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

March 14, 2019

Mr. Scott Borland
Quality Assurance Manager
HydroAire Services, Inc.
834 W. Madison
Chicago, IL 60607

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF HYDROAIRE SERVICES, INC., NO. 99902072/2019-201, NOTICE OF NONCONFORMANCE

Dear Mr. Borland:

From January 28 through February 1, 2019, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at HydroAire Services, Inc. (hereafter referred to as HydroAire) facilities in Chicago, IL. The purpose of this limited-scope routine inspection was to assess HydroAire'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 HydroAire's implementation of the quality activities associated with design, fabrication, assembly, and testing of safety-related pumps 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 HydroAire's overall quality assurance (QA) or 10 CFR Part 21 programs.

Based on the results of this inspection, the NRC inspection team found that the implementation of your QA program did not meet certain regulatory requirements imposed on you by your customers or NRC licensees. Specifically, the NRC inspection team determined that HydroAire was not fully implementing its QA program in the areas of control of measuring and test equipment and instructions, procedures, and drawings. The specific finding and references to the pertinent requirements are identified in the enclosures to this letter. In response to the enclosed notice of nonconformance (NON), HydroAire should document the results of the extent of condition review for the finding and determine if there are any effects on other safety-related components. Please provide a written statement or explanation within 30 days of this letter in accordance with the instructions specified in the enclosed NON. We will consider extending the response time if you show good cause for us to do so.

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," the NRC will make available electronically for public inspection a copy of this letter, its enclosure, and your response through the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System, which is

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

Sincerely,

/RA/

Kerri A. Kavanagh, Chief
Quality Assurance Vendor Inspection Branches 1 and 2
Division of Construction Inspection
and Operational Programs
Office of New Reactors

Docket No.: 99902072

EPID No.: I-2019-201-0024

Enclosure:
1. Notice of Nonconformance
2. Inspection Report No. 99902072/2019-201
   and Attachment

SUBJECT: NUCLEAR REGULATORY COMMISSION VENDOR INSPECTION REPORT OF HYDROAIRE SERVICES, INC., NO. 99902072/2019-201, NOTICE OF NONCONFORMANCE Dated: March 14, 2019

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NOTICE OF NONCONFORMANCE

HydroAire Service Inc.
834 W. Madison
Chicago, IL 60607

Docket No. 99902072
Report No. 2019-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the HydroAire Service Inc.'s (hereafter referred to as HydroAire) facility in Chicago, IL from January 28, 2019, through February 1, 2019, it appears that HydroAire did not conduct certain activities in accordance with NRC requirements that were contractually imposed upon HydroAire by its customers or NRC licensees:

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

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

   HydroAire's Nuclear Quality Assurance Manual Section 12, "Control of Measuring and Test Equipment," states, in part that, "measuring and test equipment shall be calibrated at intervals established in approved procedures against equipment with higher accuracy levels through an unbroken chain traceable to National Institute of Standard Technology standard or a natural physical constant." The Nuclear Quality Assurance Manual also states that, "pressure gages used for hydrostatic test will be calibrated prior to and after each test or series of tests using the same pressure gage not to exceed two weeks."

   Contrary to the above, as of February 1, 2019, HydroAire failed to establish adequate measures to assure that pressure gages were properly calibrated and adjusted at specific periods to maintain accuracy within necessary limits and failed to establish documented instructions or a procedure that would prescribe the calibration process of pressure gages for use in activities affecting quality.

   Specifically, the NRC inspection team determined that, HydroAire failed to calibrate its digital pressure gages over their entire working range of 0-7000 pounds per square inch gage (psig) used during hydrostatic test activity of Section III, "Rules for Construction of Nuclear Facility Components," of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel (B&PV) Code. The NRC inspectors identified twenty-two hydrostatic tests (two safety-related pumps and eighteen pump components) where HydroAire inadequately calibrated the digital pressure gages at an operating range of 1167-7000 psig and used them during testing of ASME Section III safety-related

components at a hydrostatic pressure range of 152-370 psig. HydroAire has been inadequately calibrating and using these digital pressure gages since 2016. The validity of such hydrostatic test results are of indeterminate quality.

This issue has been identified as Nonconformance 99902072/2019-201-01

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Quality Assurance Vendor Inspection Branches 1 and 2, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each noncompliance: (1) the reason for the noncompliance or, if contested, the basis for disputing the noncompliance; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further noncompliance; and (4) the date when the corrective action will be completed. Where good cause is shown, the NRC will consider extending the response time.

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

Dated this the 14th day of March 2019.

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

Docket No.:	99902072
Report No.:	99902072/2019-201
Vendor:	HydroAire Service Inc. 834 W. Madison Chicago, IL 60607
Vendor Contact:	Mr. Scott Borland Quality Assurance Manager Nuclear Division & Corporate E-mail: sborland@hydroinc.com Phone: (312) 738-3000
Nuclear Industry Activity:	HydroAire Service Inc.'s Madison Facility is an ASME N and NPT certificate holder. HydroAire's scope of supply for the commercial US nuclear industry includes manufacturing, repair, and replacement of safety-related American Society of Mechanical Engineers (ASME) Class 1, 2, & 3 and non-ASME safety-related pumps, including spare/replacement parts, components, and appurtenances; associated engineering; and field services.
Inspection Dates:	January 28 – February 1, 2019
Inspectors:	Jonathan Ortega-Luciano NRO/DCIP/QVIB-2, Team Leader Andrea Keim NRO/DCIP/QVIB-2 Raju Patel NRO/DCIP/QVIB-2 Robert J. Wolfgang NRR/DE/EMIB
Approved by:	Kerri A. Kavanagh, Chief Quality Assurance Vendor Inspection Branches 1 and 2 Division of Construction Inspection and Operational Programs Office of New Reactors

EXECUTIVE SUMMARY

HydroAire Services, Inc.
99902072/2019-201

The U.S. Nuclear Regulatory Commission (NRC) staff conducted a vendor inspection at the HydroAire Service Inc.'s (hereafter referred to as HydroAire) facility in Chicago, IL, 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." Furthermore, the NRC inspection team verified that HydroAire had implemented a program in accordance with Section III, "Rules for Construction of Nuclear Facility Components," of the American Society of Mechanical Engineers and Pressure Vessel Code. This was the first NRC vendor inspection at HydroAire.

This technically-focused inspection specifically evaluated HydroAire's implementation of the quality activities associated with the design and fabrication of safety-related pumps and parts being supplied to US operating reactors

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 February 13, 2012.

With the exception of the Nonconformance described below, the NRC inspection team concluded that HydroAire'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 HydroAire's personnel are implementing these policies and procedures effectively. The results of this inspection are summarized below.

10 CFR Part 21

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the implementation of its 10 CFR Part 21 program and determined that there is no specific guidance in HydroAire's procedures as to what types of issues would constitute a deviation that would fall into the category of 10 CFR Part 21 noncompliances, or at what point in the corrective action process an identified issue becomes a deviation subject to 10 CFR Part 21 time requirements for evaluation and reportability. While the NRC inspection team did not identify any items in the corrective action program that would have clearly required an evaluation under 10 CFR Part 21, the lack of guidance in this area was considered a minor issue by the NRC inspection team. HydroAire issued corrective action report No. (CAR) 19-03, dated January 30, 2019, to address this issue. No findings of significance were identified.

Commercial-Grade Dedication and Supplier Oversight

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the implementation of its commercial-grade dedication and supplier oversight programs to determine compliance with the requirements of Criterion III, "Design Control," Criterion IV, "Procurement Document Control," and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50. The NRC inspection team identified that HydroAire accepted a Nuclear Industry Assessment Committee (NIAC) commercial-grade survey for a heat treatment service supplier that failed to adequately evaluate the critical characteristic (CCs) identified by HydroAire engineers. The NIAC commercial-grade survey was a limited-scope audit of the supplier's QA program rather than commercial-grade survey specific to the CCs of the item or service being dedicated. Furthermore, HydroAire's commercial-grade surveys of heat treatment services performed for two other commercial suppliers incorrectly used the ISO 17025:2005 alternative as the acceptance method for the calibration of the measurement equipment used during the heat treatment. HydroAire initiated CAR No. 19-04, 19-05 and 19-06, dated January 31, 2019, to address these issues. No findings of significance were identified.

Control of Special Processes

The NRC inspection team reviewed HydroAire's policies, implementing procedure and completed reports associated with welding and nondestructive examination (NDE) of components and determined to meet the requirements of Criterion IX, "Control of Special Processes," of Appendix B to 10 CFR Part 50 as well as Section V, "Nondestructive Examination," and Section IX, "Welding and Brazing Qualification," of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code. The NRC inspection team reviewed HydroAire's certification and qualification records of NDE personnel and welders and confirmed they were qualified in accordance with the requirements of ASME Section IX, and Section III of the ASME B&PV Code. No findings of significance were identified.

Design Control

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the design control program to verify compliance with the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50 and with the applicable requirements of Subsection ND, "Class 3 Components," of the ASME B&PV Code, various editions and addenda. The NRC inspection team verified that the design and procurement specifications were properly translated into HydroAire's specification sheets, drawings, procedures, data sheets, analyses and engineering calculations. No findings of significance were identified.

Test Control

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the test control program to verify compliance with the requirements of Criterion XI, "Test Control," and XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50. The NRC inspection team reviewed a sample of job orders and hydrostatic test reports which showed that applicable customer specifications were: correctly translated into job orders; confirmed the test activity was performed in accordance with HydroAire's test procedure; calibrated measuring and test equipment was used; conducted by qualified test personnel;

results were independently verified by a quality control inspector (QCI); and testing was witnessed by authorized nuclear inspector (ANI).

The NRC inspection team issued Nonconformance 999002071/2019-201-01 in association with HydroAire's failure to implement the regulatory requirements of Criteria XII and V, "Instructions, Procedures, and Drawings." Nonconformance 99902071/2019-201-01 cites HydroAire for failing to establish adequate procedures and controls to ensure that the pressure gages used in hydrostatic testing of safety-related components affecting quality were properly calibrated and adjusted at specific periods to maintain accuracy within necessary limits.

Nonconformance and Corrective Action Programs

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the implementation of its nonconformance and corrective action program to determine 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 also reviewed a sample of items entered into HydroAire's corrective action program during calendar year 2018. The NRC inspection team identified a minor issue related to the corrective action program. The corrective action process control procedure (PCP 116) did not have measures in place to clearly identify how a condition adverse to quality or significant condition adverse to quality are determined and what actions need to be performed once the determination is completed. HydroAire issued CAR No. 19-02, dated January 30, 2019 to address this issue. No findings of significance were identified.

REPORT DETAILS

1. 10 CFR Part 21 Program

   a. Inspection Scope

   The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the implementation of its 10 CFR Part 21, "Reporting of Defects and Noncompliance," program to determine compliance with regulatory requirements. In addition, the NRC inspection team evaluated the 10 CFR Part 21 postings and a sample of HydroAire'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." The NRC inspection team evaluated whether HydroAire's corrective action and nonconformances were sufficiently integrated such that issues identified in the corrective action program or nonconformances would be appropriately considered for 10 CFR Part 21 evaluation and reportability.

   The NRC inspection team reviewed HydroAire's procedure to perform a 10 CFR Part 21 evaluation and determined that it addresses the requirements for evaluating deviations and failures to comply. The NRC inspection team reviewed only the procedures because at the time of the inspection HydroAire had not performed any evaluations under 10 CFR Part 21.

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

   b. Observations and Findings

   The NRC inspection team identified one minor issue concerning the integration between HydroAire's process control procedure (PCP) 116, "Corrective Action," Revision 5, PCP 115, "Control of Non-Conforming Items," Revision 9, and PCP 041, "10 CFR Part 21, Reportability," Revision 8. Specifically, the NRC inspection team identified that although PCP 116 had a note in the procedure regarding the need to check the 'Part 21 Reportable' box on the corrective action form, there was no specific guidance in the procedure as to what types of issues would constitute a potential 10 CFR Part 21 noncompliance, or at what point in the corrective action process an identified issue becomes a deviation subject to 10 CFR Part 21 time requirements for evaluation and reportability. Upon questioning, HydroAire staff indicated that as far as they could remember, no corrective action issue was ever determined to be potentially reportable under 10 CFR Part 21 and no 10 CFR Part 21 evaluations or notifications have been made by HydroAire.

   While the NRC inspection team did not identify any items in the corrective action program that would have clearly required an evaluation under 10 CFR Part 21, the lack of guidance in this area was considered a minor issue by the NRC inspection team. HydroAire issued corrective action report (CAR) No. 19-03, dated January 30, 2019, to address this issue. No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that with the exception of the minor issue identified herein, HydroAire 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 HydroAire is implementing its policies and procedures associated with the 10 CFR Part 21 program. No findings of significance were identified.

2. Design Control

a. Inspection Scope

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the design control program to verify compliance with the regulatory requirements of Criterion III, "Design Control," of Appendix B, "Quality Assurance Program Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," (Appendix B to 10 CFR Part 50) and with the applicable requirements of Subsection ND, "Class 3 Components," of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, various editions and addenda.

The NRC inspection team verified that the design and procurement specifications were properly translated into HydroAire's specification sheets, drawings, procedures, data sheets, analyses and engineering calculations. The specifications verified by the NRC inspection team included material specifications, applicable ASME B&PV Code design and construction requirements, qualification reports, test requirements, and test reports. The associated documentation reviewed included design reports, pump drawings, and lists of materials of construction. All documents reviewed contained appropriate technical details and met the corresponding design specifications.

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

b. Observations and Findings

No findings of significance were identified.

c. Conclusion

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

3. Commercial-Grade Dedication and Supplier Oversight

a. Inspection Scope

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the implementation of its commercial-grade dedication and supplier oversight programs to verify compliance with the requirements of Criterion III, "Design Control," Criterion IV, "Procurement Document Control," and Criterion VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50.

HydroAire is a member of Nuclear Industry Assessment Committee (NIAC), which consists of companies who supply components and services to the nuclear industry based on a quality assurance (QA) program that meets the requirements of Appendix B to 10 CFR Part 50 and accept 10 CFR Part 21. The NRC inspection team confirmed that once a NIAC audit or commercial-grade survey is received, HydroAire's QA Manager reviews them for completeness and adequacy. These documents are evaluated in accordance with HydroAire's QA program and if found to be acceptable, the QA Manager will document and use these evaluations as the basis for including these suppliers on HydroAire's Approved Suppliers List (ASL).

The NRC inspection team reviewed a sample of commercial-grade dedication plans, checklists, reports, associated POs, and commercial-grade surveys of several vendors on HydroAire's ASL. The NRC inspection team evaluated a sample of technical evaluations and concluded that the technical evaluations in the dedication plans appropriately identify the critical characteristics (CCs) and technical attributes necessary to provide reasonable assurance that the services would perform their intended safety function.

The NRC inspection team reviewed a sample of external audits to verify the implementation of HydroAire's supplier oversight program. The NRC inspection team verified that HydroAire had prepared and approved plans that identify the audit scope and applicable checklist criteria before the initiation of the audit activity. The NRC inspection team confirmed that the audit reports contained objective evidence of the review of the relevant QA criteria of Appendix B to 10 CFR Part 50. For audits that resulted in findings, the NRC inspection team verified that the supplier had established a plan for corrective action and that HydroAire had reviewed and approved the corrective action and verified its satisfactory completion and proper documentation. The NRC inspection team verified that the POs included, as appropriate: the scope of work, right of access to facilities, and extension of contractual requirements to subcontractors. In addition, the NRC inspection team confirmed that the reviewed safety-related POs invoked the requirements of Appendix B to 10 CFR Part 50 and 10 CFR Part 21.

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

The NRC inspection team discussed the commercial-grade dedication and supplier oversight programs with HydroAire's management and technical staff. The attachment to this inspection report lists the documents reviewed and staff interviewed by the NRC inspection team.

b. Observation and Findings

The NRC inspection team found three examples where HydroAire did not conduct commercial-grade surveys in accordance with their policies and procedures. The examples are related to commercial services procured by HydroAire for heat treatment services.

In two of the three commercial-grade surveys performed by HydroAire, the NRC inspection team noted that HydroAire listed 'Control of Measurement and Test Equipment,' as a CC. As part of the commercial-grade survey, HydroAire incorrectly allowed two commercial heat treating suppliers to contract the calibration of measurement and test equipment based on the International Organization for Standardization (ISO) 17025:2005 alternative as the acceptance method.

The ISO 17025:2005 alternative is contained in Nuclear Energy Institute (NEI) 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. The NRC staff considers the alternative to be an acceptable method for licensees and suppliers of basic components to use this process in lieu of performing commercial-grade surveys for procurement of calibration and testing services performed by domestic and international laboratories accredited by ILAC signatories as part of the commercial-grade dedication process. The evaluation by the NRC staff of the NEI guidance is documented in a safety evaluation report dated February 9, 2015 (Agencywide Documents Access Management System Accession No. ML14322A535). The alternative is acceptable for entities having a QA program that meets Appendix B and meets the guidance as approved in the NRC safety evaluation report.

For the third example, the NRC inspection team noted that HydroAire took credit for a NIAC commercial-grade survey to qualify a commercial heat treatment service. The NRC inspection team found that the NIAC commercial-grade survey did not address the CCs of the service being dedicated. Furthermore, the NIAC survey directed users of the survey to address the CCs in its purchase orders. In addition, the evaluation performed by NIAC on this commercial supplier incorrectly allowed the use of the ISO 17025:2005 alternative as the acceptance method for the calibration of the equipment used during the heat treatment.

While HydroAire's procedures for dedicating the services in question were deficient, the NRC inspection team considered this to be a minor issue because HydroAire was able to provide objective evidence to demonstrate that the certificates of calibration for these instruments were up-to-date and were performed using a national standard. Also, HydroAire's fabrication process had provisions in place that would detect if the heat treatment performed on these items was adequate or not. HydroAire initiated CAR Nos. 19-04, 19-05 and 19-06, dated January 31, 2019, to address these issues. No findings of significance were identified.

c. Conclusion

The NRC inspection team concluded that with the exception of the minor issues identified herein, HydroAire is implementing its commercial-grade dedication and supplier oversight programs in accordance with the regulatory requirements of Criterion III, Criterion IV, and Criterion VII of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that HydroAire is implementing its policies and procedures associated with the commercial-grade dedication and supplier oversight programs. No findings of significance were identified.

4. Control of Special Processes

a. Inspection Scope

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the control of special processes to verify compliance with the regulatory requirements of Criterion IX, "Control of Special Processes," in Appendix B to 10 CFR Part 50 and with the requirements in Subsection NCA, "General Requirements for Division 1 and Division 2," Subsection NB, "Class 1 Components," Subsection NC, "Class 2 Components," and Subsection ND, "Class 3 Components," 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 personnel are qualified in accordance with the American Society for Nondestructive Testing (ASNT) Recommended Practice SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing."

Welding

The NRC inspection team reviewed a sample of HydroAire's welding procedure specifications (WPSs) to ensure appropriate criteria were specified and procedure qualification records (PQRs) to verify they were qualified in accordance with ASME Section IX and Section III Code requirements.

The NRC inspection team witnessed weld activity on HydroAire Order No. NC-8681 for a Retainer Bearing (Spider). The NRC inspection team noted that the welder was following the critical criteria on the WPS listed on the traveler using designated weld wire released by the QCI using a calibrated welding machine.

The NRC inspection team performed a walk-down of the weld storage area to verify weld materials were controlled to prevent degradation, inadvertent use, or loss of traceability in accordance with HydroAire's approved procedures. The NRC inspection team reviewed weld issuance to ensure the job travelers link the weld material to the welder and heat storage. The NRC inspection team noted that the weld area was kept clean and environmentally protected. The NRC inspection team verified the applicable welding data such as weld material and heat/batch number, WPS, inspection procedures used, and the final inspection results were recorded in accordance with the applicable HydroAire procedures.

The NRC inspection team reviewed a sample of certified material test reports (CMTRs) for the weld filler metal used to verify that the material specifications for physical and

chemical properties met the ASME B&PV Code Section II, “Materials,” and Section III requirements. The NRC inspection team confirmed the weld wire were procured from an approved supplier listed on HydroAire’s approved supplier list.

Nondestructive Examination

Although there were no nondestructive examination (NDE) activities during the week of the inspection, the NRC inspection team reviewed HydroAire’s magnetic particle (MP), Ultrasonic Testing (UT), and Liquid Penetrant (LP) procedures to ensure conformance to ASME B&PV Code Section V requirements. The NRC inspection team selected a sample of LP reports for ASME Section III Code safety-related components and verified the examinations were performed by qualified personnel, using qualified procedures, calibrated equipment, and in compliance with the requirements of Section III and V of the ASME B&PV Code.

Qualification and Training Records of Welders and Nondestructive Testing Personnel

The NRC inspection team reviewed training and qualification records for two welders and confirmed the welders had completed all the required training and had maintained their qualification in accordance with HydroAire’s policies and procedures and were qualified in accordance with the requirements of Sections III and IX of the ASME B&PV Code.

The NRC inspection team reviewed HydroAire’s procedure for certification and qualification of NDE personnel and confirmed the procedure was consistent with the latest revision of the ASNT Recommended Practice SNT-TC-1A and Section III of the ASME B&PV Code. The NRC inspection team reviewed training and qualification records for four NDE Level II and one Level III inspector and confirmed that their records reflect the individuals were trained and qualified in accordance with HydroAire’s procedure. The NRC inspection team also verified that all NDE personnel annual vision and acuity records were current. The NRC inspection team verified that the NDE instrumentation used during visual, MP and LP examination were identified with a calibration sticker and verified its calibration record were current, within the range and frequency maintained. In addition, the NRC inspection team verified that the NDE consumable materials used for the LP process which includes penetrant, developer, and cleaner were from the same manufacturer, and confirmed the material test reports specified the halogen and sulfur contents were below 1% by weight in order to meet the requirements of Section V of the ASME B&PV Code.

The NRC inspection team discussed the special processes program with HydroAire’s management and technical staff. The attachment to this inspection report lists the documents reviewed and staff interviewed by the NRC inspection team.

b. Observation and Findings

No findings of significance were identified.

c. Conclusion

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

5. Test Control

a. Inspection Scope

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the test control program to verify compliance with the requirements of Criterion XI, "Test Control" and Criterion XII, "Control of Measuring and Test Equipment," of Appendix B to 10 CFR Part 50.

During the week of inspection, there was no test activity that the NRC inspection team could witness. Therefore, the NRC inspection team selected a sample of twenty hydrostatic test reports from ASME B&PV Code Section III and safety-related pumps and components supplied to domestic nuclear customers. The NRC inspection team verified the hydrostatic test reports documented the required qualitative and quantitative acceptance criteria and confirmed the test activity was performed in accordance with HydroAire's test procedure, conducted by a qualified test personnel, calibrated M&TE was used, results were independently verified by a quality control inspector (QCI), and witnessed by an ANI.

The NRC inspection team reviewed in-process and finished travelers and noted that the Authorized Nuclear Inspector (ANI) had reviewed and placed witness hold points. The NRC inspectors confirmed the ANI had witnessed the hydrostatic test hold points and signed off on a sample of five nuclear orders.

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

b. Observations and Findings

The NRC inspection team reviewed calibration records of M&TE selected from a sample of twenty test reports for ASME Section III and safety-related pumps and components. During this review the NRC inspection team noted that HydroAire had used digital pressure gages ID No. 1313113 and 1208422, both having a range of 0-7000 pounds per square inch gage (psig) during hydrostatic testing of two pumps, and eighteen pump components that were safety-related ASME Section III. Upon review of calibration records for ID No. 1313113 and 1208422, the NRC inspection team noted that HydroAire had failed to properly calibrate these digital pressure gages over their working range of 0-7000 psig. HydroAire calibrated the digital gages, using a standard traceable to the National Institute of Standards and Technology (NIST) over an operating range of 1167- 7000 psig. After the calibration had been performed by HydroAire, these gages were used for hydrostatic testing of safety-related ASME Section III components at a

lower range of 152-370 psig. HydroAire has been calibrating and using these digital pressure gages under this condition since 2016.

HydroAire's Nuclear QA manual Section 12, "Control of Measuring and Test Equipment," states, in part that, "measuring and test equipment shall be calibrated at intervals established in approved procedures against equipment with higher accuracy levels through an unbroken chain traceable to NIST standard or a natural physical constant." The Nuclear QA Manual also states, "pressure gauges used for hydrostatic test will be calibrated prior to and after each test or series of tests using the same pressure gauge not to exceed two weeks."

To verify implementation of Section 12 of HydroAire's Nuclear QA Manual, the NRC inspection team reviewed PCP 014, "Instrument Calibration Procedure," that provides controls for HydroAire's M&TE calibration program. However, the procedure has no detailed calibration guidance with respect to gages. Therefore, the NRC inspection team determined that HydroAire did not have a documented instruction or procedure that prescribes the process to calibrate digital pressure gages to ensure they would be calibrated to their full working range and adjusted at specified periods to maintain accuracy within specified limits. Instead, HydroAire has been using Gauge CalXP Pressure Comparator operator instructions during calibration of digital pressure gages. The lack of an adequate procedure resulted in HydroAire failing to establish controls to ensure that the digital pressure gages used in hydrostatic pressure testing of ASME Section III safety-related components affecting quality were properly calibrated and adjusted at specified periods to maintain their accuracy within necessary limits. The NRC inspection team identified this issue as Nonconformance 99902072/2019-201-01 for HydroAire's failure to establish adequate measures to assure that pressure gages were properly calibrated and adjusted at specific periods to maintain accuracy within necessary limits and failed to establish documented instructions or a procedure that would prescribe the calibration process of pressure gages for use in activities affecting quality. HydroAire initiated CAR No. 19-07, dated January 31, 2019, to address these issues.

c. Conclusion

The NRC inspection team issued Nonconformance 99902072/2019-201-01 in association with HydroAire' failure to implement the regulatory requirements of Criterion XII and Criterion V of Appendix B to 10 CFR Part 50. Nonconformance 99902072/2019-201-01 cites HydroAire for failing to establish adequate procedural controls to ensure that the M&TE used in activities affecting quality are properly calibrated and adjusted at specified periods to maintain accuracy within necessary limits using a documented calibration procedure. Specifically, HydroAire, did not calibrate its digital pressure gages to their full operating range of 0-7000 psig and used them during hydrostatic test of ASME Section III safety-related pumps and components at a lower pressure range of 152-370 psig.

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

a. Inspection Scope

The NRC inspection team reviewed HydroAire's policies and implementing procedures that govern the nonconformances and corrective action programs 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 nonconformance reports (NCRs) to verify that HydroAire: (1) dispositioned the NCRs in accordance with the applicable procedures, (2) documented an appropriate technical justification for various dispositions, and (3) took adequate corrective action regarding the nonconforming items. For NCRs that were dispositioned use-as-is, the NRC inspection team confirmed the technical justifications were documented to verify the acceptability of the nonconforming item. The NRC inspection team also verified that the NCR process provides a link to the 10 CFR Part 21 program.

The NRC inspection team also reviewed a sample of CARs to ensure that conditions adverse to quality were promptly identified and corrected. The NRC inspection team verified the CARs provided: (1) adequate documentation and description of conditions adverse to quality; (2) an appropriate analysis of the cause of these conditions and the corrective actions taken to prevent recurrence, as applicable; (3) direction for review and approval by the responsible authority; (4) a description of the current status of the corrective actions; and (5) the follow-up actions taken to verify timely and effective implementation of the corrective actions. In addition, the NRC inspection team verified that HydroAire’s corrective action program provides a link to the 10 CFR Part 21 program.

The NRC inspection team discussed the nonconformance and corrective action programs with HydroAire’s management and technical staff. The attachment to this inspection report lists the documents reviewed and staff interviewed by the NRC inspection team.

b. Observations and Findings

The NRC inspection team identified a minor issue concerning the integration between the corrective action and nonconformance program with the 10 CFR Part 21 program. Specifically, the NRC identified that both corrective action request and nonconformance forms have a box that quality assurance uses to address the question, “Part 21 Reportable? Yes or No.” The procedures for these forms do not provide any guidance for this box. This question implies that HydroAire has gone through a Part 21 evaluation process and concluded that the issue identified is not reportable to the NRC. The procedures did not address how corrective action requests and nonconformances are screened to determine if the Part 21 process/evaluation is applicable. The NRC did not identify any items in the corrective action program that would have clearly required an evaluation under 10 CFR Part 21, the lack of guidance in the procedures to determine 10 CFR Part 21 applicability was considered a minor issue. HydroAire issued CAR No. 19-03, dated January 30, 2019, to address this issue.

The NRC inspection team identified a second minor issue related to the corrective action program. The HydroAire quality assurance manual discusses the terms of condition adverse to quality (CAQ) and significant condition adverse to quality (SCAQ) but no guidance is provided. The corrective action procedure (PCP 116) does not have measures in place that provides for HydroAire to clearly identify how a CAQ or

SCAQ are determined and what actions are needed to be performed once the determination is completed. HydroAire issued CAR No. 19-02, dated January 30, 2019 to address this issue.

No findings of Significance were identified

c. Conclusion

The NRC inspection team concluded that with the exception of the minor issues identified herein, HydroAire established its nonconforming materials, parts, or components and corrective action programs in accordance with the regulatory requirements of Criterion XV and Criterion XVI of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed, the NRC inspection team also determined that HydroAire is adequately implementing its policies and procedures associated with the nonconformance and corrective action programs. No findings of significance were identified.

7. Entrance and Exit Meetings

On January 28, 2019, the NRC inspection team discussed the scope of the inspection with Mr. Scott Borland, QA Manager, and other members of HydroAire's management and technical staff. On February 1, 2019, the NRC inspection team presented the inspection results and observations during an exit meeting with Mr. Borland, and other members of HydroAire's management and technical staff. 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
Jonathan Ortega-Luciano	Inspector, Team Leader	NRC	X	X	
Andrea Keim	Inspector	NRC	X	X	
Raju Patel	Inspector	NRC	X	X	
Robert Wolfgang	Technical Specialist	NRC	X	X	
Werner Barnard	Reverse Engineering Manager	HydroAire	X	X	
Madhav Durge	Contract Manager	HydroAire	X	X	
Dibu Chowdhury	Engineering Manager	HydroAire	X	X	X
Nick Dagres	VP Nuclear Operations	HydroAire	X	X	
George Harris	CEO	HydroAire	X	X	
Anil Singh	Operation/Shop Manager	HydroAire	X	X	X
Adam Jung	Quality Assurance Specialist	HydroAire	X	X	
Scott Borland	Quality Assurance Manager	HydroAire	X	X	X
Catherine Tarczynski	Quality Assurance Assistant	HydroAire	X	X	
Floyd Reiner	QA/QC Specialist	HydroAire	X	X	

Roy Stewart	Quality Assurance Engineer	HydroAire	X	X	

2. INSPECTION PROCEDURES USED

- Inspection Procedure (IP) 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance," dated February 13, 2012.
- IP 43002, "Routine Inspections of Nuclear Vendors," dated January 27, 2017
- IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated January 27, 2017

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Type	Description
99902072/2019-201-01	OPEN	NON	Criterion XII and V

4. DOCUMENTS REVIEWED

Policies and Procedures

- HydroAire Service Inc. Quality Assurance Manual, 5th Edition Revision 0, dated April 26, 2018
- Process Control Procedure (PCP)-001, "Water Washable Liquid Penetrant Method," Revision 14, dated March 26, 2018
- PCP-003, "HydroAire Tests and Inspection," Revision 5, dated February 24, 2015
- PCP-009, "Solvent Removable Liquid Penetrant Method," Revision 17, dated March 26, 2018
- PCP-012, "Magnetic Particle Inspection Process," Revision 11, dated March 26, 2018
- PCP-013, "Certification of Test & Inspection Personnel, Training and Certification," Revision 6, dated April 28, 2016
- PCP-015, "Welder and Welding Procedure Qualification," Revision 8, dated February 25, 2015
- PCP-016, "Ultrasonic Inspection," Revision 10, dated February 6, 2018
- PCP-019, Auditor Qualification, Internal & External Audits," Revision 5, dated August 20, 2018
- PCP-021, "Nondestructive Testing Acceptance Procedure," Revision 8, dated April 2, 2018
- PCP-022, "Acceptance Standard for Penetrant Examination of Electro-Deposited Chromium on Steel Shafting," Revision 1, dated November 14, 1988
- PCP-027, "Hydrostatic Pressure Testing," Revision 7, dated April 14, 2016
- PCP-045, "Control of Weld Filler Metal," Revision 4, dated April 9, 2010

- PCP-047, “Technical Evaluation and Part Dedications,” Revision 05, dated March 29, 2016
- PCP 059, “Nuclear Order Processing Control Procedure,” Revision 4, dated May 12, 2016
- PCP-060, “Training, Examination and Certification of NDE Personnel,” Revision 8, dated June 20, 2018
- PCP-061, “Procedure for Visual Testing,” Revision 3, dated May 10, 2016, demonstrated to ANI on July 25, 2017
- PCP-104, “Procurement Document Control,” Revision 8, dated March 17, 2015
- PCP-107, “Control of Purchased Materials, Equipment and Services,” Revision 5, dated April 1, 2016
- PCP-114, “Condition Reports,” Revision 0, dated October 18, 2012
- PCP-115, “Control of Non-Conforming Items,” Revision 9, February 23, 2015
- PCP-116, “Corrective Actions,” Revision 5, March 17, 2015
- PCP-118, “Audits,” Revision 4, dated March 12, 2015
- PCP-121, “Acceptance of Sub-Contracted Audits,” Revision01, dated March 17, 2015
- PCP-123, “Certificate of Conformance/Compliance Procedure,” Revision 01, dated February 28, 2015
- PCP-125, “Material Qualification Procedure,” Revision 2, dated March 20, 2018
- PCP-128, “Procedure for Visual Inspection of Welds,” Revision 0, dated November 20, 2017
- PCP-130, “Dedication Plan for the Acceptance of Commercial Testing Services,” Revision 0, dated July 18, 2018
- Welding Procedure Specification No. HSW 70 Supporting PQR No. T700375, “Gas Tungsten Arc Welding (GTAW) &/or Gas Metal Arc Welding (GMAW), dated January 23, 2017
- Welding Procedure Specification (WPS) HSW-70, Revision 0, dated January 23, 2017, for manual Gas Tungsten Welding (GTAW) and semi-automatic Gas Metal Arc Welding (GMAW) process for P6 group 4 material with thickness 3/16-inch to 8-inch
- Procedure Qualification Record (PQR) No. T700375, Revision 0, with post-weld heat treat (PWHT) dated January 6, 2017 qualifying WPS HSW-70 Revision 0, in GTAW and GMAW process
- WPS HSW-066, Revision 0, dated March 27, 2017 for manual GTAW and semiautomatic GMAW for P1 group 2 material with thickness range 5/8-inch to 1-1/2-inch
- PQR No. T703363, Revision 0, with post-weld heat treat dated March 14, 2017 qualifying WPS HSW-066 Revision 0, in GTAW and GMAW process with PWHT
- WPS HSW-45-AW-T, Revision 01, dated October 15, 2015, for GTAW process for P45 material qualified to base material thickness 1-1/2-inch by PQR No. T515157
- PQR No. T515517 Revision 0, dated July 29, 2015, qualifying WPS HSW-45-AW-T for P45 material by manual GTAW process for base material thickness 1-1/2-inch in accordance with ASME Section IX.

<u>Purchase Orders</u>

- PO No. 147547.0 for Material Analysis, dated January 25, 2019
- PO No. 147068.0 for Casting, dated October 24, 2018
- PO No. 147200.0 for Mechanical Seal, dated November 15, 2018
- PO No. 147310.1 for Mechanical Seal Cartridge, dated December 13, 2018

- PO No. 145593.0 for Radiography Inspection, dated January 17, 2018
- PO No. 142889.0 Welder's test plate, dated January 3, 2017
- PO No. 144756.0 for Casting Bowl, dated September 14, 2017
- PO No. 146271.0 Casting (Casing Bowl), dated May 30, 2018
- PO No. 142928.0, dated January 9, 2017, for material analysis of weld procedure qualification test sample for PQR HSW-070 to ASME Section IX
- PO No. 143305.0, dated February 24, 2017, for material analysis of weld coupon for WPS & PQR HSW-066 to ASME Section IX
- PO No. 29686-1, dated September 4, 2014, for procurement of 280 pounds of 0.035-inch electrode ER70S-3 to SFA 5.18 for GMAW process
- PO No. 32513-1 Revision 01, dated March 11, for procurement of 150 pounds of weld wire ER70S-6 size 3/32 x 36-inch, and 100 pounds of ER316 TIG size 1/8 x 36-inch weld wire to ASME Section III, Class 3, 1974 Edition, 1974 Addenda up to including 2013 Edition with No addenda
- PO No. 14355.0 dated March 21, 2017, for procurement of 100 pounds of ER316 SFA 5.9 size 3/32-inch weld wire to ASME Section III, Class 3, 1974 Edition, 1974 Addenda up to including 2013 Edition with No addenda
- PO No. 146614.0, dated August 9, 2018, for procurement of 50 pound of ERNiCrMo-3 SFA 5.14 UNS N06625 size 3/32 x 36-inch weld wire

Design /Drawing Documents

- Drawing No. 1087540-7060, "Bearing Retainer-Welding," Revision 1, dated May 9, 2016
- Drawing No. 1087398, "Pump Bill of Materials," Revision 5, dated May 9, 2016
- Drawing No. 1089517, "Pump 3196STi 1.5x3-6," Revision 12, dated December 13, 2017
- Drawing No. 2318692, "Cross Sectional Drawing," Revision 01, dated March 15, 2018

Calibration, Heat Treatment, Non-Destructive Examination, Inspection and Test Records

- Certificate of Calibration No. 1002132076 dated April 5, 2018 for HydroAire's master digital pressure test gage S/N 1304657 operating range of 0-7000 psig calibrated to 1750-7000 psig
- Certificate of Calibration No. 1002110302 dated February 16, 2018 for HydroAire's master digital pressure test gage S/N 1313104 operating range of 0-7000 psig calibrated to 1167-7000 psig
- Certificate of Calibration No. 1002110301 dated February 16, 2018 for HydroAire's internal digital pressure test gage S/N 1313113 operating range of 0-7000 psig calibrated from 1167-7000 psig
- Certificate of Calibration dated February 20, 2017, for HydroAire's internal digital pressure test gage S/N 1208422 operating range of 0-7000 psig calibrated from 700-7000 psig by HydroAire using master digital pressure gage ID No. 1313104
- Certificate of Calibration dated March 20, 2018, for HydroAire's internal digital pressure test gage ID No. 74921438 operating range of 0-10,000 psig calibrated from 2500-10,000 psig by HydroAire using master digital pressure gage ID No. 1313104
- Certificate of Calibration dated March 19, 2018, for HydroAire's internal digital pressure test gage ID No. PG-5000 operating range of 0-5,000 psig calibrated from 1250-5,000 psig by HydroAire using master digital pressure gage ID No. 1313104

- Certificate of Calibration dated March 19, 2018, for HydroAire's internal digital pressure test gage ID No 6766147 operating range of 0-3,000 psig calibrated from 760-3,000 psig by HydroAire using master digital pressure gage ID No. 1313104
- Certificate of Calibration dated March 19, 2018, for HydroAire's internal digital pressure test gage ID No. AB60316 operating range of 0-3,000 psig calibrated from 750-3,000 psig by HydroAire using master digital pressure gage ID No. 1313104
- Certificate of Calibration dated January 26, 2018, for HydroAire's internal digital pressure test gage ID No. DPG7000-7K operating range of 0-7,000 psig calibrated from 70-5,000 psig by HydroAire using master digital pressure gage ID No. 1313104
- Liquid Penetrant Examination Report dated May 22, 2018 accepting casing casting S/N 008720-1-1-32 for order NC-8720 by Level II using water washable process
- Radiography Examination Report dated June 2, 2018 for weld repaired casing casting S/N 008720-1-1-32 for order NC-8720 performed to PO 146265.0, reviewed and accepted by HydroAire QCI on June 2, 2018
- Ultrasonic Examination Report dated August 9, 2018, for Head Shaft on W/O 008812-1-1-28, heat No. A180134 on Job NC-8812 accepted by Level II
- HydroAire Receiving Receipt Report (RIR) dated March 26, 2017, for the acceptance of 100 pounds of weld wire ER316/316L, SFA 5.9, size 3/32 x 36-inch traceable to heat No. 751142, Lot No. CT0414 from PO No. 14355.0
- Receive Inspection Report (RIR) dated February 2, 2016, accepting 280 pounds of 0.035-inch x 35 ER70S-3 3/32 weld spools heat No. 482597 to PO 32513-1
- RIR dated October 18, 2018, for PO No. 146614 line 01 accepting 50 pounds of ERNiCrMo-3 SFA 5.14 UNS N06625 size 3/3/2 X 36-inch weld wire procured traceable to Heat No. QT671
- RIR dated April 1, 2018, for acceptance of casing casting 150 pound to ASTM 351 Gr. CF8M from Tech Cast on PO No. 145342 traceable to Heat No. S7051-2 and drawing 1090496, Revision 0, dated November 3, 2015
- Hydrostatic Test Reports for Order Nos. NC-8720-2-1-1 and NC-8720-2-1-2 dated June 21, 2018, using a pressure gauge 1208422 that was pre and post calibrated on June 21, 2018 by QC1
- Hydrostatic Test report dated November 18, 2018, for Job Order No. NC-7061 for using pressure gage ID No. 1208422 at 152 psig, accepted by QCI and Authorized Nuclear Inspector (ANI) for 27A31-2 stage hydro pump
- Hydrostatic Test report dated November 9, 2016, on work order (W/O) No. 49475 using pressure gage ID No. 1208422 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27A31-2 stage hydro pump on HydroAire job order(J/O) No. NC-7061
- Hydrostatic Test report dated November 18, 2016, on W/O No. 48979 for Hydro seal/liquid seal assembly, using pressure gage ID No. 1208422 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-7061
- Hydrostatic Test report dated November 2, 2016, on W/O No. 49479 for bowl discharge, using pressure gage ID No. 1208422 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-7061
- Hydrostatic Test report dated November 17, 2017, on W/O No. 008466-1-1-90 for #3 Retainer Bearing Assembly, using pressure gage ID No. 13131113 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-8466
- Hydrostatic Test report dated November 17, 2017, on W/O No. 008466-1-1-89 for #2 Retainer Bearing Assembly, using pressure gage ID No. 13131113 at hydrostatic

pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-8466

- Hydrostatic Test report dated November 17, 2017, on W/O No. 008466-1-1-88 for #1Retainer Bearing Assembly, using pressure gage ID No. 1313113 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-8466
- Hydrostatic Test report dated October 20, 2017, on W/O No. 008466-1-1-4 for Hydro Seal, using pressure gage ID No. 1313113 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-8466
- Hydrostatic Test report dated November 17, 2017, on W/O No. 008466-1-1-87 for Top Column (Lower Flange Welds), using pressure gage ID No. 1313113 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-8466
- Hydrostatic Test report dated October 20, 2017, on W/O No. 008466-1-1-26 for Diffuser Bowl, using pressure gage ID No. 1313113 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-8466
- Hydrostatic Test report dated November 17, 2017, on W/O No. 008466-1-1-25 for Intermediate Bowl, using pressure gage ID No. 1313113 at hydrostatic pressure of 152 psig, accepted by QCI and ANI for 27 A31-2 stage hydro pump on HydroAire Job Order No. NC-8466
- Hydrostatic Test report dated March 12, 2018 on W/O No. 008450-1-1-53 Column Bottom, using pressure gage ID No. 1208422 at hydrostatic pressure of 225 psig, accepted by QCI and ANI on HydroAire Job Order No. NC-8450
- Hydrostatic Test report dated March 12, 2018, on W/O No. 008450-1-1-60 for Column Top (#10), using pressure gage ID No. 1208422 at hydrostatic pressure of 225 psig, accepted by QCI and ANI for HydroAire Job Order No. NC-8450
- Hydrostatic Test report dated January 13, 2017, on W/O No. 48009 for pump assembly – Case, Stuffing Box Cover, and Mechanical Seal Gland using pressure gage ID No. 1208422 at hydrostatic pressure of 370 psig, accepted by QCI and ANI for HydroAire Job Order No. NC-7130
- Hydrostatic Test report dated October 31, 2018, on W/O Nos. 009009-2-1-3-1, through 2-3-1-5 for five glands using pressure gage ID No. 1313113 at hydrostatic pressure of 225 psig, accepted by QCI and ANI for HydroAire Job Order No. NC-9009
- Hydrostatic Test report dated January 8, 2018, on W/O No. 008390-1-1-14 for Mechanical Seal Gland using pressure gage ID No. 1313113 at hydrostatic pressure of 313 psig, accepted by QCI and ANI for HydroAire Job Order No. NC-8390
- Hydrostatic Test report dated January 19, 2018, on W/O No. 008390-1-1-7 for casing using pressure gage ID No. 1313113 at hydrostatic pressure of 313 psig, accepted by QCI and ANI for HydroAire Job Order No. NC-8390
- Certificate of Conformance dated September 4, 2014, for 280 pounds of ESAB ER70S-3 0.035-inch x 35-pound spools heat No. 482597 certified to ASME Section II Part C and ASME Section III
- Certificate of Conformance Rev dated March 11, 2016 for 100 pounds of 1/8 x 36-inch ARCOS ER316/316L traceable to Heat No. 540811 Lot No. DF0270, meeting the requirements of ASME Section II, Part C and ASME Section III
- Certificate of Conformance dated March 22, 2017 for HydroAire PO No. 143555.0 for 100 pounds of weld wire ER316/316L, SFA 5.9, size 3/32 x 36-inch traceable to heat No. 751142, Lot No. CT0414

- Certificate of Conformance dated October 16, 2018 for HydroAire PO No. 146614.0 for 50 pounds of ERNiCrMo-3 SFA 5.14 UNS N06625 size 3/32 x 36-inch weld wire traceable to heat No. QT671, Lot No. CP0316
- HydroAire CMTR for casting casing 150-pound RF Gould for Energy Grand Gulf plant order for Job No. 8720-1 material ASME SA351 Grade CF8M, traceable to Heat No. S-7051-1 certified by HydroAire on May 17, 2018
- Certificate No. 92-79068 to HydroAire Service Inc. for Certification of Heat Treatment of PO No. 142889, JOB#NQ-7840, WO/SN#47291, dated January 6, 2017

American Society of Mechanical Engineers (ASME) Code Data Reports, and Shop Travelers Welding Records

- HydroAire Nuclear Order No. NC-8681 PO No. 02768212A-10 on work order (W/O) No. 008681-1-1-78 for retainer bearing (spider) subjected to operation sequence 20 verify weld wire QC hold point and operation sequence 30 perform welding performed by welder on January 30, 2019, using Welding Procedure Specification (WPS) specified on traveler
- NC-9009 for ASME N-2 data report for HVAC Chilled Water Circulation Gould Pump equipment model No. 3196MT 3 x 4-13,1, stage, serial No. N778B833, and N778B834 to ASME Section III Class 3 1977 Edition no Addenda for PO No. SNG37848-0048,
- NC-8450 for rebuild assembly of Gould Pump serial No. N301213, vertical RHRSW model No. VIT 12 x 18 HMC 2 stage to ASME Section III Class 3 1971 Edition 1972 Winter Addenda for PO No. 4701083585
- NC-8720-1 and 8720-2 for two new Gould Pump S/N N737B221, model 3196STi size 1 x 1.5-6 for LPCS and HPCS system fabricated to ASME Section III, Class 2, 1971 Edition through Summer 1973 Addenda, 1977 Edition through Summer 1977 with Code Cases 1677 and 1636-1 for bolting for PO No. 10531406
- Traveler for W/O No. 008720-2-1-33 for Casting P/N 1090116 for PO No. 10531406 for new Gould Pump S/N N737B221, model 3196STi size 1 x 1.5-6 for LPCS and HPCS system with ANI review, was qualified through ASME NCA- NCA 4255.5 process
- Traveler for W/O 008720-2-1-34 for casting cover stuffing box P/N 1090224 material ASME SA 351 Grade CF8M traceable to Heat No. C145 to for Entergy PO 10531406
- Weld Repair Report for W/O 008720-1-1-32 Job No. NC-8720 of casting material ASME SA 351 Grade CF8M heat No. 541571 welded using WPS HSW-063 and accepted by QC on May 22, 2018
- NC-7130 for Gould pump P/N 1089517 model 3196 STi size1.5 x 3-6, ASME Section III, Class 3 to 2007 Edition, 2008 Addenda for PO 4500201986
- Traveler for W/O 48026 for Stuffing Box Cover P/N 1093494 ASME Section III Code and safety-related parts with Hydrostatic Test was transferred to final assembly of pump on traveler WO-48009
- Traveler for W/O 48028 for Bearing Frame Gould 3196 P/N 1093496 ASME Code Section III
- Traveler for W/O No. 48025, casing p/n 1093517 ASME Section III
- Traveler for W/O 48026 for Stuffing Box Cover P/N 1093494 ASME Section III Code and safety-related parts was transferred to final assembly of pump on traveler WO-48009
- Traveler for W/O No. 48027 for Gland Mechanical Seal P/N 1089517 ASME Code and safety-related part was transferred to final pump on traveler W/O 48009

- Specification 238-044, “Procurement of Product-Lubricated Service Water Pumps-AL6XN,” Revision 12, dated October 13, 2015
- HydroAire Design Report ER020615, Revision 03, Addendum 03, dated April 12, 2017
- HydroAire Engineering Parts List for Job No. NC7061, Revision 2, dated December 7, 2016
- Calculation Number 0SW-0022, “Review of ME-1434/27CC-2 Stage NC-6543 SW Pump for IRR BM-1065/PM 82-221L/BNP,” Revision 1, dated October 21, 1994
- HydroAire Hydrostatic Test Report, Job No. NC7061, WO/SN 48980, dated November 21, 2016
- HydroAire Hydrostatic Test Report, Job No. NC7061, WO/SN 49475, dated November 18, 2016
- HydroAire Hydrostatic Test Report, Job No. NC7061, WO/SN 49480, dated November 2, 2016
- Purchase Order 03026348, Revision 001, dated September 1, 2016
- Contract 02768212 dated January 7, 2015
- Certificate of Compliance for Flange-Column Pipe, dated September 2, 2016
- Certified Material Test Report for Flange-Column Pipe, dated March 24, 2016
- Certificate of Compliance for Flange-Bearing Retainer, dated August 7, 2015
- Certified Material Test Report for Flange-Bearing Retainer, dated March 24, 2016
- Certificate of Compliance for Bearing-Bowl Discharge, dated February 25, 2016
- Certified Material Test Report for Bearing-Bowl Discharge, dated March 7, 2016
- Certificate of Compliance for Pump Shaft, dated January 6, 2016
- Certified Material Test Report for Pump Shaft, dated February 19, 2016
- Certificate of Compliance for Impeller, dated September 30, 2016
- Certified Material Test Report for Impeller, dated August 10, 2016
- Certificate of Compliance for Wear Ring-Impeller, dated December 16, 2015
- Certified Material Test Report for Wear Ring-Impeller, dated January 20, 2016
- Certificate of Compliance for Key-Impeller dated November 3, 2015
- Certified Material Test Report for Key-Impeller dated November 3, 2015
- Specification M3-SPECMP-PS-ME-1216, “Procurement Specification for 3 Service Water Booster Pumps 3SWP*P2A/B AND 3SWP*P3A/B,” Revision 1, dated March 17, 2016
- MA30353, “Design and Seismic Report for the HydroAire/Goulds Model 3196STI 1.5x3-6 Horizontal Centrifugal Pump in Accordance with the ASME Boiler & Pressure Vessel Code Section III, Subsection ND (Class 3),” Revision B, dated February 21, 2017
- HydroAire Hydrostatic Test Report, Job Number 7130, WO/SN 48009, dated January 13, 2017
- Seller Fill In Data Sheet 3SWP*P3A/B,” dated December 20, 2017
- Certificate of Compliance for Casing, dated December 16, 2016
- Certified Material Test Report for Casing, dated December 20, 2016
- Certificate of Compliance for Impeller, dated November 14, 2017
- Certified Material Test Report for Impeller, dated November 2, 2017
- Certificate of Compliance for Pump Shaft, dated November 17, 2016
- Certified Material Test Report for Pump Shaft, dated November 17, 2016
- Certificate of Compliance for Key-Square End, dated October 29, 2014
- Certified Material Test Report for Key-Square End, dated October 29, 2014
- Certificate of Compliance for Stuffing Box Cover, dated December 13, 2016
- Certified Material Test Report for Stuffing Box Cover, dated December 27, 2016

- Certificate of Compliance for Mechanical Seal, dated December 13, 2016
- Certified Material Test Report for Mechanical Seal, dated December 7, 2016
- Certificate of Compliance for Gland-Mechanical Seal, dated June 13, 2016
- Certified Material Test Report for Gland-Mechanical Seal, dated June 13, 2016
- Certificate of Compliance for Bearing Frame, dated June 13, 2016
- Certified Material Test Report for Bearing Frame, dated June 13, 2016
- Design Specification, "Miscellaneous Horizontal Centrifugal Pumps (Section III)," J-2944, Revision 3, dated August 17, 2004
- Fuel Pool Emergency Makeup Pump Purchase Order, 00604791, Revision 0, dated June 7, 2017
- HydroAire "Design Report," ER041018, Revision 1, April 12, 2018
- HydroAire Hydrostatic Test Report for Casing, dated January 19, 2018
- Certificate of Compliance for Casing, dated November 21, 2017
- Certified Material Test Report for Casing, dated November 21, 2017
- Certificate of Compliance for Impeller, dated September 15, 2017
- Certified Material Test Report for Impeller, dated September 25, 2017
- Certificate of Compliance for Shaft, dated September 29, 2017
- Certified Material Test Report for Shaft, dated October 13, 2017
- Certificate of Compliance for Coupling Key, dated April 4, 2016
- Certified Material Test Report for Coupling Key, dated April 28, 2017
- Certificate of Compliance for Bearing Frame, dated September 12, 2017
- Certified Material Test Report for Bearing Frame, dated September 12, 2017
- Certificate of Compliance for Bearing Housing, dated September 13, 2017
- Certified Material Test Report for Bearing Housing, dated September 26, 2017
- Certificate of Compliance for Bearing Cover, Inboard, dated September 29, 2017
- Certified Material Test Report for Bearing Cover, Inboard, dated October 5, 2017
- Certificate of Compliance for Stuffing Box Cover, dated August 18, 2017
- Certified Material Test Report for Stuffing Box Cover, dated August 17, 2017
- Calculation COD-000847, Revision 0, dated July 13, 1982
- HydroAire Design Report EC618469, Revision 002, dated May 17, 2018
- Procurement Data Sheet Number EWV760Q, Revision 0, dated August 31, 2015
- HydroAire Document "NC 7696 Repair Plan," Revision 05, dated September 2, 2016
- HydroAire PCP-001/009, "Liquid Penetrant Examination Report," No Revision, dated October 17, 2016
- Certificate of Compliance for Suction Ring, dated September 12, 2016
- Certified Material Test Report for Suction Ring, dated September 12, 2016
- Certificate of Compliance for Channel Ring – Stage 1, dated August 24, 2016
- Certified Material Test Report for Channel Ring – Stage 1, dated August 24, 2016
- Certificate of Compliance for Channel Ring – Stage 2, dated August 24, 2016
- Certified Material Test Report for Channel Ring – Stage 2, dated August 24, 2016
- Certificate of Compliance for Diffuser Discharge, dated September 12, 2016
- Certified Material Test Report for Diffuser Discharge, dated September 12, 2016
- Certificate of Compliance for Pump Shaft, dated July 22, 2016
- Certified Material Test Report for Pump Shaft, dated July 22, 2016
- HydroAire Magnetic Particle Examination Report, Form PCP-012, for Channel Ring – Stage 1, dated September 29, 2016
- HydroAire Magnetic Particle Examination Report, Form PCP-012, for Channel Ring – Stage 2, dated October 3, 2016

- HydroAire Magnetic Particle Examination Report, Form PCP-012, for Diffuser Discharge, dated October 12, 2016
- HydroAire UT Report (No Form Number) for Pump Shaft, dated July 19, 2016

Commercial-Grade Surveys/Audit Reports

- Audit: HydroAire16-04 NIAC 21123, dated May 5, 2016
- Audit: HydroAire 18-02 NIAC 23097 dated June 19, 2018
- Audit: Closure HydroAire 18-02 NIAC 23097, dated January 23, 2019
- NIAC Audit Report No. 23049, dated February 12, 2018
- NIAC Audit Report No. 2824, dated April 4, 2016
- NIAC Audit No. 21061, dated May 11, 2016
- NIAC Survey Report, dated January 26, 2017
- Audit: 16-07, dated September 26, 2016
- NIAC Commercial Service Survey #22014, dated April 14, 2017
- Audit: 16-07, dated September 26, 2016
- Audit: 16-05 (Commercial-Grade Survey), dated July 7, 2016

Training Records

- NDE training, qualification and annual assessment records, for JK, as Level II in PT, MT, UT certified by NDE Level III and QA Manager
- Visual Acuity Record for Level II and Level III to Jaeger J1 and Color vision to ISHIHARA
- NDE training, qualification and annual assessment records for JL, Level II in PT reviewed and approved by a NDE Level III and QA Manager
- NDE training, qualification and annual assessment records for JD Level II in PT and MT, reviewed and approved by a NDE Level III and QA Manager
- NDE training, qualification and annual assessment records for FR, Level II in PT, MT, UT, reviewed and approved by a NDE Level III and QA Manager
- NDE training, qualification and annual assessment records for WA as ASNT Level III in PT, MT, UT, RT and VT certified by ASNT on October 2015 due October 2020
- HydroAire appointment letter dated September 25, 2013, to Level III for PT, MT, UT, and VT of personnel qualification, procedure development and approvals, administration and maintenance of NDE program.
- 2018 Annual Review Welder Activity for welders from January through December 2018 for Welders stamp number Z, D, and J in GMAW, GTAW welding process
- Welder Performance Qualification Record (WPQR) dated January 16, 2017, for welder stamp D, qualified in WPS HSW-70 procedure in GTAW manual groove weld on P6 material in accordance with ASME Section IX
- WPQR dated March 27, 2012 for welder stamp D, qualified in WPS Carb A36 procedure in SMAW manual groove weld on P1 material in accordance with ASME Section IX
- WPQR October 12, 2013 for welder stamp D, qualified in WPS HSW-004-CRO procedure in GMAW manual groove weld on P1 material in accordance with ASME Section IX
- WPQR dated on March 2, 2016, for welder stamp Z, qualified in WPS HSW-014 procedure in GTAW manual groove weld on P6 material in accordance with ASME Section IX

- WPQR dated January 23, 2017, for welder stamp J, qualified in WPS HSW-063 procedure in GTAW manual groove weld on P8 material in accordance with ASME Section IX
- WPQR dated November 4, 2016for welder stamp J, qualified in WPS HSW-064 procedure in GMAW manual groove weld on P1 material in accordance with ASME Section IX
- WPQs dated December 9, 2015, for welder SS qualified to WPS-HSW-45-AW-T Revision 01 to GTAW process on P45 materials in accordance with ASME Section IX.

Miscellaneous Documents

- HEWI #058, "Commercial-Grade Dedication for Heat Treatment," Revision 00, dated March 14, 2018

Nonconformance Report

- QANC Nos: 18-055, 18-058, 18-059, 18-061, 18-064, 18-065, 18-068

Corrective Action Reports (CARs)

- CAR Nos: 17-04, 17-05, 18-01, 18-10, 18-11, 18-23

CARs Opened During the Inspection

- CAR 19-01, dated January 29, 2019
- CAR 19-02, dated January 30, 2019
- CAR 19-03, dated January 30, 2019
- CAR 19-04, dated January 31, 2019
- CAR 19-05, dated January 31, 2019
- CAR 19-06, dated January 31, 2019
- CAR 19-07, dated January 31, 2019