FLOWSERVE

Limitorque Actuators

Flow Control Division

TO: US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-001

FROM: Jeff McConkey

DATE: 1/17/2013

SUBJECT: Response to Notice of Violation's and Nonconformance's (99900100/2012-201)

Ref.: Notice of Violation's and Nonconformance's as stated in Nuclear Regulatory Commission Inspection report Number 99900100/2012-201; Flowserve Limitorque Corporation

Attached are Flowserve-Limitorque responses for request for additional information for NON 99900100/2012-201-03, NON 99900100/2012-201-04 and NON 99900100/2012-201-05.

If you have questions or require further information, please contact me at 434-845-9738

Regards,

Jeff McConkey
Quality Assurance Manager

Cc: Richard A. Rasmussen, Chief
Electrical Vendor Branch
Division of Construction Inspection and Operational Programs
Office of New Reactors

Attachments

Flowserve
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NRO

Reply to Notice of Violation
NRC Inspection Report 99900100/2012-201; Flowserve

Violation VIO 99900100/2012-201-01

The Violation as stated in the referenced Notice of Violation (NOV) is as follows:

> Title 10 of the *Code of Federal Regulations* (10 CFR) 21.21, "Notification of Failure to Comply or Existence of a Defect and Its Evaluation," requires, in part, that "each individual, corporation, partnership, dedicating entity, or other entity subject to the regulations in this part shall adopt appropriate procedures to evaluate deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practicable...in all cases within 60 days of discovery, in order to identify a reportable defect or failure to comply that could create a substantial safety hazard, were it to remain uncorrected."
>
> Contrary to the above, as of September 10, 2012, Flowserve failed to:
>
> 1. Adopt appropriate procedures to identify when a deviation is discovered, reviewed, evaluated, and approved by the Part 21 committee. Specifically, the use of terms "evaluation", "deviation", and "defect" in QAP 13.2, "Reporting Defects for Safety Related Equipment," were inconsistent within the procedure and inconsistent with the definitions in 10 CFR 21.3, "Definitions."
>
> 2. Evaluate deviations identified in Evaluation Reports 11-69 and 11-72 within 60 days of discovery.

These issues have been identified as Violation 99900100/2012-201-01.

This is a Severity Level IV violation (Section 6.9.d of the NRC Enforcement Policy).

Reasons for the Violation

Flowserve's procedure for Reporting of Defects for Safety Related Equipment (QAP-13.2) does not affectively identify the definitions of the relevant terms (Discovery, Deviation, Defect) and the regimented order of events in the evaluation of a potentially reportable defect per the requirements of 10CFR Part21.

Corrective Actions Taken

Flowserve's internal procedure QAP 13.2 Section 5.0, will be revised as follows:

- Definitions of relevant terms (from 10 CFR-21.3) will be added to QAP 13.2
- Section 5.0 and Section 6.0 of QAP 13.2 will be reviewed and revised for clarity and consistency in accordance with the 10 CFR –21.3 definitions to ensure compliance with the timelines for reporting a defect per 10 CFR-21.21

Actions to Avoid Future Violations

All personnel with direct responsibility for evaluating deviations and reporting of defects (Application Engineering, Service, QA, General Manager) will be trained in the requirements of the revised QAP-13.2.

Date of Full Compliance

Corrective actions will be completed by 2/8/13

Reply to Notice of Nonconformance
NRC Inspection Report 99900100/2012-201; Flowserve

Violation VIO 99900100/2012-201-02

The Nonconformance as stated in the referenced Notice of Notice of Nonconformance (NON) is as follows:

A. Criterion XVI, "Corrective Action," of Appendix B, to Title 10 of the *Code of Federal Regulation* (10 CFR) Part 50 states, in part, that "[m]easures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected."

   Flowserve Quality Management System Manual (QMSM), Revision 4, dated June 27, 2011, in Section 8.5.2 states that corrective action shall be appropriate to the effects of the nonconformities encountered.

   Contrary to the above, as of September 10, 2012, Flowserve failed to take corrective action to resolve several inadequacies in its program for the design, production, and testing of safety-related Limitorque motor-operated valve actuators consistent with the NRC regulations and Flowserve policies and procedures. These inadequacies include the following:

   - Flowserve did not complete the extent of condition review for application of the Configurator software over the previous 2 years specified in the Flowserve letter dated August 2, 2011, in response to NRC Inspection Report No. 99900100/2011-201.

   - Flowserve did not complete the extent of condition review and the quarterly independent calculations of the Center of Gravity computer software consistent with the completion date of September 12, 2011, specified in the Flowserve letter dated August 2, 2011, in response to NRC Inspection Report No. 99900100/2011-201.

   - Flowserve failed to generate a discrepant material report to identify a failure to meet an inspected attribute during the inspection of gear limit switches.

   - Flowserve failed to promptly identify and correct six customer complaints in its corrective action program.

These issues have been identified as Nonconformance 99900100/2012-201-02.

Reasons for the Violation

- Flowserve failed to complete the (2) year extent of condition review for configurator changes as noted in a previous NRC Notice of Nonconformance 99900100/2011-201-04.

- Flowserve failed to complete the (2) year extent of condition review for center of gravity calculations changes as noted in a previous NRC Notice of Nonconformance 99900100/2011-201-04.

- Employee performing the inspection work on a 4-train gear limit switch did not consider that any rework even if extremely minor warranted the creation of a Discrepant Material Report.

- Several customer complaints were identified in the system as not being promptly identified and addressed per requirements of QAP 14.1.

Corrective Actions Taken

1. Revisions to the SMB & HBC EPS documents were reviewed for the last two years to include random checks of the configurator to make sure that the parts are being selected for the BOM structure. All validations were found to be correct.

2. C of G non-conformance:
   Excel spreadsheet has been developed to validate the calculations in the C of G program. There is a print out of the equations for validations from the separate Excel spreadsheet. We have randomly selected C of G reports for validation dating from 9/09 to present, which covers the 2 year extent of condition review, plus current quarterly reviews requested. Eight reports were validated, all were found to be correct. Reference LCAR 12.4

3. Internal corrective action LCAR 12-1 was generated to address Flowserve's failure to generate a Discrepant Material Report to address a failed attribute of a geared limit switch, which was reworked by the inspector.

4. Review and retrain appropriate individuals to the requirements of QAP 14.1.

Actions to Avoid Future Violations

Review and revise QAP 5.1 as appropriate to incorporate the configurator and C of G reviews.

Follow requirements of QAP 14.1

Date of Full Compliance

Corrective actions will be completed by 1/31/13

Reply to Notice of Nonconformance
NRC Inspection Report 99900100/2012-201; Flowserve

Violation VIO 99900100/2012-201-03

The Nonconformance as stated in the referenced Notice of Notice of Nonconformance (NON) is as follows:

> Criterion III, "Design Control," of Appendix B to 10 CFR Part 50 states, in part,"Measures shall also be established for the selection and review for suitability ofapplication of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems, and components."
>
> Flowserve QMSM, Section 7.3.3 states, in part, "Acceptance criteria conforms to the applicable regulatory industry consensus standard requirements and identifies the characteristics of the design necessary to ensure proper functioning of the product."
>
> Flowserve Procedure QCP 10.10, "Commercial Grade Dedication," Section 6.6.2, states, "Fasteners material characteristics will be verified by testing the hardness of the fasteners."
>
> Contrary to the above, as of September 10, 2012, Flowserve failed to verify the adequacy of certain design features associated with Grade 5 Hex Head Cap Screws that were procured from commercial suppliers and dedicated by Flowserve for use in safety-related applications. Specifically, the material characteristics of the cap screws were tested on a limited basis from the shipment received from the distributor without establishing a basis for lot sampling. Flowserve failed to verify the source of the screws or traceability from the original manufacturer.
>
> This issue has been identified as Nonconformance 99900100/2012-201-03.

Reasons for the Violation

The inspector did not follow the sampling plan as established in QCI-10.7 (Sample Inspection Plan).

Flowserve had not performed a commercial grade survey on IPC.

Corrective Actions Taken

The receiving inspectors will be re-trained on the sampling plan requirements established in QCI-10.7.

A Commercial Grade Survey will be developed to identify the critical characteristics associated with acceptance criteria of hardware being purchased from the supplier (IPC). The survey will also consist of a review of the material characteristics from the original manufacture as well as lot traceability.

Additional Comments- The population of Grade 5 Hex Head Cap Screws was released due to the fasteners met the requirements of the established inspection plan and we requested and received the Mill Test Report from the manufacturer containing the chemistry and mechanical properties of the lot in question. The fastener manufacturer's Mill Test Reports are now included with each lot received since

the initial finding. Procedure QCP 10.10 (Commercial Grade Dedication) will be reviewed and revised for these additional requirements. As a review of extent of condition, Industrial Products Company is the only supplier that we buy fasteners from.

Actions to Avoid Future Violations

See corrective actions

Date of Full Compliance

2/15/13

Reply to Notice of Nonconformance
NRC Inspection Report 99900100/2012-201; Flowserve

Nonconformance NON 99900100/2012-201-04

The Nonconformance as stated in the referenced Notice of Notice of Nonconformance (NON) is as follows:

> Criterion X, "Inspection," of Appendix B to 10 CFR Part 50 states, in part, "A program for inspection activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity. Such inspection shall be performed by individuals other than those who performed the activity being inspected."
>
> Contrary to the above, as of September 10, 2012, Flowserve failed to ensure that individuals performing quality inspections for commercial-grade dedication do not perform assembly work. Specifically, the quality control inspector performing the inspection of three four-train geared limit switches disassembled one limit switch when it did not pass one of its critical characteristic checks, performed work to correct the problem, reassembled, did not document, and retested the switch.
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> This issue has been identified as Nonconformance 99900100/2012-201-04.

Reasons for the Nonconformance

The quality inspector was performing the dedication inspections required in IP 10.38 for a 4-train GLS and noticed a piece of plastic flashing that created a continuity issue with one of the rotor contacts. The inspector removed the finger base to remove the flashing then re-assembled and continued to complete the inspection process. Contrary to the requirements of 10CFR50 Appendix B criterion 10 the rework should have been done by the appropriate person other than the individual performing the inspections.

Corrective Actions Taken

1. Flowserve will retrain all the inspection associates in the requirements of the "Section 206" posting and the requirement that no rework is allowed by the quality inspector for any inspections being performed on safety related product.
2. Flowserve will evaluate and add additional checks to the switch assembly process to eliminate rejects at the inspection step for the above issue.
3. A supplier corrective action (SCAR 267) was issued to the supplier of the rotor component to eliminate the potential flashing issue that had been identified.

Additional Comments- The three four-train switches were sent back to assembly to be retested, then were re-inspected by the QC inspector. The switches passed all functional and inspection criteria. Flowserve QA reviewed daily inspection activities in the department and did not find evidence of any other work being performed outside the QC inspectors documented responsibilities.

Actions to Avoid Future Nonconformance

See corrective actions

Date of Full Compliance

Corrective actions are to be completed by 1/31/13.

Reply to Notice of Nonconformance
NRC Inspection Report 99900100/2012-201; Flowserve

Nonconformance NON 99900100/2012-201-05

The Nonconformance as stated in the referenced Notice of Notice of Nonconformance (NON) is as follows:

> Criterion II, "Quality Assurance Program," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," states, in part, that "the program shall provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained."
>
> Criterion XVII, "Quality Assurance Records," of Appendix B to 10 CFR Part 50 states, in part, that "sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include at least the following: Operating logs and the results of reviews, inspections, tests, audits, monitoring of work performance, and materials analyses. The records shall also include closely-related data such as qualifications of personnel, procedures, and equipment."
>
> "Flowserve Quality Management System Manual," Section 1.1, states, in part, "that the Lynchburg facility will also comply with [American Society for Mechanical Engineers] NQA-1-1994."
>
> American Society of Mechanical Engineers standard NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications," Supplemental Requirement 2S-1, "Supplementary Requirements for the Qualification of Inspection and Test Personnel," Section 2.6 states, "The job performance of inspection and test personnel shall be reevaluated at periodic intervals not to exceed 3 years."
>
> Contrary to the above, as of September 10, 2012, Flowserve failed to establish a program to maintain proficiency for test personnel and maintain sufficient records to demonstrate maintenance of qualification. Specifically, QAP 18.1, "Indoctrination and Training," Revision 13, dated December 11, 2009, and QAP 10.1, "Test Laboratory Procedures," Revision 12, dated November 20, 2008, failed to describe the requirements for conducting or documenting requalification testing for test personnel. Additionally, Flowserve was unable to provide evidence that two test personnel had been trained in the diagnostic testing equipment being used or that they had maintained proficiency since training conducted in 1993.
>
> This issue has been identified as Nonconformance 99900100/2012-201-05.

Reasons for the Nonconformance

Flowserve failed to maintain current requalification documentation and training records for all test personnel per procedure QAP 18.1 (Indoctrination and Training) and QAP 10.1 (Test Laboratory Procedures).

Corrective Actions Taken

Procedures QAP 18.1 and QAP 10.1 will be reviewed and revised if needed to describe the requirements for conducting or documenting requalification for test personnel.

All test personnel's qualification records will be reviewed and updated appropriately.

Additional Comments- The two test personnel in the test lab were re-qualified on all current instrumentation. This requalification was documented. All other test personnel qualification records are up to date per procedure.

Actions to Avoid Future Nonconformance

Test personnel's qualification records will be reviewed every three years as required in QAP 18.1 and this review will be documented.

Date of Full Compliance

Corrective actions will be completed by 12/15/12.