Flow Control Operations
Anchor/Darling Valves
BW/IP Valves
Edward Valves
Valtek Control Products
Worcester Valves

April 27, 2018

U.S Nuclear Regulatory Commission
Attention: Document Control Desk, Washington, DC 20555-0001
Subject: Reply to a notice of non-conformance on inspection report 99901356/2017-201 dated August 22nd 2017 and letters dated October 16th 2017 and January 12th 2018.

Subject: **Flowserve Corporation – Raleigh NC – Reply to letter dated October 16th 2017 in regards to Nonconformance #99901356/2017-201-01, 99901356/2017-201-02, 99901356/2017-201-03, and 99901356/2017-201-04.**

Dear Mr. Jackson,

I am writing you in response to the letter dated October 16th 2017 in regards to nonconformance #99901356/2017-201-01, 99901356/2017-201-02, 99901356/2017-201-03, and 99901356/2017-201-04, addressed in the NRC Inspection Report No. 99901356/2017-201.

With regards to Notice of Nonconformance 99901356/2017-201-01 (Flowserve Corrective Action 1684 and letter dated October 16th, 2017):

NRC Question A: *The response states, in part, that Flowserve requested additional information to satisfy the audit reports on file and that you will review the objective evidence to determine if a re-audit is necessary. For the suppliers that were inadequately qualified by Flowserve, in addition to the casting and forging suppliers, clarify if Flowserve plans on performing the requalification of these suppliers during the next audit cycle or the or the plans are to immediately requalify these suppliers within the next few months.*

Flowserve Response: A.

Flowserve auditors validated their inspections by performing an additional review and contacting the suppliers for additional objective evidence to meet the requirements that Raleigh qualified them for on the Approved Vendor List (AVL). The audit reports did in fact lack the evidence needed to support what Raleigh performed and are being updated to reflect the correct requirements; objective evidence to support this is being collected and additional audits will be scheduled into our 2018 audits regardless of next audit cycle as required based on the outcome of the review. Further, the reporting process and checklists have been revised to meet the requirements of NCA 3842.2 and NCA-3850 when qualifying a material organization under those rules.

IE09
NRD

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NRC Question B: *If your response to question 1a above is that Flowserve will requalify the suppliers during the next audit cycle, describe in detail which actions Flowserve has taken to assure that the material or services, as applicable, provided by these suppliers will perform their intended safety function.*

Flowserve Response B:

Flowserve is scheduling audits as applicable in our 2018 schedule if the supplier's documentation did not meet the requirements after review by Flowserve. All Nonconformance reports generated by our suppliers are verified and approved by Flowserve and were not found to be create a safety concern for our customers. Any nonconformance found at our suppliers that could create a safety concern would be identified and evaluated for impacts and notification to the NRC would take place; this has not been the case in this review.

NRC Question C: *The response states, in part, that the issue had been determined that Flowserve did not reference in the audit reports that the suppliers were qualified as material organizations under the rules of NCA 3842.2, and that the suppliers were in fact audited to meet these requirements. In addition, the response states, in part, that the AVL and the audit reports for the casting and forging suppliers will be corrected to show what they were audited against and qualified to supply under the NCA-3850 rules. The nonconformance was issued due to Flowserve not providing sufficient objective evidence to support the conclusion that the suppliers had met the controls and applicable requirements of NCA-3850, not just because the there was no reference in the audit reports that the suppliers were qualified as material organizations. Describe in detail how Flowserve plans on showing that the suppliers were audited against and qualified to supply under the requirements of NCA-3850.*

Flowserve Response C:

In response to the above non-conformance and letter: Raleigh performed a full review of our material suppliers to determine whether we had adequate details and or objective evidence in the reports and checklists. The audit reports and checklists along with one on one reviews with the auditing group show that the audit was performed with intentions to qualify the material organizations but the evidence was not explicit in the reports, nor did it adequately state they were audited to be qualified under the rules of NCA 3842.2 and NCA-3850. The auditors validated their inspections by performing an additional review and contacting the suppliers for additional objective evidence to meet the requirements that Raleigh qualified them for on the Approved Vendor List (AVL). The audit reports did in fact lack the evidence needed to support what Raleigh performed and are being updated to reflect the correct requirements; objective evidence to support this is being collected.

The reporting process and checklists have been revised to meet the requirements of NCA 3842.2 and NCA-3850 when qualifying a material organization under those rules.

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Example 1: Pradeep was found during the audit that Flowserve Raleigh failed to adequately qualify them as a material organization in the report. After Flowserve Raleigh's request, Pradeep could not provide supporting documentation for NCA 3842.2 in Subsection NCA of Section III of the ASME B&PV Code,10CFR50 Appendix B and 10CFR Part 21. An audit was scheduled and completed in November 2017. Pradeep was audited under the rules of NCA 3842.2 and NCA-3850 and approved on Raleigh's AVL; the new report structure and checklist were used.

Example 2: Aruna was found during the NRC inspection that Flowserve Raleigh failed to adequately qualify them as a material organization. Flowserve Raleigh requested additional documentation/objective evidence to Aruna. Aruna provided an updated QA Manual with supporting documentation for NCA 3842.2 and NCA-3850 of the ASME B&PV Code. Flowserve Raleigh reviewed the documentation and found it to be in compliance. No additional audit outside of the schedule triannual audit has been scheduled.

Based on the above reviews, Raleigh has determined there is no impact on the materials that were supplied from Raleigh as the suppliers were found to meet the requirements of NCA-3842.2 and NCA-3850 although the objective evidence reported was not adequate at the time of the NRC inspection. Reports and checklists are being updated as reviews are closed with additional objective evidence or follow up audits are performed. In addition to the NRC's finding the QA Manager has instituted an annual oversight on the Raleigh Lead Auditors for capability demonstration. Raleigh is tentatively scheduling this full review and all audit reports to be closed by March 31st 2018.

With regards to Notice of Nonconformance 99901356/2017-201-02 (Flowserve Corrective Action 1684 and letter dated October 16th, 2017):

NRC Question A: *The response states that, in part, that Flowserve requested additional information to satisfy the audit reports on file and the you will review the objective evidence to determine if a re-audit is necessary. For the suppliers that were inadequately qualified by Flowserve, in addition to the casting and forging suppliers, clarify if Flowserve plans on performing the requalification of these suppliers during the next audit cycle or the plans are to immediately requalify these suppliers with the next few months.*

Flowserve Response A:

Flowserve Response A) Raleigh performed a full review of the AVL for all our suppliers in regards to 10CFR50 Appendix B and 10CFR21 regulations. BodyCote, East Carolina Heat Treat, Pradeep, Aruna and Exova are part of this review. Raleigh determined there was not enough solid objective evidence in the reports or the quality programs that the company met the requirements of 10CFR50 Appendix B or 10CFR21 and requested from the suppliers that they provide this for review and approval and Raleigh would use this as objective evidence in the audit reports. If Raleigh determined this objective evidence was not adequate and could not have the supplier update their procedures, an audit was scheduled in our 2018 calendar regardless of next audit cycle.

NRC Question B: *If your response to question 1a above is that Flowserve will requalify the suppliers during the next audit cycle, describe in detail which actions Flowserve has taken to assure that the material or services, as applicable, provided by these suppliers will perform their intended safety function.*

Flowserve Response B:

Flowserve is scheduling audits as applicable in our 2018 schedule if the supplier's documentation did not meet the requirements after review by Flowserve. There has been no suppliers identified as a safety concern after reviews and audits were performed for validation of qualifications.

NRC Question C: *The response states, in part, that the programs were audited to the requirements of Title 10 of the Code of Federal Regulations (10CFR) Part 50 Appendix B and 10CFR Part 21 but the audit checklists were not fully disclosing enough objective evidence. For the suppliers identified in example 1 of the nonconformance, the NRC inspection team had identified that these suppliers had quality assurance (QA) programs based on ISO 17025 and ISO 9001, as applicable. Suppliers with this type of programs need to have additional controls and processes in place to ensure that they have a QA program that meets the requirements of Appendix B to 10 CFR Part 50. In addition, these suppliers must have an adequate program that meets the requirements of 10 CFR Part 21 for the supply of basic components. Describe in detail what actions Flowserve is planning on taking to ensure these suppliers do in fact have the adequate controls and processes built into their quality programs to assure that they meet the applicable requirements of Appendix B to 10 CFR Part 50 and 10 CFR Part 21.*

Flowserve Response C:

Raleigh performed a full review of the AVL for all our suppliers in regards to 10CFR50 Appendix B and 10CFR21 regulations. Aruna, Pradeep, Trinity Forge, Bodycote, East Carolina Heat Treat, Exova and Wodin were part of this review. The review showed a lack of reporting of objective evidence in the audit report and checklist to validate the qualification of the material suppliers. There was not enough solid objective evidence in the reports or the quality programs that the supplier of material met the requirements of 10CFR50 Appendix B or 10CFR21. Objective evidence was requested and received from our suppliers including implementing 10 CFR Part 21 and annexes implementing 10CFR50 Appendix B. Suppliers that did not have the annex to Appendix B will and have created and added this to their programs. Suppliers that had 10CFR21 procedures that were not adequate will and have revised to satisfy the full requirements. Objective evidence is being maintained with the audit reports. A review of 36 audits of Flowserve Raleigh determined 4 suppliers had issues with their 10CFR Part 21 and 10 CFR Part 50 of Appendix B program not meeting the full extent of the regulation.

During the reviews of objective evidence from our suppliers or if responses were not clear, Raleigh scheduled audits in our 2018 calendar to perform an onsite visit. Flowserve Raleigh did perform audits of Bodycote, Aruna, East Carolina Heat Treat and Exova to include a few to validate the controls in regards to meeting 10CFR Part 50, Appendix B and 10 CFR Part 21.

Example 1: An audit of Bodycote was required and performed by Flowserve Raleigh. After review it was determined to remove Bodycote as a safety related service as they did not meet the full extent of 10CFR50 Appendix B and 10CFR21 and had no intentions of doing so going forward. A review of all purchase orders was performed and determined that Raleigh was not using this supplier for safety related applications and changed them on the AVL as commercial and a dedication of service will be required if needed for any safety related service.

Example 2: East Carolina Heat Treat was audited and verified that an 10CFR50 Appendix B annex was in place and implementing procedures were being utilized to satisfy the regulations. 10CFR Part 21 was reviewed and revised during the audit to meet the regulation in its entirety. East Carolina was notifying Raleigh of all nonconformance's and Raleigh would review for any potential part 21 concerns. There were no 10 CFR Part 21 issues identified at East Carolina from the nonconformance reviews by Raleigh.

Example 3: Exova was contacted by Raleigh and provided their Annex to 10CFR Part 50 and 10CFR Part 21 procedure. The review was performed and accepted by Flowserve Raleigh; the objective evidence is being maintained in the Exova audit file. No onsite visit was required as the audit performed and with the objective evidence validates the 10CFR Part 50 and 10CFR Part 21 requirements at Exova.

With regards to Notice of Nonconformance 99901356/2017-201-03 (Flowserve Corrective Action 1680 Revision 2 and letter dated October 16th, 2017):

NRC Question A: *The response states that immediate action was to lock the cages and only the supervisor or designees will have access to the weld material storage area. Confirm that this action is also the corrective action that will be implemented going forward.*

Flowserve Response to A:

The immediate and long term corrective action was to lock the cages with only the Supervisor and designees having access to the weld material storage areas, this is in place. Raleigh management trained all personnel in the welding departments on procedure 36-40-14 and the QA Manual.

NRC Question B: *The response states that the procedures and quality program will be reviewed for potential process changes to provide clearer directions for better process and weld controls. Specify the proposed completion date for these actions.*

Flowserve Response to B:

The procedure 36-40-14 and QA program reviews and updates are scheduled to be completed by June of 2018. A copy of the revised quality manual will be sent out after approvals have been completed.

With regards to Notice of Nonconformance 99901356/2017-201-04 (Flowserve Corrective Action 1686 and letter dated October 16th, 2017):

NRC Question A: *The response states, in part, that "the welding procedures P8-123NW and P8-323NW all list the requirements to only use stainless steel materials during processing." However, there are two requirements in WEC Technical Specification No. APP-GW-X0-602, "Cleaning and Cleanliness Requirements for Equipment for Use in Nuclear Supply and Associated Systems" Revision 3, dated February 18, 2013, for cleaning of stainless steels. The first requirement is that these wire brushes that are used for stainless steel shall not be used on carbon steel material in order to prevent cross-contamination. Bother of these requirements should be specified in the weld procedures that are used in production and are qualified in accordance with Section IX of the ASME Code. However, not all of Flowserve's weld procedures include both of these requirements. For Example, weld procedure P8-121N only has requirements of cross contamination. There is no requirement in in weld procedure P8-121N to use stainless steel wire brushes, while weld procedure P8-323NW requires the use of stainless steel wire brushes but does not require steps to prevent cross-contamination. In Addition, paragraph QW-200.1(b) states that "The completed WPS shall describe all of the essential, nonessential, and when required, supplementary essential variables for each welding process used in the WPS. These variables are listed for each process in QW-250 and are defined in Article IV, Welding data." QW-250 in Section IX of the ASME BP&V Code lists cleaning as a variable that shall be specified in the WPS.*

Describe what actions will be taken to ensure Flowserve's weld procedures will meet the requirements of the WEC Technical specifications and of the ASME BP&V Code. In addition, specify the proposed completion dates for these actions. It is noted that cleaning of stainless steel welds is critical for ensuring the integrity of stainless steel welds (including the issue discussed above) and is documented in a paper titled "Selecting the Best Wire Brushes for Weld Cleaning," in the American Welding Society (AWS) Welding Journal, August 2017 Edition.

Flowserve Response to A:

The WPS's applicable to the WEC Sales Orders, and currently approved by WEC in the present content, have been revised to insert the following statement to replace the current notes as presently worded in the current WEC approved WPS revision levels. "Only stainless steel brushes and wheels shall be used when removing scale or rust from the surfaces to be welded. Only equipment previously used strictly for stainless steel may be used." (See Example 1). These actions have been completed in Raleigh.

Flowserve Raleigh has verified that the requirements to prevent cross contamination are built into the processes and quality program here in Raleigh. The cleaning process is being performed during all facets of the manufacturing. If a component is suspected of being cross contaminated during any manufacturing process it will be segregated and processed under a non-conformance under the rules of Raleigh's approved quality program and processes.

Code requirement: ASME Section IX "Qualification Standard for Welding, Brazing, and Fusing Procedures; Brazers; and Welding, Brazing, and Fusing Operators of the ASME B&PV Code Non-Essential Variable QW- 410.5 States "A change in the method of initial and interpass cleaning (brushing, grinding, etc)" specifies NO Content Requirement.

Flowserve Response: The Code requirement is only that the topic be addressed and a revision to the WPS be issued when there is a change to the method. The WPS as currently written does not violate the requirement of the QW-410.5 variable as there has been no change to the stated method of cleaning from wire brushes and wheels to any other form of cleaning.

Example 1: Cleaning procedure 8260NW Revision 4 is located on the Route Cards in multiple steps in regards to welding and cleaning 2.2) Quality Assurance plans in multiple sections 2.3) welding procedures P8-123N, P8-323N, P8-123NW and P8-323NW. These all list the requirement to only use stainless material during processing but will be updated to meet the WEC specification verbatim.

Questions or comments please contact me directly: jocarter@flowserve.com or 919-831-3220.

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