 2012

### Assembly/Test Records

- 09G-001, "TR Assembly Operation Sheet – Routing (6 x 10 Safety Relief Valve, 3-stage)," Revision 0, dated February 1, 2011
- 300083-3.REV.E, "ENG109 – "Operation Sheet Assembly (Bellows Spring)," Revision 0, dated September 8, 2014
- 303975-1.REV.C, "TR Assembly Operation Sheet – Routing (Air Operator Assembly)," Revision 0, dated September 15, 2014
- 304095-1.REV.B, "TR Assembly Operation Sheet – Routing (Pilot Assembly, 3-stage, 6 x 10)," Revision 0, dated September 15, 2014
- 305319-1, "Liquid Penetrant Inspection, 1-inch safety-related solenoid valve body to bonnet seal weld," completed March 9, 2017
- Model 76H-001B, S/N 104, Project 76H, "1 inch Solenoid Operated Valve"
- Model 81B-003-1, "TR Assembly Operation Sheet – Routing"
- 0867F-001-1.REV.D, "TR Assembly Operation Sheet – Routing (Valve Assembly, 6 x 10, 3-stage)," Revision 0, dated January 28, 2011
- WR 90914, "Welding Report, 3 x 3 safety-related PORV main disc hardsurfacing," dated March 7, 2017
- WR 90917, "Welding Report, 1-inch safety-related solenoid valve body to bonnet seal weld," dated March 9, 2017

### Design Documents

- TR Drawing No. 0867F-001, "Model 0867F 6 x 10 Safety Relief Valve Assembly Drawing," Sheets 1-7, Revision F, dated August 22, 2016
- TR Drawing No. 09G-001, "6 x 10 Pilot Operated Main Steam Relief Valve with 3 Way Solenoid Air Operator," Sheets 1-3, Revision F, dated October 10, 2013
- TR Drawing No. 202819, "Rod, Disc," Revision D
- TR Drawing No. 304047, "Main Disc – R/M & H/F," Revision B, dated March 3, 2004

### Nonconformance Documents

- NCR 9397, "Deficiencies identified on 6 x 10 body assembly," dated January 4, 2015
- NCR 9402, "Chrome plating peeling and flaking," dated January 15, 2015
- NCR 9446, "Insufficient weld on stem disc," dated January 14, 2015
- NCR 9489, "Missing plating on supplied component," dated January 15, 2015
- NCR 9566, "Inadequate IBAD coating of 2-stage pilot discs," dated February 12, 2015
- NCR 9686, "M100 valve improperly swaged," dated March 9, 2015
- NCR 9761, "Valve failed to lift at set pressure," dated March 3, 2015
- NCR 9785, "Commercial grade survey not up-to-date," dated December 23, 2015
- NCR 9830, "Valve failed leak test," dated April 4, 2015
- NCR 9927, "Inadequate component marking," dated April 30, 2015
- NCR 10873, "Incorrect stencil on board," dated October 27, 2015
- NCR 10913, "Liquid penetrant inspection not performed," dated October 25, 2015
- NCR 11536, "Valve failed leak test," dated March 1, 2016
- NCR 12078, "Dimensional nonconformance identified following hydro," dated June 17, 2016
- NCR 12575, "LPI not performed on internal component," dated September 10, 2016
- NCR 12656, "Method 2 survey not completed," dated September 29, 2016



- NCR 12729, "12Q valve hydrostatic test overpressure, dated November 2, 2016
- NCR 12841, "Excess weld material on bonnet assembly threads," dated November 8, 2016
- NCR 12978, "Valve not functioned properly following cycling," dated December 2, 2016
- NCR 13014, "Method 2 survey not performed," dated December 9, 2016
- NCR 13139, "Steam test results not met," dated January 18, 2017
- NCR 13140, "Steam test results not met," dated January 18, 2017

#### Corrective Action Documents

- CAR 12-063, "Response to NRC Inspection Report 9990060/2012-201," dated November 19, 2012
- CAR 15-004, "Internal audit independence," dated February 12, 2015
- CAR 15-005, "Significant condition adverse to quality not defined (NUPIC audit)," dated February 5, 2015
- CAR 15-006, "TRP 5041 review: CGD definitions and calibration accreditation (NUPIC audit)," dated February 17, 2015
- CAR 15-007, "Missed supplier audit (NUPIC audit)," dated February 12, 2015
- CAR 15-045, "Test-induced defect on 6x10 Safety Relief Valve," dated April 14, 2015
- CAR 15-087, "10Q/12Q valve leak test," dated September 1, 2015
- CAR 15-106, "Pilot disc coating delamination," dated August 24, 2015
- CAR 15-132, "TR Balanced Disc SOV design seat leakage requirements," Revision B, dated February 11, 2016
- CAR 16-024, "Incorrect O-ring part number provided," dated March 1, 2016
- CAR 16-048, "Valve 89K-010 main disc assembly not sufficiently swaged," dated August 22, 2016
- CAR 16-112, "Audit 16-04 Commercial Grade Dedication," dated December 1, 2016
- CAR 16-116, "Approved Supplier List QMP," dated November 16, 2016
- CAR 16-118, "ASME Deficiency 661-7A94 (internal audits)," dated November 18, 2016
- CAR 16-132, "Heat treatment temperature not included on MTR," dated November 18, 2016

#### Procurement Documents

- PO No. 36277-0 for Hexagon Metrology Inc.
- PO No. 42821-0 for Hexagon Metrology Inc.
- PO No. 44355-2 for Quality Vision Services Inc.
- PO No. 46037-0 for NOVA Machine Products
- PO No. 46153-0 for MCS Calibration Inc.
- PO No. 46471-0 for Leader Corp.
- PRS 07-16, "Procurement Specification for Calibration Services," Revision 1, dated May 8, 2012
- PRS 08-5, "Procurement Specification for Control of Heat Treatment," Revision A, dated January 14, 2015
- PRS 08-9, "Procurement Specification for Chromium Plating for Commercial Nuclear Applications," Revision C, dated February 28, 2017
- PRS 08-28, "Procurement Specification for Calibration Grade Items for Commercial Nuclear Applications," Revision C, May 3, 2013

- PRS 08-32, "Procurement Specification ASME Section IX 2001/2003 Code Edition Brazing Services," Revision A. dated March 10, 2016

#### Calibration Certificates and Records

- Calibration Record, "Digital Height Gage," S/N 3616, dated July 22, 2016
- Calibration Record, "Digital Weight Gage," S/N 5120, dated April 27, 2016
- Calibration Record, "Micrometer," S/N 7181, dated March 9, 2017
- Calibration Record, "Pressure Gage," S/N 1041, calibrated by MCS Calibration, Inc., dated September 9, 2016, Certification No. 60908-G01
- Calibration Record, "Pressure Gage," S/N 6900, dated November 11, 2015
- Calibration Record, "Pressure Gage," S/N 6970, dated November 11, 2015
- Calibration Record, "Pressure Gage," S/N 7249, dated March 2, 2017
- Calibration Record, "Pressure Gage," S/N 761-J, dated March 7, 2017
- Calibration Record, "Pressure Gage," S/N 762-D, dated March 7, 2017
- Calibration Record, "Torque Wrench," S/N 6970, dated February 23, 2017

#### Commercial Grade Survey Reports

- NIAC Audit No. 20032 of Suhm Spring Works Inc., dated April 16, 2015
- NIAC Audit No. 21067 of Laboratory Testing Inc., dated July 20, 2016
- Supplier Audit Report No. 15-07-1 for Bennett Heat Treating and Brazing Co., dated May 6, 2015
- Supplier Audit Report No. 16-06-1 for Electrolizing Corp., dated July 8, 2016
- Supplier Audit Report No. 16-11-1 for Skovira Machine Company, dated November 15, 2016
- Supplier Commercial Grade Item Survey Report for Advance Product Business Unit Composite Sealing System Division, Parker Hannifin Corp., dated September 14, 2012
- Supplier Performance Assessment for Advance Products/Parker Hannifin Corp., dated August 16, 2016

#### Commercial Grade Dedication Documents

- CCAV Nos. 055-0001 thru 056-0024, "TR Description: Screw, Pan, Button and Hex Head Mechanical Fasteners," dated December 21, 2015
- Certificate of Conformance, No. 386679, from NOVA Machine Products, for #10-32 UNF 2A x ¾" CRRE Pan Head Machine Screw, dated February 28, 2017
- Inspection Attribute List for Part # 202819-1, Rod Disc

#### Training Documents

- Certificate of Qualification for Al Dias
- Certificate of Qualification for Dave Deroia
- Certificate of Qualification for Hector Alonzo Jr.
- Lead Auditor Qualification Record for B. Maher, dated July 23, 2009
- Lead Auditor Qualification Record for J. Debonis, dated September 4, 2014
- Lead Auditor Qualification Record for R. Many, dated November 3, 2016
- Welder Qualification Record for George Kalmbacher, dated April 2, 2007

## Audit Records

- 2016 Internal Audit Report #15-03, dated June 18, 2015
- 2016 Internal Audit Report #15-04, dated September 25, 2015
- 2016 Internal Audit Report #15-05, dated September 25, 2015
- 2016 Internal Audit Report #15-06, dated September 25, 2015
- 2016 Internal Audit Report #16-04, dated September 12, 2016
- 2016 Internal Audit Report #16-05, dated November 7, 2016

## 10 CFR Part 21 Documents

- Curtiss-Wright letter NID#15155 to U.S. NRC, "10 CFR Part 21 Interim Report – Notification of a Potential Test Induced Defect 0867F Series Main Steam Safety Relief Valves, dated March 16, 2015
- Curtiss-Wright letter NID#15308 to U.S. NRC, "10 CFR Part 21 Interim Report – Updated Notification of a Potential Test Induced Defect 0867F Series Main Steam Safety Relief Valves, dated May 1, 2015
- Curtiss-Wright letter NID#16309 to U.S. NRC, "10 CFR Part 21 Report – Update to Notification of a Defect, Potential for Test Induced Damage – 0867F Series Main Steam Safety Relief Valves," dated June 8, 2016
- Curtiss-Wright letter NID#16310 to U.S. NRC, "10 CFR Part 21 Report – Notification of a Defect, Inadequate Swaging and Adherence of Silicone O-Ring and Silicone Pad in Soft Seat Main Disc and Pilot Disc Assemblies," dated June 30, 2016
- Curtiss-Wright letter NID#17043 to U.S. NRC, "10 CFR Part 21 Report – Update to Notification of a Defect, Potential for Test Induced Damage – 0867F Series Main Steam Safety Relief Valves," dated February 3, 2017

## Miscellaneous Documents

- Service Information Letter No. 646, "TR safety relief valve failure to open," dated December 20, 2002
- Licensee Event Report (LER) from Duke Energy, BSEP 14-0074, "Brunswick Steam Electric Plant, Unit 1, Setpoint Drift in Main Steam Line Safety/Relief Valves Results in Two Valves Inoperable, dated July 21, 2014
- LER from Duke Energy, BSEP 15-0052, "Brunswick Steam Electric Plant, Unit 2, Setpoint Drift in Main Steam Line Safety/Relief Valves Results in Three Valves Inoperable, dated June 26, 2015
- LER from Southern Company, NL-15-1230, "Edwin I. Hatch Nuclear Plant, Safety Relief Valves As Found Settings Resulted in Not Meeting Tech Spec Surveillance Criteria, dated July 11, 2015
- LER from PSEG Nuclear LLC., LR-N15-0172, "Hope Creek Generating Station, Unit 1, As-Found Values for Safety Relief Valve Lift Set Points Exceed Technical Specification Allowable Limit," dated August 26, 2015
- LER from PSEG Nuclear LLC., LR-N16-0227, "Hope Creek Generating Station, Unit 1, As-Found Values for Safety Relief Valve Lift Set Points Exceed Technical Specification Allowable Limit," dated December 20, 2016
- Report from Kalsi Engineering for Southern Company, "Review and FMEA Assessment of Target Rock 3-Stage Model 0867F MSRVs in Degraded Condition at Plant Hatch, Revision 0, dated April 15, 2016