



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

September 3, 2021

Mr. Joe Ghiardi
Quality Assurance Director
Curtiss-Wright Nuclear - Nova
18001 Sheldon Road
Middleburg Heights, OH 44130

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF
CURTISS-WRIGHT NUCLEAR – NOVA, NO. 99901052/2021-201

Dear Mr. Ghiardi:

From July 19 through July 23, 2021, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at the Curtiss-Wright Nuclear – Nova (Nova) facility in Middleburg Heights, OH. The purpose of this limited-scope inspection was to assess Nova's compliance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," and selected portions of Appendix B, "Quality Assurance Program Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

This technically-focused inspection specifically evaluated Nova's implementation of the quality activities associated with design control associated for commercial-grade dedication and reverse engineering, and fabrication and testing of safety-related components being supplied to the U.S. operating nuclear power plants. The enclosed report presents the results of the inspection. This NRC inspection report does not constitute NRC endorsement of Nova's overall quality assurance (QA) or 10 CFR Part 21 programs.

Based on the results of this inspection, the NRC inspection team found the implementation of your QA program met the applicable technical and regulatory requirements imposed on you by your customers or NRC licensees. No findings of significance were identified.

In accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," of the NRC's "Rules of Practice," a copy of this letter, and its enclosure(s), will be made available electronically for public inspection in the NRC Public Document Room and from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions concerning this matter, please contact Mr. Aaron Armstrong of my staff at (301) 415-8396.

Sincerely,

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

Docket No.: 99901052

EPID No.: I-2021-201-0050

Enclosure:

1. Inspection Report No. 99901052/2021-201
and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF
NOVA MACHINE PRODUCTS, NO. 99901052/2021-201
DATED: SEPTEMBER 3, 2021

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NRR-106

OFFICE	NRR/DRO/IQVB	NRR/DRO/IQVB	NRR/DRO/IQVB
NAME	AKeim	YLaw	PPrescott
DATE	08/26/2021	08/26/2021	08/26/2021
OFFICE	NRR/DRO/IQVB	NRR/DRO/IQVB	
NAME	AArmstrong	KKavanagh	
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**U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF REACTOR OVERSIGHT
QUALITY ASSURANCE AND VENDOR INSPECTION REPORT**

Docket No.: 99901052

Report No.: 99901052/2021-201

Vendor: Curtiss-Wright Nuclear – Nova
18001 Sheldon Road
Middleburg Heights, OH 44130

Vendor Contact: Mr. Joe Ghiardi
Director of Quality Assurance
Curtiss-Wright Nuclear – Nova
Email: jghiardi@curtisswright.com

Nuclear Industry Activity: The Curtiss-Wright Nuclear - Nova facility is located in Middleburg Heights, Ohio. This facility provides safety-related fasteners and machined components for U.S. nuclear power plants.

Inspection Dates: July 19 - 23, 2021

Inspection Team Leader Aaron Armstrong NRR/DRO/IQVB Team Lead

Inspectors: Paul Prescott NRR/DRO/IQVB
Yiu Law NRR/DRO/IQVB
Andrea Keim NRR/DRO/IQVB

Approved by: Kerri A. Kavanagh, Chief
Quality Assurance and Vendor Inspection Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

Curtiss-Wright Nuclear - NOVA

99901052/2021-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a vendor inspection at the Curtiss-Wright Nuclear - Nova (Nova) facility in Middleburg Heights, OH 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" and 10 CFR Part 21, "Reporting of Defects and Noncompliance." This was the fifth NRC vendor inspection at Nova.

This technically-focused inspection specifically evaluated Nova's implementation of the quality activities associated with the design control associated with commercial-grade dedication (CGD) and reverse engineering, and fabrication and testing of safety-related fasteners and machined components being supplied to U.S. operating nuclear power plants.

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 of Defects and Noncompliance," dated May 16, 2019.

The NRC inspection team concluded that Nova'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 Nova's personnel are implementing these policies and procedures effectively. The results of this inspection are summarized below.

10 CFR Part 21 Program

The NRC inspection team reviewed Nova's policies and implementing procedures that govern the implementation of its 10 CFR Part 21 program to verify compliance with the requirements of 10 CFR Part 21. The NRC inspection team: 1) reviewed the 10 CFR Part 21 postings; 2) reviewed a sample of purchase orders; 3) verified that Nova's nonconformance and correction action programs provide a link to the 10 CFR Part 21 program; 4) reviewed a sample of 10 CFR Part 21 evaluations; and 5) verified that Nova's employee training records show that they fully understand and are in compliance with 10 CFR Part 21 as it pertains to their jobs. No findings of significance were identified.

Nonconforming Materials, Parts, or Components and Corrective Action

The NRC inspection team reviewed Nova's policies and implementing procedures that govern the nonconforming materials, parts, or components and corrective action program to verify compliance with the 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 a sample of Nova’s nonconformance and corrective action reports. No findings of significance were identified.

Design Control/Reverse Engineering

The NRC inspection team reviewed Nova’s policies and implementing procedures that govern the implementation of its design control program to verify compliance with the requirements of Criterion III, “Design Control,” and Criterion VII, “Control of Purchased Material, Equipment, and Services,” of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of Nova’s reverse engineering packages. The NRC inspection team reviewed technical evaluations, engineering information reports, purchase order technical requirements, shop orders, certified material test reports, and component test results associated with the reverse engineering packages. No findings of significance were identified.

Design Control/Commercial-Grade Dedication

The NRC inspection team reviewed Nova’s policies and implementing procedures that govern the CGD program to verify compliance with the requirements of Criterion III, “Design Control,” and Criterion VII “Control of Purchased Material, Equipment, and Services,” of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of Nova’s surveys, procurement documents and CGD packages. No findings of significance were identified.

Identification and Control of Materials, Parts, and Components

The NRC inspection team reviewed Nova’s policies and implementing procedures that govern the implementation of its identification and control of materials, parts, and components process to verify compliance with the regulatory requirements of Criterion VIII, “Identification and Control of Materials, Parts, and Components,” of Appendix B to 10 CFR Part 50. The NRC inspection team walked down the process of a work order from getting material from the stockroom through processing, testing, and shipping. No findings of significance were identified.

Control of Special Processes

The NRC inspection team reviewed Nova’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. The NRC inspection team reviewed completed reports associated with nondestructive testing (NDT) of components. In addition, the NRC inspection team reviewed Nova’s certification and qualification records of NDT personnel and confirmed they were qualified in accordance with regulatory requirements. No findings of significance were identified.

Control of Measuring and Test Equipment (M&TE)

The NRC inspection team reviewed Nova’s policies and implementing procedures that govern the implementation of its control of M&TE program to verify compliance with the requirements of Criterion XII, “Control of Measuring and Test Equipment,” of Appendix B to 10 CFR Part 50. The NRC inspection team observed that M&TE was calibrated, labeled, tagged, handled, stored, or otherwise controlled to indicate the calibration status and its traceability to nationally recognized standards. In addition, the NRC inspection team confirmed that when M&TE is

found to be out of calibration, Nova initiated a nonconformance report and performed an evaluation to determine the extent of condition. No findings of significance were identified.

Oversight of Suppliers and Internal Audits

The NRC inspection team reviewed Nova's policies and implementing procedures that govern the implementation of its oversight of suppliers and internal audit programs to verify compliance with the regulatory requirements of Criterion VII, "Control of Purchased Material, Equipment, and Services" and Criterion XVIII, "Audits," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed the frequency of the internal audits, supplier audits/surveys and evaluations, the independence and qualification of auditors, the audit/survey reports' objective evidence, and verified findings were captured in the corrective action program. No findings of significance were identified.

REPORT DETAILS

1. 10 CFR Part 21 Program

a. Inspection Scope

The U.S. Nuclear Regulatory Commission (NRC) inspection team reviewed Curtiss-Wright Nuclear – Nova’s (Nova’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 also evaluated the 10 CFR Part 21 postings and a sample of Nova’s purchase orders (POs) 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 21.31, “Procurement Documents.” In addition, the NRC inspection team also verified that Nova’s nonconformance and corrective action procedures provide a link to the 10 CFR Part 21 program. Furthermore, for a sample of 10 CFR Part 21 evaluations performed by Nova, the NRC inspection team verified that Nova had effectively implemented the requirements for evaluating deviations and failures to comply. The NRC inspection team also verified that Nova employees have up to date training records and that they fully understand and are in compliance with 10 CFR Part 21 as it pertains to their jobs.

The NRC inspection team also discussed the 10 CFR Part 21 program with Nova’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 Nova was 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 Nova was implementing its policies and procedures associated with the 10 CFR Part 21 program. No findings of significance were identified.

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

a. Inspection Scope

The NRC inspection team reviewed Nova’s policies and implementing procedures that govern the control of nonconformances and corrective action to verify compliance with the requirements of Criterion XV, “Nonconforming Materials, Parts, or Components,” and Criterion XVI, “Corrective Action,” 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,” respectively. Additionally, the NRC inspection team interviewed Nova’s personnel to verify there were designated areas to segregate and control nonconforming materials.

The NRC inspection team discussed the nonconforming materials, parts, or components and corrective action programs with Nova's management and technical personnel.

The NRC inspection team also reviewed Nova's corrective actions in response to the inspection findings identified in NRC Inspection Report (IR) No. 99901052/2015-201 dated January 15, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16006A394). The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observations and Findings

b.1. Corrective Action Associated with Notice of Violation No. 99901052/2015-201-01

Following the December 2015 inspection at Nova, the NRC issued Notice of Violation (NOV) No. 99901052/2015-201-01 for failure to evaluate a deviation potentially associated with a substantial safety hazard as soon as practical and within 60 days of discovery. Specifically, Nova initiated Corrective Action Request (CAR) #246 on January 24, 2014 to document a leakage issue concerning two hydraulic control unit (HCU) accumulators. However, Nova failed to identify a deviation associated with the degraded accumulators and subsequently did not perform a Part 21 evaluation in accordance with 10 CFR 21.21(a)(1).

In response to NOV 99901052/2015-201-01, Nova issued CAR #281 on December 3, 2015, as well as updated its procedure MIP 061704 to address this issue. The NRC inspection team reviewed the updated procedure and documentation which provided objective evidence that Nova's corrective actions were adequate. In addition, the NRC inspection team reviewed current implementation of the updated procedure and a sample of CARs that resulted in Part 21 evaluations.

The NRC inspection team determined that Nova's corrective actions were adequate to address the NOV. Based on the review of the corrective actions, the NRC inspection team closed NOV 99901052/2015-201-01.

b.2. Corrective Action Associated with Nonconformance No. 99901052/2015-201-02

The NRC issued Notice of Nonconformance (NON) 99901052/2015-201-02 for failure to establish adequate design control measures to verify and check the adequacy of the design of HCU accumulators. Nova reverse engineered and fabricated approximately 881 safety-related HCU accumulator assemblies without proper design verification by use of calculational methods or through a suitable testing program.

Nova issued CAR # 279 in response to the NRC's finding. Nova requested that the licensee provide specific information on the design parameters for the HCU accumulators and initiated a design analysis verification review. Nova also performed an extent of condition of previous safety-related reverse engineered items. The historical review indicated that only single piece parts were reverse engineered. Nova also reviewed and revised the Reverse Engineering Work Instruction.

The NRC inspection team reviewed MA30669, "Design and Seismic Analysis Report for Nova HCU Scram Accumulator," Project No. 801159, dated June 6, 2016. The

design and seismic analysis report presented the results of the stress analysis and design verification of Nova's HCU accumulators. The NRC inspection team noted that the stresses were found to be within the specified allowable stresses for accumulator part materials. The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section III was used as a basis for the analysis. Also included in MA30669 was an operability analysis to verify that piston motion would not be affected by seismic deflections and clearances between components during stroking of the piston. Based on the analysis, the accumulators were qualified for use in accordance with the associated PO and test plan.

The NRC inspection team reviewed MA30648, "Design Verification Test Report for Nova HCU Scram Accumulator," Project No. 801159, dated June 17, 2016. The report detailed the design verification testing performed on Nova's HCU accumulators. A sub-supplier performed analysis and testing to demonstrate that the accumulators met critical design parameters and functional requirements. The sub-supplier employed type testing based on the Institute of Electrical and Electronics Engineers (IEEE) 382-2006, "Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations." The NRC inspection team determined that the design verification testing documented in MA30648 demonstrated that Nova's accumulators operated within design parameters and in accordance with specified performance requirements.

The NRC inspection team reviewed the changes made to "Safety-related Reverse Engineering Work Instruction," No. 7.1.1, Revision 7, dated April 20, 2021 and reviewed a sample of recently reverse engineered items. The NRC inspection team determined that Nova's corrective actions were adequate to address the NON. Based on the review of the corrective action implementation, the NRC inspection team closed NON 9991052/2015-201-02.

b.3 Corrective Action Associated with Nonconformance 99901052/2015-201-03

The NRC issued NON 9991052-2015-201-03 for failure to establish adequate measures for the selection and review for suitability of application of materials and processes that are essential to the safety related functions of the structures, systems, and components. Nova also failed to assure that purchased material and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents.

Nova issued CAR # 283 in response to the NRC's finding. The NRC inspection team reviewed the commercial-grade dedication (CGD) plans CGD 2016-004 and CGD 2016-005 which incorporated additions of quality control lab checks for plating and verification of material requirement conformance, respectively. In addition, the NRC inspection team reviewed a sample of plating company and material supplier POs, commercial-grade surveys, critical characteristics such as material control, nonconforming material control, process control, and test control. The NRC inspection verified that appropriate critical characteristics were verified by Nova. Based on objective evidence reviewed, the NRC inspection team closed NON 99901052/2015-201-03.

b.4 Corrective Action Associated with Nonconformance 99901052/2015-201-04

The NRC issued NON 99901052/201-04 for failure to verify that audits were performed by personnel not having direct responsibilities in the areas being audited.

Nova issued CAR # 280 in response to the NRC's finding. The NRC inspection team reviewed a sample of audits and verified that internal audits were performed by individuals not having direct responsibility in the areas being audited. The NRC inspection team verified that the 2018, 2019, and 2020 internal audits were performed by an external contracted firm. Based on this review, the NRC inspection team closed NON 9991052/2015-201-04.

c. Conclusion

The NRC inspection team concluded that Nova is implementing its nonconforming materials, parts, or components and corrective action program activities in accordance 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. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team determined that Nova is implementing its policies and procedures associated with nonconforming materials, parts, or components and corrective action program activities. No findings of significance were identified.

3. Design Control/Reverse Engineering

a. Inspection Scope

The NRC inspection team reviewed Nova's policies and implementing procedures that govern the implementation of its design control to verify compliance with the requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed technical evaluations, engineering information reports, purchase order technical requirements, shop orders, certified material test reports, component test results associated with the reverse engineering packages and discussed the program changes with Nova's management.

The NRC Inspection team reviewed reverse engineering evaluations for an American Society for Testing and Materials (ASTM) Standard screws, American Iron and Steel Institute (AISI) Standard screws, a stem, nut and disk assembly, air compressor inlet tube to ASTM, and a blind flange to the ASME Standard. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observation and Findings

The NRC inspection team noted that Nova had modified its reverse engineering process in response to the NRC's NON 99901052/2015-201-02 (Section 2.b.2). If the request is for a component rather than an item, Nova's procedure now requires communication directly with the customer. The component will not be supplied unless written authorization is received absolving Nova from design qualification responsibilities. Dimensions and material attributes required to fully specify the part for manufacturing as an exact duplicate of the original will be determined and considered critical characteristics for the safety-related reverse engineering request. Nova's process, as described in work instruction No. 7.1.1, Revision 7, focuses on reverse

engineering of generic items, as procedurally defined. A generic item is an item that has all attributes in full conformance with a recognized consensus standard, such as the ASME, International Organization for Standardization (ISO) or the Society of Automotive Engineering (SAE) for dimension, material, and mechanical properties.

c. Conclusion

The NRC inspection team concluded that Nova 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 Nova is implementing its policies and procedures associated with the design control program. No findings of significance were identified.

4. Design Control/Commercial-Grade Dedication

a. Inspection Scope

The NRC inspection team reviewed Nova's policies and implementing procedures that govern the implementation of its CGD to verify compliance with the requirements of Criterion III and Criterion VII "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. The NRC inspection team also reviewed Nova's policies and implementing procedures that govern oversight of contracted commercial items and services to verify compliance with the requirements of Criterion IV, "Procurement Document Control," and Criterion VII of Appendix B to 10 CFR Part 50. The NRC inspection team discussed the CGD process with Nova's management. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

The NRC inspection team reviewed the CGD methodology for items and services for safety-related replacement snubber components, including the development of critical characteristics (CCs), technical evaluations, failure mode and effects analysis, acceptance criteria methods, sampling methodology, checklists, survey reports, and associated POs. The NRC inspection team reviewed the CGD process for several various product types. Components reviewed included, but were not limited to threaded rod and various types of fasteners. The NRC inspection team evaluated a sample of technical evaluations and concluded that the technical evaluations in the dedication methodology appropriately identified the CCs necessary to provide reasonable assurance that the item would perform its intended safety function.

The NRC inspection team reviewed procedures and controls for CGD of calibration or testing services and ensured the appropriate requirements were imposed in the procurement documents. The NRC inspection team reviewed a sample of POs to verify inclusion, as appropriate, of the scope of work and the extension of contractual requirements to subcontractors. The NRC inspection team reviewed Nova's Approved Suppliers List (ASL) and selected a sample of suppliers to review the methodology of conducting and documenting surveys. The NRC inspection team reviewed Nova's process of selecting and approving commercial suppliers and service providers. The NRC inspection team verified that Nova had prepared and approved plans that identify the scope and applicable CCs to be verified before initiation of the survey. The attachment to this inspection report lists the documents reviewed and the personnel interviewed by the NRC inspection team.

b. Observation and Findings

No findings of significance were identified.

c. Conclusion

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

5. Identification and Control of Materials, Parts, and Components

a. Inspection Scope

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

The NRC inspection team performed a walk down and observed the processing and testing of a safety related order. The NRC inspection team walked down the following areas: stockroom, processing floor, testing, nonconforming material storage, and final testing and shipping. The NRC inspection team confirmed that materials were adequately identified with Nova's unique identification code, which is traceable to the POs and vendor certification reports. The NRC inspection team verified that Nova personnel appropriately maintained identification and traceability markings during the various stages of fabrication.

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

b. Observation and Findings

No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that Nova is implementing its audit program 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 and activities observed, the NRC inspection team determined that Nova is implementing its policies and procedures associated with the internal audit program. No findings of significance were identified.

6. Control of Special Processes

a. Inspection Scope

The NRC inspection team reviewed Nova's policies and implementing procedures that govern the implementation of its manufacturing control program to verify compliance with the regulatory requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50. During the week of the inspection, the NRC inspection team observed a non-destructive testing (NDT) activities being performed on 1 3/8", A/SA 540 grade B23, Class 3, nut body. The NRC inspection team reviewed the NDT procedure. The NRC inspection team verified that the applicable NDT was adequately performed and recorded in accordance with Nova's procedures. Also, the NRC verified Nova personnel qualification meets the applicable requirements of Sections III of the ASME B&PV Code. The NRC inspection team confirmed that the NDT personnel were qualified in accordance with the requirements of ASNT SNT-TC-1A and ASME Section III. The NRC inspection team also discussed the control of special processes program with Nova's management and technical staff. The attachment to this inspection report lists the documents reviewed by the NRC inspection team.

b. Observation and Findings

No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that Nova is implementing its audit 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 and activities observed, the NRC inspection team determined that Nova is implementing its policies and procedures associated with the control of special processes. No findings of significance were identified.

7. Control of Measuring and Test Equipment (M&TE)

a. Inspection Scope

The NRC inspection team reviewed Nova's policies and implementing procedures that govern the implementation of its control of the 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.

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 M&TE had been calibrated, adjusted, and maintained at prescribed intervals prior to use. The calibration records associated with the M&TE indicated the as-found or as-left conditions, accuracy required, calibration results, calibration dates, the due date for recalibration, and the applicable National Institute of Standards and Technology traceable reference equipment used in the calibration.

The NRC inspection team also verified that when M&TE is found to be out of tolerance when being calibrated or when the M&TE is lost, Nova initiates a nonconformance report to identify items that have been accepted using this equipment since the last valid

calibration date and to perform an extent of condition evaluation. In addition, the NRC inspection team performed a walk-down of Nova's calibration laboratory to ensure that equipment located in the M&TE storage area, the M&TE hold area, and inspection and test facility 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 attachment to this inspection report lists the documents reviewed and the personnel interviewed by the NRC inspection team.

b. Observation and Findings

No findings of significance were identified.

c. Conclusion

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

8. Oversight of Suppliers and Internal Audits

a. Inspection Scope

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

The NRC inspection team reviewed a sample of internal audits to verify the scope, frequency, and independence of the auditors from the topic they were auditing. Additionally, the NRC inspection team reviewed Nova's approved suppliers list (ASL) and selected a sample of suppliers to review the methodology of conducting and documenting audits and surveys to verify adequate evaluation of the sub-supplier's quality practices. The NRC inspection team reviewed Nova's process for conducting audits at an established frequency. The NRC inspection team verified that Nova had prepared and approved plans that identified the audit or survey scope and applicable checklist criteria before the initiation of the audit or survey activity.

The NRC inspection team also discussed the oversight of suppliers and internal audit programs and the performance of audits and surveys with Nova's management and technical staff. The attachment to this inspection report lists the documents reviewed and personnel interviewed by the NRC inspection team.

b. Observation and Findings

The NRC inspection team identified a process in the Nova Quality Assurance Manual, Section 6, "Purchasing" and Procedure 7.3, "Purchasing" that states for certified material organizations and certificate holders (ASME), these vendors are not required to be surveyed/audited by Nova. These statements are in opposition to the guidance in NRC Information Notice (IN) 86-21, "Recognition of American Society of Mechanical

Engineers Accreditation Program for N Stamp Holders.” IN 86-21 clarifies the NRC’s recognition of the programmatic aspects of the ASME Accreditation Program but also that licensees and contractors are responsible for ensuring that the supplier is effectively implementing the approved quality assurance program. The NRC inspection team did not identify any vendors that had not been audited or surveyed. Nova entered this issue into their corrective action program under CAR #349.

In addition, the NRC inspection team observed the ASL contained vendors with no evaluation date, or evaluation due date listed. Consequently, some vendors did not receive periodic evaluations. The Nova ASL includes commercial grade suppliers that Nova dedicates the products for safety related use. The NRC inspection team did not identify any issues with these vendors. Nova entered this issue into their corrective action program under CAR #351.

No findings of significance were identified

c. Conclusion

The NRC inspection team concluded that Nova is implementing its audit program in accordance with the regulatory requirements of Criterion VII, and Criterion XVIII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and activities observed, the NRC inspection team determined that Nova is implementing its policies and procedures associated with the internal audit program.

9. Entrance and Exit Meetings

On July 19, 2021, the NRC inspection team discussed the scope of the inspection with Mr. Joe Ghiardi, Quality Assurance Manager, and Nova’s management. On July 23, 2021, the NRC inspection team presented the inspection results and observations during an exit meeting with Mr. Joe Ghiardi and Nova’s management. The attachment to this report lists the attendees of the entrance and exit meetings, as well as those individuals whom the NRC inspection team interviewed.

ATTACHMENT

1. Entrance/Exit Meeting Attendees and Persons Interviewed

Name	Title	Affiliation	Entrance	Exit	Interviewed
Aaron Armstrong	Inspection Team Leader	NRC	X	X	
Paul Prescott	Inspector	NRC	X	X	
Yiu Law	Inspector	NRC	X	X	
Andrea Keim	Inspector	NRC	X	X	
Kerri Kavanagh	Branch Chief	NRC		X*	
Rob Yeomans	General Manager	Nova	X	X	
Tim Franchuk	Quality Assurance Director	Nova	X	X	
Joe Ghiardi	Quality Assurance Director	Nova	X	X	
Ed Baus	Operations Director	Nova	X	X	
Mike Rea	Sales/Procurement Director	Nova	X	X	
Jason Heilbrun	RE Manager	Nova	X	X	
Frank Star	Supervisor Engineering Tech	Nova	X	X	
Nick Rini	Machanic/Machinist	Nova			X
Ray Barrett	Warehouse Clerk	Nova			X
Zack Britton	QC Inspector	Nova			X
Jennifer Demarco	Lead Certification Specialist	Nova			X
Harold James	Shipping	Nova			X
Timothy Zisko	Testing Tech	Nova			X
Dan Zapotosky	Testing Tech	Nova			X
Teresa Parker	Sup QA Control	Nova			X
Anthony Fabri	Testing Tech	Nova			X

* Via teleconference

2. INSPECTION PROCEDURES USED

- Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated May 16, 2019
- IP 43002, "Routine Inspections of Nuclear Vendors," dated January 27, 2017
- IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated January 27, 2017

3. DOCUMENTS REVIEWED

Policies and Procedures

- Nova Machine Products, Inc. Quality Assurance Manual, Rev. 1, dated January 2, 2021
- Work Instruction (WI) 7.1.1, "Safety Related Reverse Engineering Work Instruction," Rev. 7, dated April 20, 2021
- WI 7.3.5, "Warehouse Vendor Material Traceability," Revision 1, dated September 26, 2005
- WI 7.3.8, "Heat Treating," Rev. 7, dated April 20, 2021
- WI 7.3.20, "Commercial Grade Dedication," Rev. 4, dated April 20, 2021
- WI 8.2.1, "Qualification of Audit Personnel," Revision 7, dated June 8, 2011
- WI 8.3.1, "10 CFR 21," Rev. 10, dated April 30, 2015
- WI 7.8.5, "Tread Ring Gauge Calibration," Rev. 0, dated August 29, 2005
- WI 7.8.6, "Tread Set Plug /Tread Plug Gage," Rev. 0, dated August 29, 2005
- WI 7.8.1, "Caliper Calibration," Rev. 0, dated August 30, 2005
- Procedure 7.2, "Contract Review and Amendments," Revision 4, dated July 19, 2010
- Procedure 7.3, "Purchasing," Revision 6, dated February 10, 2016
- Procedure 7.5, "Product Identification and Traceability," Rev. 3, dated November 20, 2014
- Procedure 7.8, "Control of Inspection, Measuring and Test Equipment," Rev. 13, dated April 20, 2021
- Procedure 8.2, "Internal Audits," Rev. 2, dated November 20, 2014
- Procedure 8.3, "Control of Nonconforming Product," Rev. 4, dated November 20, 2014
- Procedure 8.7, "Continual Improvement Through Corrective and Preventive Actions," Rev. 4, dated October 13, 2016
- Procedure MIP 061704, "Accumulator Assembly Manufacturing and Inspection Plan," Rev. 4, dated July 2011
- Procedure MIP 061704, "Accumulator Assembly Manufacturing and Inspection Plan," Rev. 5, dated February 2014

Nonconformances/Corrective Actions

- Nonconforming Report #EXT00003005, dated May 01, 2018
- Nonconforming Report #EXT00003115, dated November 29, 2018
- Nonconforming Report #EXT00003128, dated December 19, 2018
- Nonconforming Report #EXT00003138, dated January 08, 2019
- Nonconforming Report #EXT00003296, dated January 10, 2020
- Nonconforming Report #EXT00003297, dated January 10, 2020
- Nonconforming Report #EXT00003354, dated May 21, 2020
- Nonconforming Report #EXT00003395, dated September 16, 2020
- CAR 0000246, dated January 24, 2014
- CAR 0000281, dated December 03, 2015
- CAR 0000275, dated December 1, 2015
- CAR 0000276, dated December 1, 2015
- CAR 0000276, dated December 1, 2015
- CAR 0000277, dated December, 2, 2015
- CAR 0000279, dated December 08, 2015

- CAR 0000280, dated December 3, 2015
- CAR 0000282, dated December 8, 2015
- CAR 0000283, dated December 11, 2015
- CAR 0000300, dated June 30, 2017
- CAR 0000307, dated February 28, 2018
- CAR 0000308, dated April 13, 2018
- CAR 0000313, dated October 02, 2018
- CAR 0000314, dated December 11, 2018
- CAR 0000331, dated October 20, 2020
- CAR 0000340, dated April 24, 2021

Corrective Actions Generated during this Inspection

- CAR 0000349, dated July 20, 2021
- CAR 0000350, dated July 20, 2021
- CAR 0000351, dated July 21, 2021

10 CFR Part 21 Reports

- Curtiss-Wright Letter, "Interim Report Regarding Qualification/Verification Testing of Reversed Engineered (HCU) Accumulators Used in the Control Rod Drive System of Boiling Water Reactors," dated February 02, 2016
- Curtiss-Wright Letter, "Final Report Regarding Qualification/Verification Testing of Reversed Engineered (HCU) Accumulators Used in the Control Rod Drive System of Boiling Water Reactors," dated June 01, 2016.
- Curtiss-Wright Letter, "Initial Notification for Nova Machine Products Hex Cap Screws Produced from One Heat of Material," dated July 13, 2017
- Curtiss-Wright Letter, "Written Notification for Nova Machine Products Hex Cap Screws Produced from One Heat of Material," dated August 09, 2017

Procurement Documents

- Purchase Order (PO) 315244, dated February 13, 2015
- PO 3176957, dated July 27, 2017
- PO 3202570, dated January 4, 2021
- PO 3625143, dated February 24, 2018
- PO 3205187, dated June 23, 2021
- PO 4500695516, dated June 22, 2021
- PO 4501162813, dated June 17, 2021
- PO 10638204, dated April 2, 2021
- PO 01603180, dated June 6, 2021
- PO 6886217, dated June 28, 2021
- PO 10645178. Dated June 23, 2021

Work Orders

- 16 UNC 2A x 1 ¾" Hex Cap Screw, dated August 16, 2017
- 20 UNC 2A x 1 ¼" Hex Cap Screw, dated June 23, 2021

Measuring and Testing Equipment (M&TE) Records

- Calibration Record for CT-04, Temp Indicator, due date July 31, 2012
- Calibration Record for HT-10, Furnace Controller (Lucifer), due date July 31, 2012
- Calibration Record for HT-11, Oven Controller (Lucifer), due date July 31, 2012
- Calibration Record for HT-12, Chart Recorder (Honeywell) due date July 31, 2012
- Calibration Record for C-161C, 6" Caliper, July 31, 2012
- Calibration Record for HT-12, Chart Recorder (Honeywell) due date July 31, 2012
- PO 320442 for Calibration of HT10 and HT2, Revision 0, dated May 3, 2021

Commercial-Grade Surveys (CGD)/Audit Reports

- Nova Machine Products Approved Vendor List, dated July 19, 2021
- CGD Plan for Job Number 439554, dated March 07, 2016
- CGD Package for Plating Company
- Assessment Evaluation to Plating Company, dated October 23, 2018
- Annual Supplier Evaluation for Plating Company for Year 2019
- Annual Supplier Evaluation for Plating Company for Year 2020
- Certificate of Registration for Plating Company, Quality Management System ISO 9001:2015, dated March 01, 2018
- Nova NCA-3800 Audit/Commercial Grade Checklist for Plating Company, dated October 23, 2018
- Plating Company Quality System Manual, dated August 21, 2017
- Nova Commercial Grade Survey Critical Characteristics for Plating Company, dated January 04, 2008
- Commercial Grade Item/Service Summary for Plating Company, dated October 23, 2018
- IA-2020-01, 2020 Internal Audit Report, dated July 31, 2020
- IA-2019-01, 2019 Internal Audit Report, dated July 19, 2019
- IA-2018-01, 2018 Internal Audit Report, dated July 31, 2020
- Supplier Survey Report Thermal Processing, dated October 6, 2020
- Supplier NCA-4255.5 Audit Report, dated September 22, 2018
- Supplier NCA-3800/Commercial Grade Checklist (services only),” dated September 20, 2018
- Survey for Heat Treating, dated December 28, 2018
- Supplier Survey Report, dated December 17, 2018
- Supplier NCA-3800 Report, dated June 28, 2018
- CGD Package for PO 4501151970, dated April 2021
- CGD Package for PO 6819571, dated June, 2021
- Commercial Grade Technical Evaluation (CGTE) #2, “Square Bolt, Hex Head,” dated March 2016
- CGTE #43, “Square Bolt, Hex Head,” dated October 18, 2009
- Material Commercial Grade Technical Evaluation (MCGTE) #50, “Material Commercial Grade Technical Evaluation ASTM 468,” dated April 23, 2009
- MCGTE #25, “Material Commercial Grade Technical Evaluation A/AS-325,” dated April 23, 2009
- CDG plan 2013-004, “Outside Process – Plating or Coating,” Revision 2, Date December 1, 2020
- CDG plan 2013-005, “Outside Process – Heat Treating,” Revision 0, Date February 9, 2016

Training Records

- Lead Auditor Qualification for JS dated January 17, 2020
- Lead Auditor Qualification for FF dated December 9, 2020
- Level II Magnetic Particle training TZ, dated April 23, 2020

Others

- Certificate of Compliance/Conformance 470624, Rev. 1, dated March 12, 2018
- Email Communication between Nova and Exelon from April 06, 2017 to June 06, 2017
- Certificate of Compliance/Conformance 518856, Revision 0, dated July 21, 2021