UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 23, 2025

Ms. Nancy Macias
Facility Quality Supervisor
Flowserve Corporation Pump Division
2300 East Vernon Ave.
Vernon, CA 90058

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT OF FLOWSERVE CORPORATION PUMP DIVISION. NO. 99901369/2025-201, AND NOTICE OF NONCONFORMANCE

Dear Ms. Macias:

On March 24 - 28, 2025, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Flowserve's Corporation Pump Division (hereafter referred to as Flowserve) facility in Vernon, CA. The purpose of this limited-scope routine inspection was to assess Flowserve'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 specifically evaluated Flowserve's implementation of quality activities associated with the design, fabrication, and testing of American Society of Mechanical Engineers (ASME) and non-ASME safety-related pumps, and commercial-grade dedication of replacement parts and/or appurtenances for U.S. nuclear power plants. The enclosed report presents the results of the inspection. This NRC inspection report does not constitute NRC's endorsement of your overall quality assurance (QA) or 10 CFR Part 21 programs.

During this inspection, the NRC inspection team found that the implementation of your QA program failed to meet certain regulatory requirements imposed on you by your customers or NRC licensees. Specifically, the NRC inspection team determined that Flowserve was not fully implementing its QA program in the area of procurement document control, control of purchased material, equipment, and services, control of measuring and test equipment, corrective action, and commercial-grade dedication. 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), Flowserve should document the results of the extent of condition review for the findings and determine if there are any effects on other safety-related components.

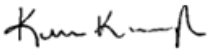
Please provide a written statement or explanation within 30 days from the date of this letter in accordance with the instructions specified in the enclosed NON. We will consider extending the response time if you show good cause for us to do so.

In accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," and the NRC's "Rule of Practice," a copy of this letter, its enclosure(s), and your response will

be made available electronically for public inspection in the NRC's Public Document Room or from the NRC's document system (ADAMS), accessible at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or Safeguards Information (SGI) so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information would create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information).

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

Sincerely,


Signed by Kavanagh, Kerri
on 05/23/25

Kerri Kavanagh, Chief
Quality Assurance and Vendor Inspection Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

Docket No.: 99901369

EPID No.: I-2025-201-0011

Enclosure:
Inspection Report No. 99901369/2025-201
and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT OF FLOWSERVE CORPORATION PUMP DIVISION. NO. 99901369/2025-201, AND NOTICE OF NONCONFORMANCE DATE: May 23, 2025

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DATE	5/14/2025	5/20/2025	5/23/2025

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NOTICE OF NONCONFORMANCE

Flowserve Corporation Pump Division
2300 East Vernon Ave.
Vernon, CA 90058

Docket No. 99901369
Report No. 2025-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the Flowserve Corporation Pump Division's (hereafter referred to as Flowserve) facility in Vernon, CA, from March 24 through March 28, 2025, Flowserve did not conduct certain activities in accordance with NRC requirements that were contractually imposed on Flowserve by its customers or NRC licensees:

A. Criterion III, "Design Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," states, in part, that "Measures shall 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."

   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."

   Step 2.2 of Section 2, "General Requirements," of Flowserve's procedure No. EE-1122, "Engineering Evaluation for the Dedication of Calibrations Services," Revision 5, dated September 27, 2023, states that the "EPRI Method 2 (Commercial Grade Survey) may be performed at the supplier's location or, when the item being calibrated is unable to be transported to the supplier location, may be performed through a witness activity at the NPO location (Bridgeport Method) and using the same dedication criteria to qualify the supplier quality program and product as described within this procedure. "

   Contrary to the above, as of March 28, 2025, Flowserve failed to ensure the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the calibration services. Specifically, Flowserve did not verify the control of the critical characteristics for the commercial-grade dedication of the calibration services for the granite surface plate and the balance machine.

   This issue has been identified as Nonconformance 99901369/2025-201-01.

B. Criterion IV, “Procurement Document Control,” of Appendix B to 10 CFR Part 50 states, in part, that “Measures shall be established to assure that applicable regulatory requirements, […] and other requirements which are necessary to assure adequate quality are suitably included or referenced in the documents for procurement of material, equipment, and services, whether purchased by the applicant or by its contractors or subcontractors.”

   Criterion VII of Appendix B to 10 CFR Part 50, states, in part, that “The effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee at intervals consistent with the importance, complexity, and quantity of the product or services.”

   Step 6.2 in Section 6, “Water Testing Requirements,” of Flowserve’s procedure No. GS-1553, “Deionized Water Control Specification for Nuclear and Safety Related Use,” Revision 6, dated December 5, 2024, states that “All deionized water samples shall be tested for the water quality limits specified in Paragraph 2.1. Testing shall be subcontracted to a qualified testing laboratory that has been surveyed and approved on the Flowserve Approved Vendor List.”

   Contrary to the above, as of March 28, 2025, Flowserve failed to (1) assure that applicable regulatory, technical, and quality requirements, which are necessary to assure adequate quality, were suitably included or referenced in the procurement documents for materials and services and (2) failed to assess the effectiveness of the control of quality by contractors and subcontractors. Specifically:

   1. Flowserve did not invoke the applicable regulatory, technical, and quality requirements in the procurement documents for the water testing services to ensure the water meets the chemistry requirements used in the hydrostatic testing and cleaning of the safety-related items. The specific regulatory, technical and quality requirements would depend on whether the testing services are procured as safety-related or as commercial as part of the commercial-grade dedication process.

   2. Flowserve did not perform an assessment of the water testing supplier to verify the adequate implementation of their quality controls associated with the supply of water testing services. Flowserve did not conduct an audit or a commercial-grade survey of the water testing supplier.

   This issue has been identified as Nonconformance 99901369/2025-201-02.

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

   Subsection 4.2.2.B.1 of Section 4.2, “Manufacturing Responsibilities,” of GS-1553, states that “1) The specific resistivity meter shall be maintained at the “1M” minimum limit.”

   Contrary to the above, as of March 28, 2025, Flowserve failed to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting

quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits. Specifically, Flowserve did not calibrate the specific resistivity meter used to monitor the deionized water to ensure the specific resistivity (the inverse of specific conductivity) is maintained at the 1 megohm-centimeter minimum limit and meet the water chemistry requirements for specific conductivity.

This issue has been identified as Nonconformance 99901369/2025-201-03.

D. Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50, states 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. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined, and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management."

Section 7.2 of Flowserve's procedure No. NPO-CNP-04, "Implementation of the Nuclear Products Operation Corrective Action Program", Revision 1, dated October 15, 2024, states, in part, that "…targeted lead time for [Corrective Action] closure is 55 days".

Section 4.0 of Flowserve's procedure No. NPO-ANP-02, "Internal Quality Audit Program", Revision 7, dated March 10, 2022, states, in part, that "findings require resolution through the Corrective Action Program process".

Contrary to the above, as of March 28, 2025, Flowserve failed to assure that conditions adverse to quality are promptly identified and corrected. Specifically:

1. Seven corrective action reports (CARs) were past the 55 days due date as required by Flowserve's procedure No. NPO-CNP-04. Of the seven CARs, two have been open for more than a year.

2. Flowserve's internal audits of the Corrective Action Program in 2023 and 2024 have identified issues with meeting the 55 day due date requirement for closing CARs.

This issue has been identified as Nonconformance 99901369/2025-201-04.

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 and Vendor Inspection Branch, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each noncompliance: (1) the reason for the noncompliance, or if contested, the basis for disputing the noncompliance; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid noncompliance; and (4) the date when your corrective action will be completed. Where good cause is shown, consideration will be given to extending the response time.

In accordance with the requirements of 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," of the NRC's "Rule of Practice," your response will be made available electronically for public inspection in the NRC's Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-

rm/adams.html. To the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information.

If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, “Protection of safeguards information: performance requirements.”

Dated this 23rd day of May, 2025.

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF REACTOR OVERSIGHT
VENDOR INSPECTION REPORT

Docket No.:	99901369		
Report No.:	99901369/2025-201		
Vendor:	Flowserve Corporation Pump Division 2300 East Vernon Ave. Vernon, CA 90058		
Vendor Contact:	Ms. Nancy Macias Facility Quality Supervisor Email: nmacias@flowserve.com		
Nuclear Industry Activity:	Flowserve Corporation Pump Division's (hereafter referred to as Flowserve) scope of supply includes design, fabrication, testing, of American Society of Mechanical Engineers (ASME) and non-ASME safety-related pumps, and commercial-grade dedication of replacement parts and/or appurtenances.		
Inspection Dates:	March 24-28, 2025		
Inspectors:	Aixa Belen Yamir Diaz-Castillo Andrea Keim Tiffany Lee	NRR/DRO/IQVB NRR/DRO/IQVB NRR/DRO/IQVB NRR/DRO/IQVB	Team Leader Trainee
Approved by:	Kerri Kavanagh, Chief Quality Assurance and Vendor Inspection Branch Division of Reactor Oversight Office of Nuclear Reactor Regulation		

EXECUTIVE SUMMARY

Flowserve Corporation Pump Division
99901369/2025-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a limited-scope routine vendor inspection at the Flowserve Corporation Pumps Division's (hereafter referred to as Flowserve) facility in Vernon, CA, to verify 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," and 10 CFR Part 21, "Reporting of Defects and Noncompliance." Furthermore, the NRC inspection verified that Flowserve had implemented a program in accordance with the applicable requirements of Section III, "Rules for Construction of Nuclear Facility Components," Section V, "Nondestructive Examination," and Section IX, "Welding and Brazing Qualification," of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, and the American Society for Nondestructive Testing SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing." This was the third NRC inspection at this facility. The last NRC inspection team of this facility was conducted on October 23 - 26, 2017.

This technically-focused inspection specifically evaluated Flowserve's implementation of the quality activities associated with design, fabrication, and testing of ASME and non-ASME safety-related pumps, and commercial-grade dedication of replacement parts and/or appurtenances for U.S. nuclear power plants.

Specific activities observed by the NRC inspection team included:

- Electrochemical etching on a stationary face retainer
- Receipt inspection and use of a vibration pen on two plates
- Final inspection of a sleeve shaft
- Removal of O-rings from the warehouse that were past the shelf-life expiration date
- Material Review Board meeting
- Inspections of washers and rings as part of the commercial-grade dedication process

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

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

During this inspection, the NRC inspection team implemented Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated February 10, 2023; IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated February 10, 2023; and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting of Defects and Noncompliance," dated February 10, 2023.

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

Commercial-Grade Dedication and Control of Purchase Material, Equipment, and Services

The NRC inspection team issued Nonconformance 99901369/2025-201-01 in association with Flowserve's failure to implement regulatory requirements of Criterion III, and Criterion VII, of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-01 cites Flowserve for failing to: (1) ensure the selection and review for suitability of application of material, parts, equipment, and processes that are essential to the safety-related functions of the calibration services; and (2) perform an inspection at the contractor or subcontractor source. Specifically, Flowserve did not verify the control of the critical characteristics for the commercial-grade dedication of the calibration services for the granite surface plate and the balance machine.

Procurement Document Control and Control of Purchase Material, Equipment, and Services

The NRC inspection team issued Nonconformance 99901369/2025-201-02 in association with Flowserve's failure to implement regulatory requirements of Criterion IV, and Criterion VII of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-02 cites Flowserve for failing to: (1) invoke the applicable regulatory, technical, and quality requirements in the procurement documents for the water testing services to ensure the water meets the chemistry requirements used in the hydrostatic testing and cleaning of the safety-related components, and (2) perform an assessment of the water testing supplier to verify the adequate implementation of their quality controls associated with the supply of water testing services.

Control of Measuring and Test Equipment

The NRC inspection team issued Nonconformance 99901369/2025-201-03 in association with Flowserve's failure to implement regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-03 cites Flowserve for failing to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits. Specifically, Flowserve did not calibrate the specific resistivity meter used to monitor the deionized water to ensure the specific resistivity is maintained at the 1 megohm-centimeter minimum limit and meet the water chemistry requirements for specific conductivity.

Corrective Action Program

The NRC inspection team issued Nonconformance 99901369/2025-201-04 for Flowserve's failure to implement the regulatory requirements of Criterion XVI of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-04 cites Flowserve for failing to assure that conditions adverse to quality are promptly identified and corrected.

Other Inspection Areas

The NRC inspection team determined that Flowserve established its programs for material traceability, control of special processes, inspection, and nonconformances in accordance with

the applicable regulatory requirements of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team also determined that Flowserve is implementing its policies and procedures associated with these programs. No findings of significance were identified in these areas. In addition, the NRC inspection team determined that Flowserve is implementing its 10 CFR Part 21 program for evaluating deviations and reporting defects that could create a substantial safety hazard in accordance with the applicable regulatory requirements. No findings of significance were identified in these areas.

REPORT DETAILS

1. Commercial-Grade Dedication

   a. Inspection Scope

   The U.S. Nuclear Regulatory Commission (NRC) inspection team reviewed Flowserve Corporation Pumps Division's (hereafter referred to as Flowserve) policies and implementing procedures that govern the implementation of its commercial-grade dedication (CGD) program to verify compliance with the regulatory requirements of Criterion III, "Design Control," and Criterion VII, "Control of Purchased Material, Equipment, and Services," 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."

   The NRC inspection team reviewed a sample of Flowserve's completed CGD packages for silicon carbide mechanical seal, washers, and mechanical rings. The NRC inspection team evaluated the criteria for the identification of the safety functions, selection of critical characteristics and acceptance criteria, selection of verification methods, and the justification provided for the sampling methodologies, as applicable, to verify effective implementation of Flowserve's CGD process. The NRC inspection team confirmed that Flowserve's CGD process provides reasonable assurance that the items and services being dedicated will perform their intended safety function.

   The NRC inspection team also reviewed Flowserve's measures established for the use of the International Laboratory Accreditation Cooperation (ILAC) accreditation process in lieu of performing commercial-grade surveys for procurement of calibration and testing services as part of the CGD process. Flowserve currently implements this process as described in the Nuclear Energy Institute document No. 14-05A, "Guidelines for the Use of Accreditation in Lieu of Commercial Grade Surveys for Procurement of Laboratory Calibration and Test Services," Revision 1, dated September 2020, which was recognized for use by the NRC in a safety evaluation dated November 23, 2020 (Agencywide Documents Access Management System Accession No. ML20322A019).

   The NRC inspection team also discussed the CGD program with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

   b. Observations and Findings

   During the review of Flowserve's implementation of the ILAC accreditation process as part of the CGD of calibration services, the NRC inspection team identified that it is not being adequately implemented in accordance with the requirements of Revision 1 of NEI 14-05A and the NRC's SE. For example, Flowserve did not include all of the conditions from the NRC's SE in the purchase orders (POs) for calibration services. In this case, the NRC inspection team identified that the following condition was missing from the POs: "Performance of the services listed on this order is contingent on the laboratory's accreditation having been achieved through an on-site accreditation assessment by the AB [accrediting body] within the past 48 months."

Further, the NRC inspection team noted that none of the calibration certificates or the laboratory documentation provided by the laboratory certified that the PO requirements have been met. One of the conditions from the NRC's SE states that: "It is validated, at receipt inspection, that the laboratory's documentation certifies that: (a) the contracted calibration or test services has been performed in accordance with the laboratory's 2017 edition of the International Standard Organization (ISO)/International Electrotechnical Commission (IEC) 17025, "General Requirements for the Competence of Testing and Calibration Laboratories," and (b) the purchase order's requirements are met."

The NRC inspection team determined these issues to be minor because: (1) they are a documentation issue; (2) they had no impact on the calibration services; and (3) the NRC inspection team confirmed the laboratories were accredited to the 2017 edition of ISO/IEC 17025. Flowserve initiated corrective action report (CAR) No. 202503-119111 to address these issues.

Flowserve's procedure No. EE-1122, "Engineering Evaluation for the Dedication of Calibrations Services," Revision 5, dated September 27, 2023, states that the CGD of calibration services can be performed by following the ILAC accreditation process, performing a commercial-grade survey, or performing a Bridgeport audit and/or source verification. Step 2.2 of Section 2, "General Requirements," of procedure No. EE-1122 states that the "EPRI [Electric Power Research Institute] Method 2 (Commercial Grade Survey) may be performed at the supplier's location or, when the item being calibrated is unable to be transported to the supplier location, may be performed through a witness activity at the NPO location (Bridgeport Method) and using the same dedication criteria to qualify the supplier quality program and product as described within this procedure."

Flowserve performs a witness activity called "Bridgeport audit," which is similar to a source verification, for items that are calibrated at Flowserve's facility by an external supplier. The Bridgeport audit checklist used by Flowserve includes the critical characteristics that are required to be verified during the calibration of the items and it also requires Flowserve to document the verification and acceptance of the critical characteristics in the checklist. During the review of a sample of CGD packages for calibration services, the NRC inspection team noted that Flowserve did not perform the Bridgeport audits to verify the suppliers' control of the critical characteristics for the commercial-grade dedication of the calibration services for the granite surface plate and the balance machine.

The NRC inspection team identified this issue as Nonconformance 99901369/2025-201-01 for Flowserve's failure to: (1) ensure the selection and review for suitability of application of material, parts, equipment, and processes that are essential to the safety-related functions of the calibration services; and (2) perform an inspection at the contractor or subcontractor source. Flowserve initiated CAR No. 202503-119313 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99901369/2025-201-01 in association with Flowserve's failure to implement regulatory requirements of Criterion III, and Criterion VII, of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-01 cites Flowserve for failing to (1) ensure the selection and review for suitability of application of material, parts, equipment, and processes that are

essential to the safety-related functions of the calibration services; and (2) perform an inspection at the contractor or subcontractor source. Specifically, Flowserve did not perform the Bridgeport audits to verify the suppliers' control of the critical characteristics for the commercial-grade dedication of the calibration services for the granite surface plate and the balance machine.

2. Procurement Document and Control and Supplier Oversight

   a. Inspection Scope

      The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its procurement document control and supplier oversight programs to verify compliance with the regulatory requirements of Criterion IV, "Procurement Document Control," and Criterion VII of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of POs, Flowserve's Approved Suppliers Lists (ASLs), external audit reports, including audits performed by the Nuclear Industry Assessment Committee (NIAC), and annual evaluations.

      For the review of the sample of POs, the NRC inspection team verified the POs included, as applicable: (1) the scope of work; (2) right of access to the suppliers' facilities; (3) extension of contractual requirements to sub-suppliers; (4) and the applicable technical, regulatory, and quality requirements.

      The NRC inspection team also reviewed a sample of external audit reports and verified that the audits reports included, as applicable: (1) an audit plan; (2) any findings identified and the associated corrective actions; (3) adequate documented objective evidence of compliance with the applicable requirements; and (4) a documented review by Flowserve's responsible management. The NRC inspection team confirmed that the NIAC audits were reviewed and verified to cover the scope of supply listed on the ASL and received review and approval by Flowserve's management. The NRC inspection team reviewed a sample of annual evaluations and confirmed they included the information required by Flowserve's policies and procedures.

      The NRC inspection team verified that the audits were performed in accordance with the established frequency and by qualified lead auditors and auditors. Furthermore, the NRC inspection team reviewed the training and qualification records of lead auditors and auditors and confirmed that auditing personnel had completed all the required training and had maintained the applicable qualification and certification in accordance with Flowserve's policies and procedures.

      In addition, the NRC inspection team reviewed a sample of receipt inspection records (e.g., receipt inspection reports, Certificates of Compliance), and confirmed that these records were: (1) reviewed by Flowserve for compliance with the requirements of the POs, (2) approved by qualified individuals, and (3) contained the applicable technical and regulatory information.

      The NRC inspection team also discussed the procurement document control and supplier oversight programs with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

During a walkthrough of Flowserve's facility, the NRC inspection team noted that Flowserve uses deionized water to perform hydrostatic testing and cleaning of the pumps and other safety-related items supplied by Flowserve.

Step 6.2 of Section 6, "Water Testing Requirements," of Flowserve's procedure No. GS-1553, "Deionized Water Control Specification for Nuclear and Safety Related Use," Revision 6, dated December 5, 2024, states that "All deionized water samples shall be tested for the water quality limits specified in Paragraph 2.1. Testing shall be subcontracted to a qualified testing laboratory that has been surveyed and approved on the Flowserve Approved Vendor List." The deionized water must be tested at an established frequency to ensure that it meets the applicable chemistry requirements. The water chemistry requirements used by Flowserve are from Table 304.1, "Water Requirements," from NQA-1, "Quality Assurance Program Requirements for Nuclear Facility Applications." The chemical analysis of the water used for hydrostatic testing and for the cleaning of safety-related items is significant because if out of specification, the impurities (e.g., pH, chloride, fluoride, sulfate) could be detrimental to the items' ability to perform their safety-related function during all plant operating conditions.

The NRC inspection team proceeded to ask Flowserve to provide the procurement documents issued to the testing laboratory performing the chemical testing of the deionized water as well as the assessments performed by Flowserve to verify the suppliers' implementation of their quality controls. Upon review of the procurement documents, the NRC inspection team identified that Flowserve did not invoke the applicable regulatory, technical, and quality requirements in the POs. In addition, Flowserve stated that they had not qualified or surveyed the testing laboratory to assess the quality controls associated with the supply of water testing services.

The NRC inspection team identified this issue as Nonconformance 99901369/2025-201-02 for Flowserve's failure to: (1) invoke the applicable regulatory, technical, and quality requirements in the procurement documents, and (2) perform an assessment of a supplier's quality controls. Flowserve initiated CAR No. 202503-119190 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99901369/2025-201-02 in association with Flowserve's failure to implement regulatory requirements of Criterion IV, and Criterion VII of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-02 cites Flowserve for failing to: (1) invoke the applicable regulatory, technical, and quality requirements in the procurement documents for the water testing services to ensure the water meets the chemistry requirements used in the hydrostatic testing and cleaning of the safety-related components, and (2) perform an assessment of the water testing supplier to verify the adequate implementation of their quality controls associated with the supply of water testing services.

3. Control of Measuring and Test Equipment

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its control of measuring and test equipment (M&TE) program to verify compliance with the regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50.

For a sample of M&TE, the NRC inspection team verified that the M&TE had the appropriate calibration stickers and current calibration dates, including the calibration due date. The NRC inspection team also verified that the M&TE had been calibrated, adjusted, and maintained at prescribed intervals prior to use. 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 confirmed that when M&TE equipment is found to be out of calibration, an out of tolerance report is initiated, and an evaluation is performed to determine if the M&TE was previously used. The NRC inspection team performed a walk-down of Flowserve's M&TE area to observe that M&TE were labeled, handled, and stored in a manner that indicated the calibration status of the instrument and ensured its traceability to calibration test data.

The NRC inspection team discussed the control of M&TE with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

During a walkthrough of Flowserve's facility, the NRC inspection team noted that there was a meter just above the deionizing water tanks. Flowserve stated that the meter measures the specific resistivity of the deionized water. Subsection 4.2.2.B.1 of Section 4.2, "Manufacturing Responsibilities," of Flowserve's procedure, GS-1553, states that "The specific resistivity meter shall be maintained at the "1M" minimum limit." This meter contains a shut-off device to stop the water flow when the specific resistivity of the deionized water falls below the 1 megohm-centimeter minimum limit when performing safety-related hydrostatic testing and/or cleaning safety-related items. Specific resistivity is an indicator of the quality of the deionized water and any impurities present in the deionized water could be detrimental to the items' ability to perform their safety-related function during all plant operating conditions.

The NRC inspection team asked Flowserve whether the specific resistivity meter was calibrated and part of Flowserve's M&TE program as it is relied upon to shut off and stop the water flow if the specific resistivity of the deionized water falls below the 1 megohm-centimeter minimum limit to prevent the introduction of impurities into safety-related items being hydrotested or cleaned. Flowserve stated that the specific resistivity meter was not calibrated, and not part of Flowserve's M&TE program.

The NRC inspection team identified this issue as Nonconformance 99901369/2025-201-03 for Flowserve's failure to assure that tools, gages, instruments, and other measuring

and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits. Flowserve initiated CAR No. 202503-119314 to address this issue.

c. Conclusion

The NRC inspection team issued Nonconformance 99901369/2025-201-03 in association with Flowserve's failure to implement regulatory requirements of Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-03 cites Flowserve for failing to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits. Specifically, Flowserve did not calibrate the specific resistivity meter used to monitor the deionized water to ensure the specific resistivity is maintained at the 1 megohm-centimeter minimum limit and meet the water chemistry requirements for specific conductivity.

4. Nonconforming Materials, Parts, or Components and Corrective Action

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its nonconforming materials, parts, or components and corrective action programs to verify compliance with the regulatory requirements of Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B, to 10 CFR Part 50. The NRC inspection team reviewed Flowserve's nonconformance reports (NCRs) and CAR logs and selected a sample of NCRs and CARs to verify that Flowserve had implemented an adequate program to ensure that nonconforming items are being adequately dispositioned, and that conditions adverse to quality, and significant conditions adverse to quality are promptly identified and corrected. The NRC inspection team verified that Flowserve processes and procedures provided for the identification, documentation, segregation, evaluation, and disposition of nonconforming items. Nonconformances can be dispositioned as "Use-As-Is," "Repair," "Rework," or "Scrap."

The NRC inspection team reviewed a sample of NCRs and confirmed that Flowserve: (1) dispositioned the NCRs in accordance with Flowserve's applicable policies and procedures; (2) documented an appropriate technical justification for various dispositions; and (3) took adequate corrective action with regards to the nonconforming items. The NRC inspection team also verified that Flowserve's NCRs provide a link to the 10 CFR Part 21 program.

The NRC inspection team discussed the nonconforming materials, parts, or components and corrective action programs with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team reviewed a sample of Corrective Action Reports (CARs) initiated by Flowserve for the past two years. Flowserve's procedure No. NPO-CNP-04,

"Implementation of the Nuclear Products Operation Corrective Action Program", Revision 1, dated October 15, 2024, states that the "targeted Corrective Action closure lead time is 55 days." The NRC inspection team noted that many of the CARs exceeded the 55 day closure time required by procedure No. NPO-CNP-04. The NRC inspection team specifically identified seven CARs that were past the 55 day closure time and currently remain open, with two of the CARs having been opened for more than a year. The NRC inspection team proceeded to review Flowserve's internal audit reports of the Corrective Action Program (CAP) for 2023 and 2024. The NRC inspection team noted that the internal audit reports identified issues with the timely closure of CARs. In 2023, the average closure time for CARs was 106 days. Flowserve initiated closed CAR No. 202035-77242 following the 2023 internal audit to address this issue. However, the NRC inspection team observed that the 2024 internal audit report of the CAP documented the timely closure of CARs as a recurring programmatic issue. The lead auditor identified this as a deficiency within the CAP and documented this issue as a finding in the 2024 internal audit report. Flowserve Procedure No. NPO-ANP-02, "Internal Quality Audit Program", Revision 7, dated March 10, 2022, states that "findings require resolution through the Corrective Action Program process". However, the NRC inspection team noted that Flowserve did not open a CAR to address the finding identified by the lead auditor and documented in the 2024 internal audit report.

The NRC inspection team identified this issue as Nonconformance 99901369/2025-201-04 for Flowserve's failure to assure that conditions adverse to quality are promptly identified and corrected. Flowserve initiated CAR No. 202503-119308 to address this issue.

c. Conclusion

The NRC inspection team concluded that Flowserve is implementing its nonconforming materials, parts, or components in accordance with the regulatory requirements of 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 Flowserve is implementing its policies and procedures associated with its nonconforming materials, parts, or components program.

The NRC inspection team issued Nonconformance 99901369/2025-201-04 for Flowserve's failure to implement the regulatory requirements of Criterion XVI of Appendix B to 10 CFR Part 50. Nonconformance 99901369/2025-201-04 cites Flowserve for failing to assure that conditions adverse to quality are promptly identified and corrected.

5. Design Control

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and procedures that govern the implementation of its design control program to verify compliance with the regulatory requirements of Criterion III of Appendix B to 10 CFR Part 50.

The NRC inspection team noted that all the design control work performed by Flowserve is in the area of replacement parts (e.g., pipe flanges, N-seal, rotating elements). The NRC inspection team reviewed a sample of design reports, design qualification reports,

stress analysis reports, and design checklists for a pump, rotating element, seal pipe flanges, and N-seal. The NRC inspection team verified that the customer requirements were adequately translated into the applicable Flowserve's drawings, instructions, procedures, bill of material, and specifications. The NRC inspection team verified the documentation included the applicable technical and regulatory requirements as required by customer specifications, Flowserve's procedures and the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code requirements. The NRC inspection team verified the design work was performed and independently verified by qualified personnel.

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

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

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

6. Material Traceability

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its identification and control of materials, parts, and components program to verify compliance with the requirements of Criterion VIII, "Identification and Control of Materials, Parts, and Components," of Appendix B to 10 CFR Part 50.

The NRC inspection team performed a walk-down of Flowserve's facility and verified that materials, parts, and/or components were marked and/or identified in accordance with Flowserve's policies and, as applicable. The materials, parts, and/or components were marked and/or identified with either a production order No., part No., lot No., material specification, serial No., and PO No., or a combination there of, depending on whether it's a single item or an assembly. Flowserve implements several methods for marking and/or identification including metal ink, bags/tags, electrochemical etching, vibrating pen, low stress stamps, laser identification, and programmed hand-held system.

For a sample of Certified Material Test Reports (CMTRs), the NRC inspection team confirmed that the identification markings were: (1) traceable to design and shop drawings; (2) remained legible through the manufacturing process; and (3) applied using materials and methods that provided a clear and legible identification and did not

adversely affect the function or service life of items.

The NRC inspection team observed the receipt inspection of two safety-related plates 1.5-inches thick and the electrochemical etching on a safety-related stationary face retainer. During the receipt inspection, the NRC inspection team noted the Quality Control (QC) Technician used calibrated measuring and test equipment (M&TE) and the vibrating pen to mark the plates. The NRC inspection team confirmed that the marking of the plates and the stationary face retainer was performed in accordance with Flowserve's policies and procedures.

The NRC inspection team also observed the removal of elastomeric seals in the form of O-rings from the warehouse that were past the shelf-life expiration date. These O-rings are the only products in Flowserve's inventory that have shelf-life requirements. The O-rings are stored in the nuclear aisle of the warehouse. The NRC inspection team confirmed that the O-rings packages had the cure date and the shelf-life in years marked on the label.

In addition, the NRC inspection team reviewed the training and qualification records of the QC Technicians and confirmed that the QC personnel had completed all the required training and had maintained the applicable qualification and certification in accordance with Flowserve's policies and procedures.

The NRC inspection team also discussed the material traceability program with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

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

7. Control of Special Processes

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its control of special processes program to verify compliance with the requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50, and with the applicable requirements of Section III, "Rules for Construction of Nuclear Facility Components," Section V, "Nondestructive Examination," and Section IX, "Welding and Brazing Qualification," of the ASME B&PV Code, and the American Society for Nondestructive Testing (ASNT) SNT-TC- 1A,

"Personnel Qualification and Certification in Nondestructive Testing."

Welding

There were no safety-related welding activities performed during the week of the inspection. As such, the NRC inspection team reviewed a sample of completed welding records, including Welding Procedure Specifications (WPS) and their associated Procedure Qualification Records (PQR). The NRC inspection team confirmed that the welding records, including the WPSs and PQRs, contained the required information in accordance with the applicable Flowserve's welding procedures and the applicable requirements of Section IX of the ASME B&PV Code. The NRC inspection team also verified that welding activities were performed by qualified welders.

The NRC inspection team performed a walk-through of the weld storage area and confirmed that weld rods were being adequately stored and controlled to prevent degradation, inadvertent use, or loss of traceability in accordance with the Flowserve's applicable welding procedures. The NRC inspection team also verified that the process for issuing weld filler metal was controlled in accordance with the Flowserve's applicable welding procedures. The NRC inspection team noted that the weld area was secured, clean, and protected from wind and moisture.

The NRC inspection team also reviewed the welder performance qualifications and continuity records for sample of welders. The NRC inspection team confirmed that the welders had completed the required training and had maintained their training and qualification in accordance with Flowserve's welding procedures and the applicable requirements of Sections III and IX of the ASME B&PV Code.

Non-destructive Examination (NDE)

There were no safety-related NDE activities performed during the week of the inspection. As such, the NRC inspection team reviewed a sample of completed NDE records associated with magnetic particle testing (MT), and liquid penetrant testing (PT). The NRC inspection team confirmed that the NDE reports contained the required information in accordance with Flowserve's NDE procedures and the applicable requirements of Section V of the ASME B&PV Code. The NRC inspection team also verified that NDE activities were performed by qualified NDE personnel.

The NRC inspection team also reviewed a sample of Flowserve's NDE personnel training and qualification records and confirmed that the NDE personnel had completed the required training and had maintained their qualifications in accordance with Flowserve's NDE procedures and the applicable requirements of ASNT SNT-TC-1A and Sections III and V of the ASME B&PV Code.

The NRC inspection team also discussed the control of special processes program with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

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

8. Inspection

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its inspection program to verify compliance with the requirements of Criterion X, "Inspection," of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed a sample of production orders, which include information such as hold or witness points, inspection pre-requisites, inspection equipment used, acceptance criteria, inspection personnel, and the results. The NRC inspection team confirmed that all the inspections required as part of the production orders were performed in accordance with Flowserve's policies and implementing procedures.

The NRC inspection team observed the final inspection of a safety-related sleeve shaft using the coordinate-measuring machine (CMM). The CMM is a device that measures the geometry of items by sensing points on the surface of the object with a probe. The NRC inspection team verified that the CMM was calibrated and that the QC Technician was adequately trained and qualified to sue the CMM.

The NRC inspection team also discussed the inspection program with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that Flowserve is implementing its inspection program in accordance with the regulatory requirements of 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 Flowserve is implementing its policies and procedures associated with the inspection program. No findings of significance were identified.

9. Internal Audits

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its internal audits program to verify compliance with the regulatory requirements of Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50.

The NRC inspection team reviewed a sample of Flowserve's internal audit reports performed in 2022, 2023, and 2024. The NRC inspection team verified that Flowserve's procedure described the scope and purpose of audits to be performed, the frequency, audit criteria, and corrective actions when required. For the sample of internal audits reviewed, the NRC inspection team verified that the audit reports included: (1) an audit plan; (2) the audit results; (3) adequately documented objective evidence with the applicable requirements; and (4) a review by Flowserve's responsible management. The NRC inspection team verified that the internal audits were performed by qualified auditors who were not auditing their own work and that the internal audits were performed using the appropriate checklists.

The NRC inspection team discussed the internal audits program with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

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

10. 10 CFR Part 21 Program

a. Inspection Scope

The NRC inspection team reviewed Flowserve's policies and implementing procedures that govern the implementation of its Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," program to verify compliance with the regulatory requirements. The NRC inspection team evaluated the 10 CFR Part 21 postings and a sample of Flowserve's purchase orders (POs) to verify compliance with the requirements of 10 CFR 21.6, "Posting Requirements," and 10 CFR 21.31, "Procurement Documents." The NRC inspection team also verified that Flowserve's nonconformance and corrective action procedures provide a link to its 10 CFR Part 21 program.

Furthermore, for a sample of 10 CFR Part 21 evaluations performed by Flowserve, the NRC inspection team verified that Flowserve had effectively implemented the requirements for evaluating deviations and failures to comply. The NRC inspection team verified that the notifications were performed in accordance with the requirements of 10 CFR 21.21, as applicable.

The NRC inspection team discussed the 10 CFR Part 21 program with Flowserve's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that Flowserve 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 Flowserve is adequately implementing its policies and procedures associated with the 10 CFR Part 21 program. No findings of significance were identified.

11. Entrance and Exit Meetings

On March 24, 2025, the NRC inspection team discussed the scope of the inspection with Mr. Moises Lira, Flowserve's Plant Manager and other members of Flowserve's management and technical staff. On March 28, 2025, the NRC inspection team presented the inspection results during an exit meeting with Mr. Lira and other members of Flowserve'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 by the NRC inspection team.

ATTACHMENT

1. ENTRANCE/EXIT MEETING ATTENDEES

Name	Title	Affiliation	Entrance	Exit	Interviewed
Moises Lira	Plant Manager	Flowserve Corporation Pump Division (Flowserve)	X	X	X
Nancy Macias	Facility Quality Supervisor	Flowserve	X	X	X
Keith Wilson	Charlotte Facility Quality Manager	Flowserve	X	X	X
Elizabeth Brizuela	Inventory Manager	Flowserve	X	X	X
Thomas Yim	Vernon Products Operations Manager	Flowserve	X	X	
Deanna Llamas	Supply Chain Manager	Flowserve	X	X	X
Bhavana Parvathareddy	Engineer Manager	Flowserve	X	X	
Bridgette Mason	Materials Manager	Flowserve		X	
Mark Elzik	Aftermarket Manager	Flowserve		X	
Miguel Vergara	Manufacturing Engineering Supervisor	Flowserve		X	
Kristopher Veizaga	Engineering Supervisor	Flowserve	X	X	X
Gerry DelValle	Production Supervisor	Flowserve	X	X	
Hiep Lee	Quality Control Supervisor	Flowserve	X	X	X
V.A. George	Senior QA Engineer	Flowserve	X	X	X
Paul Francis	Senior QA Engineer	Flowserve	X		
Gerardo Galvan	QA Engineer	Flowserve	X	X	X

Name	Title	Affiliation	Entrance	Exit	Interviewed
Enrique Villegas	QA Engineer	Flowserve	X		
Gerald Muendz	QC Inspector	Flowserve			X
Ruben Nuñez	QC Inspector	Flowserve			X
Jonathan Han	QC Inspector	Flowserve			X
Enrique Arellano	Manufacturing Engineer	Flowserve	X		
Ronald Schneeberger	Metallurgist	Flowserve	X	X	X
Andre Kranemann	CI Leader	Flowserve	X	X	
Sean Scott	Project Engineer	Flowserve	X	X	X
Ramy Ibrahim	Engineering Specialist	Flowserve	X		
Benjamin Busse	Engineering Specialist	Flowserve	X		
Millette Patricio	Calibration Technician	Flowserve			X
Sadq Hall	Inventory Control Lead	Flowserve			X
Daisy Martinez	Buyer	Flowserve			X
April Dominguez	Sale Support Representative	Flowserve	X		
David P. Gobbi	Quality Assurance (QA) Consultant	Flowserve	X	X	X
Gregory Miller	Authorized Nuclear Inspector	Hartford Steam Boiler			X
Aixa Belen	Inspection Team Leader	Nuclear Regulatory Commission (NRC)	X	X	
Yamir Diaz-Castillo	Inspector	NRC	X	X	

Name	Title	Affiliation	Entrance	Exit	Interviewed
Andrea Keim*	Inspector	NRC	X	X	
Tiffany Lee	Inspector	NRC	X	X	
Kerri Kavanagh*	Branch Chief	NRC		X	

*Remote

2. INSPECTION PROCEDURES USED

- Inspection Procedure (IP) 43002, “Routine Inspections of Nuclear Vendors,” dated February 10, 2023
- IP 43004, “Inspection of Commercial-Grade Dedication Programs,” dated February 10, 2023
- IP 36100, “Inspection of 10 CFR Part 21 and Programs for Reporting of Defects and Noncompliance,” dated February 10, 2023

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	Description
99901369/2025-201-01	OPENED	NON	Criterion III and VII
99901369/2025-201-02	OPENED	NON	Criterion IV and VII
99901369/2025-201-03	OPENED	NON	Criterion XII
99901369/2025-201-04	OPENED	NON	Criterion XVI

4. DOCUMENTS REVIEWED

Policies and Procedures

- Flowserve Nuclear Products Operations (NPO), “Nuclear Quality Assurance Manual 10CFR App B, 10CFR21, ANSI N-45.2, NQA-1, ASME Section XI, NBIC-NR, GSR-3, CSA N299, ISO-9001,” Edition 3, Revision 9, dated April 26, 2024
- Flowserve NPO, “ASME Code Nuclear Quality Assurance Manual,” Edition 6, Revision 4, dated February 14, 2025
- AS-1505, “Acceptance Standard for Liquid Penetrant Examination (ASME Code Section III, Subsection NB),” Revision 0, dated October 30, 1985

- AS-1515, “Acceptance Standard for Magnetic Particle Examination of Ferromagnetic Materials ASME Section III Service,” Revision A, dated May 20, 2023

- CP-1578, “Preservation, packaging and marking of elastomeric seals for controlled shelf-life service,” Revision G, dated May 31, 2013

- EE-1122, “Engineering Evaluation for the Dedication of Calibration Services,” Revision 5, dated September 26, 2023

- GS-1640, “Alloy Verification Procedure Using Niton X-Ray Fluorescent Alloy Analyzers,” Revision E, dated July 8, 2015

- GS-8020, “Change Notice Progression,” Revision 5, dated November 22, 2019

- HP-1501, “Hydrostatic Test Procedure for Pressure Containing Parts for ASME Class 1 Nuclear Pumps,” Revision 12, dated July 27, 2021

- HR-1005, “Hydrostatic Test Conditions for BWR Pumps Pressure Containing Parts,” Revision A, dated September 4, 1998

- ID-1000, “Parts Identification Methods, Location, and Content Nuclear Power Products,” Revision 6, dated September 11, 2023

- IP-1500, “General Inspection Requirements for Nuclear Spare Parts,” Revision D, dated July 31, 1989

- IP-1792, “Inspection of Nuclear Seal Components for Residual Magnetism,” Revision A, dated May 3, 2017

- MEW-001, “Welder’s Stamps,” Revision C, dated July 15, 2005

- MT-1508, “Magnetic Particle Examination Procedure Wet Fluorescent and Dry Methods ASME Section III Components,” Revision 11, dated December 25, 2023

- NPO-ACP-04, “Implementing Procedure - Supplier Audits,” Revision 1, dated September 14, 2017

- NPO-ACP-09, “Requirements for Qualifying Supplier Quality Programs, Accepting Supplier Products and Services and for the Maintenance of the NPO Approved Vendors List,” Revision 2, dated May 19, 2020

- NPO-ACP-10, “Requirements for the Application and Use of Method 2, Commercial Grade Survey and Method 3, Source Verification for Commercial Grade Dedication,” Revision 2, dated March 21, 2023

- NPO-ANP-02, “Internal Quality Audit Program,” Revision 7, dated March 10, 2022

- NPO-CNP-04, “Implementation of the Nuclear Products Operations Corrective Action Program, Revision 1, dated October 15, 2024

- NPO-DNP-05, “Engineering Design Control”, Revision 3, dated January 23, 2025
- NPO-DNP-01, “Dedication of Commercial Grade Items for 10CFR50 Applications”, Revision 00, dated December 21, 2013
- NPO-E-100, “Engineering Department Nuclear Engineering Authorized Approval List, Revision 27, dated September 18, 2024
- NPO-E-102, “Quality Level Classification”, Revision A, dated August 30, 2005
- NPO-E-105, “Utilizing Commercial Items as Safety-Related Components”, Revision 5, dated September 10, 2024
- NPO-E-116, “Nuclear Drawing Control,” Revision 1, dated May 24, 2019
- NPO-E-117, “Nuclear Drawing Review,” Revision 5, dated August 19, 2022
- NPO-E-122, “Reconciliation of ASME Code items,” Revision 1, dated September 25, 2023
- NPO-ECP-03, “Auditor Training and Qualification Requirements,” Revision 0, dated September 10, 2012
- NPO-NNP-03, “Reporting of Defects Which May Result in Substantial Safety Hazards (10CFR21), Revision 1, dated May 2, 2013
- NPO-NNP-206, “Energy Reorganization Act of 1974 - Section 206, Noncompliance,” Revision 12, dated March 18, 2025
- NPO-P-104, “Processing of Procurement within Purchasing,” Revision 0, dated July 18, 2013
- NPO-P-109, “Trailer Text for Purchase Orders,” Revision 6, dated June 23, 2022
- NPO-P-116, “Purchase Oder Content Control,” Revision 1, dated October 8, 2019
- NPO-P-121, “Supplier Deviation Requests,” Revision B, dated July 28, 2017
- NPO-QNP-04, “Management Responsibility and Review” Revision 2, dated January 21, 2025
- NPO-QNP-08, “Annual Evaluations and Performance Assessments of NPO Qualified Material Organizations,” Revision 0, dated August 8, 2018
- PT-1505, “Liquid Penetrant Examination ASME Section III Subsection NB for Class 1 Primary Coolant Components,” Revision 16, dated April 2, 2024
- QA-1104, “Written Practice for Inspector and Test Personnel,” Revision E, dated July 27, 2015

- QA-1717, “Control of Nonconforming Items,” Revision D, dated July 25, 2016
- QA-1783, “Receiving Inspection Procedure,” Revision 5, dated February 5, 2025
- QA-1784, “In-Process and Final Inspection Procedure,” Revision 6, dated January 27, 2022
- QA-1790, “Nuclear Material Review Board Authorization List,” Revision 2, dated January 21, 2025
- WC-1000, “Filler Metal Storage & Control,” Revision 18, dated January 19, 2024
- WP-1040, “Fabrication and Repair Welding Gas Tungsten Arc Welding Process P-8 Austenitic Stainless Steel,” Revision D, dated April 4, 2017
- WP-1544, “Fabrication and Repair Welding Gas Tungsten Arc Welding Process P-8 Austenitic Stainless Steel,” Revision D, dated April 4, 2017

Design Control and Commercial-Grade Dedication Records

- Engineering Record Checklist Sales Order No. RCLU00316, dated June 18, 2024
- EE-1007, “Engineering Evaluation of Retaining Rings for Assembly Retention Applications,” Revision 0, dated February 23, 1994
- EE-1120, “Engineering Evaluation of Silicon Carbide Mechanical Seal Face Material,” Revision A, dated May 20, 2013
- EE-1053, “Engineering Evaluation for the Dedication of Miscellaneous Small Machined Parts for Safety Related Service,” Revision 0, dated October 10, 1997
- EE-1122, “Engineering Evaluation for the Dedication of Calibration Services,” Revision 5, dated September 27, 2023
- EE-1142, “Engineering Evaluation for the Dedication of Material Hardening Services for Safety Related Parts,” Revision B, dated April 21, 2015
- GS-1892, Reconciliation Document New N-9000 for Westinghouse 93AS Pump Prairie Island Nuclear Power Station, Revision A, dated April 15, 2014.
- NPO-DNF-01, “Design Control Review Summary for N-9000 Westinghouse 93AS Pump,” Job No. RLCU00316, dated June 21, 2024
- SR-0772, “Structural Design Report - PCM upgrade for the Browns Ferry Primary Coolant Pumps,” Revision 2, dated October 4, 2024
- SR-0773, “Rotating Assembly Report - PCM Upgrade for the Browns Ferry Primary Coolant Pumps,” Revision 2, dated October 2, 2024
- SR-1517, “Design Qualification Report of the N9000 N-Seal Pressure Boundary for the

Westinghouse Reactor Coolant Pumps Model 93AS," Revision D, dated November 30, 2015

- SR-1525, "Design Qualification Report of the N9000 N-Seal modified Seal Pipe Flanges for the Westinghouse Reactor Coolant Pumps Model 93AS," Revision B, dated November 30, 2015

- Commercial-Grade Survey Report No. 2021-34, dated January 20, 2022

- Commercial-Grade Dedication for a Washer, Part No. 10578694, Production Order No. RLSZ02488

- Commercial-Grade Dedication for a Ring, Part No. 7003303, Production Order No. RLSA 37296

- Commercial-Grade Dedication for a Silicon Carbide Mechanical Seal, Part No. 7007437, Production Order No. RLSZ00564

- Commercial-Grade Dedication Packages for Calibration Services:

  - Customer Service Request (CSR) No. 2483 for a granite surface plate, dated July 1, 2024
  - CSR N. 2490 for a mass flow meter, dated August 15, 2024
  - CSR No. 2514 for a balancing machine, dated October 07, 2024
  - CSR No. 2520 for a torque multiplier pneumatic, dated February 28, 2025
  - CSR No. 2560 for a gage block set, dated February 10, 2025
  - CSR No. 2572 for a digital volt meter and ammeter, dated March 6, 2025

Internal Audits Records

- Internal Quality Audit Schedule/Log: 2022, dated January 26, 2023

- Internal Quality Audit Schedule/Log: 2023, dated May 5, 2024

- Internal Quality Audit Schedule/Log: 2024, dated February 10, 2025

- Internal Quality Audit Schedule/Log: 2025, dated February 12, 2025

- INT-22-007, "Order Entry," dated August 5, 2022

- INT-22-008, "Design Control," dated August 5, 2022

- INT-22-010, "Purchased Items and Services," dated August 5, 2022

- INT-22-011, "Instructions, Procedures, and Drawings" dated August 5, 2022

- INT-22-014, "Inspection and Commercial Grade Dedication," dated August 5, 2022

- INT-22-015, "Special Processes," dated August 5, 2022

- INT-22-019, “Nonconformance Control,” dated August 5, 2022
- INT-22-020, “Corrective Action,” dated August 5, 2022
- INT-22-021, “Audits,” dated January 26, 2023
- INT-23-007, “Order Entry,” dated September 28, 2023
- INT-23-008, “Design and Software Control,” dated September 28, 2023
- INT-23-010, “Purchased Items and Services,” dated September 28,2023
- INT-23-011, “Instructions, Procedures, and Drawings” dated September 28, 2023
- INT-23-014, “Inspection and Commercial Grade Dedication,” dated September 28, 2023
- INT-23-015, “Special Processes,” dated September 28, 2023
- INT-23-019, “Nonconformance Control,” dated September 28, 2023
- INT-23-020, “Corrective Action,” dated September 28, 2023
- INT-24-007, “Order Entry,” dated September 18, 2024
- INT-24-010, “Purchased Items and Services,” dated September 18, 2024
- INT-24-011, “Instructions, Procedures, and Drawings” dated September 18, 2024
- INT-24-014, “Inspection and Commercial Grade Dedication,” dated September 18, 2024
- INT-24-015, “Special Processes,” dated September 18, 2024
- INT-24-019, “Nonconformance Control,” dated September 27, 2024
- INT-24-020, “Corrective Action,” dated September 27, 2024

Supplier Oversight Records

- PO No. RLLU15326 for four hex cap screws, dated December 18, 2024
- PO No. RLLA31292 for a pump housing gear, dated February 2, 2024
- PO No. RLLA31036 for a mechanical seal, dated August 4, 2023
- PO No. RLLU14959 for a forging, dated June 10, 2024
- PO No. RLLU14853 for a shaft sleeve, dated April 24, 2024
- PO No. RLLU14435 for 25 stationary face retainers, dated July 27, 2023

- PO No. RLLU15255 for two 1.5 inches thick plates, dated November 1, 2024
- PO No. RLLU14732 for water testing services, dated January 29, 2024
- PO No. 305279 for etching fluid, dated August 28, 2024
- Flowserve Approved Vendors List (AVL) Vernon NPO and Charlotte, dated March 18, 2025
- Flowserve AVL Vernon NPO and Charlotte - Suppliers of Product for QL-1 and QL-3, Safety Related Classifications, dated January 31, 2025
- Flowserve AVL Vernon NPO and Charlotte NCSC Non-Safety Related (QL-5 and Service Suppliers), dated January 31, 2025
- Nuclear Industry Assessment Corporation (NIAC) Triennial/Qualified Material Organization (QMO) Audit Report No. 31557, dated July 31, 2024
- NIAC Triennial/QMO Audit Report No. 2023-009, dated July 13, 2023
- NIAC Triennial/QMO Audit Report No. 20841, dated May 18, 2023
- NIAC Supplier Audit Report No. 2810, dated April 27, 2023
- Annual Assessment Audit Report No. 27072, dated January 23, 2023
- Annual Assessment Audit Report No. 2024-018, dated August 19, 2024
- Annual Assessment Audit Report No. 31608, dated April 19, 2024
- Annual Assessment Audit Report No. 2024-022, dated October 7, 2024
- Supplier (QMO) Annual Evaluation and Performance Assessment Report for Supplier No. 100014001, dated February 12, 2025
- Supplier (QMO) Annual Evaluation and Performance Assessment Report for Supplier No. 100015005, dated February 12, 2025
- Supplier (QMO) Annual Evaluation and Performance Assessment Report for Supplier No. 800000115, dated February 12, 2025
- Supplier (QMO) Annual Evaluation and Performance Assessment Report for Supplier No. 100033332, dated February 12, 2025

<u>Calibration, Inspection and Test Records</u>

- CSR No. 2554 for the calibration of the welding ovens, Revision 0, dated January 22, 2025

- Certificate of Conformance (CoC) for PO No. RLLU15326, ASME Section II and III, Division 1, Subsection ND, 1998 Edition, 2000 Addenda, Class 3, dated February 24, 2025

- CoC for PO No. RLLA31292, ASTM B148-18, Grade C95200, dated July 8, 2024

- CoC for PO No. RLLA31036, Bill of Material No. 155085-GS-N3, Tag No. 10141537, dated October 21, 2022

- CoC for PO No. RLLU14435, Part No. 12122194, Heat No. 293235, dated November 8, 2024

- CoC/Certified Material Test Report (CMTR) for PO No. RLLU14959, ASME SA182 Code Section II, Part A 1989 Edition, No Addenda, Revision 2, dated September 18, 2024

- CoC/CMTR for PO No. RLLU14853, ASTM A705-23, Grade 17CR-4NI, Tag No. 1464A, dated July 15, 2024

- CoC/CMTR for PO No. RLLU15255, ASTM A240-23, Heat No. 212177, dated January 16, 2025

- Certificate of Calibration for an Oven-Dry Rod/Thermometer Small 265F, Test No. 156830.03, PO No. CSR 2554, ID No. A732/Oven No. 8, dated January 29, 2025

- Certificate of Calibration for an Oven-Dry Rod/Thermometer Small 260F, Test No. 156830.10, PO No. CSR 2554, ID No. A739/Oven No. 7, dated January 29, 2025

- Certificate of Calibration for an Oven-Dry Rod/Thermometer Intermediate 280F, Test No. 156830.11, PO No. CSR 2554, ID No. A740/Oven No. 1, dated January 29, 2025

- Certificate of Calibration for a pressure gage, Gage ID No. 16-53, Calibration Date: March 20, 2025

- Certificate of Calibration for a digital caliper, Gage ID No. 3848, Calibration Date: December 12, 2024

- Certificate of Calibration No. 5523631031547555 for a caliper, ID No. 3777, dated January 29, 2025

- Certificate of Calibration No. 21530-08/12 for a mag field indicator, Serial No. 4854, Calibration Date: February 6, 2025

- Certificate of Calibration for an XRF analyzer, Serial No. 90850, dated November 15, 2024

- Certificate of Compliance for PO No. 305279, Batch No. 24170 (no date provided)

- Drawing No. L110910, “Sleeve, Shaft Middle,” Revision H, dated April 19, 2000

- Drawing No. G100974, “Stationary Face Retainer,” Revision A, dated June 20, 1988

- Deionized Water Testing Report for December 2024, Work Order No. 24L0027
- Deionized Water Testing Report for January 2025, Work Order No. 25A0029
- Deionized Water Testing Report for February 202525, Work Order No. 25B0438
- Deionized Water Testing Report for March 2025, Work Order No. 25C0122
- Inspection Report for PO No. RLLA31422, Production Order No. RLSZ02978, Operation No. 120, Drawing No. L105140, Upper Thermowell, Item No. 7006727, ASME SA-182, Grade F316, dated March 20, 2025
- Inspection Report for PO No. RLLU13610, Production Order No. RLSA35688, Operation No. 160, Drawing No. L107330, Heater, Item No. RLCU003037011692, ASME A182, Grade F316L, dated January 4, 2024

Welding & NDE

- Welding Filler Metal Storage and Control Checklist, dated January 3, 2025
- Liquid Penetrant Testing Nondestructive Examination Report (NDE) for PO No. RLLU14222, Production Order No. RLSA37106, Operation No. 110, Drawing No. DWG053267, Seal Flange, Item No. RLCU0031910527027, ASME SA-182, Grade F316, dated March 5, 2025
- Magnetic Particle Testing NDE Report for Production Order No. RLSA36612, Operation No. 170, Drawing No. FO1331320, Impeller, Item No. RLCU003116953784, ASTM A-487, Grade CA6NM Class A, dated January 11, 2024
- Procedure Qualification Record (PQR) No. P-2167, Welding Process: Gas Tungsten Arc Welding (GTAW), Type: Manual, Approved for Use on May 11, 2005
- PQR No. P-2557, Welding Process: GTAW, Type: Manual, Approved for Use on May 11, 2005
- Welder Performance Qualification Record for Antonio Willis, Welding Process: GTAW, Type; Manual, ASME SA-312 Type 316L, dated October 8, 2015
- Welder Performance Qualification Record for Antonio Willis, Welding Process: GTAW, Type; Manual, ASME SA-106 Grade B, dated January 2, 2013

10 CFR Part 21 Evaluations

- Formal Evaluation of Graphalloy Liners, Bushings, and Bearings Associated with CAR No. 202310-86940
- Formal Evaluation of N7500 O-Rings Associated with Trending CAR No. 202410-110051
- Formal Evaluation of Incorrect O-Ring Size Associated with CAR No. 202105-27979

- Formal Evaluation of Undocumented Dedication of Lockbolts Associated with CAR No. 202408-105053

Nonconformance Reports (NCRs)

- 24771, 25016, 25140, 26003, 26124, 26656, 26838, 26119, 26611, and 26980

Corrective Action Reports (CARs)

- 202307-82562, 202310-86940, 202310-86943, 202312-90738 202402-95356, 202501-115726, and 202501-114830

Corrective Action Reports Opened During the Inspection

- 202503-119111, 202503-119190, 202503-119258, 202503-119308, 202503-119311, 202503-119313, 202503-119314, 202503-119316, and 202503-119319

Training and Qualification Records

- J. Han - Quality Control (QC) Inspector
- R. Nunez - QC Inspector
- G. Muendz - QC Inspector
- M. Patricio - Calibration Technician
- O. Torres - Liquid Penetrant Testing Level II
- B. Boothe - Lead Auditor
- B. Hodge - Lead Auditor
- R. Donatucci - Lead Auditor
- G. Galvan - Lead Auditor