



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 15, 2004

MEMORANDUM TO: Bruce Boger, Director  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation  
*/RA/*

THRU: Theodore R. Quay, Chief  
Plant Support Branch  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation  
*/RA/*

FROM: Richard P. McIntyre, Senior Reactor Engineer  
Quality and Maintenance Section  
Plant Support Branch  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

SUBJECT: TRIP REPORT BY THE QUALITY AND MAINTENANCE SECTION (QMS) STAFF  
OF THE NUCLEAR PROCUREMENT ISSUES COMMITTEE (NUPIC) JOINT  
UTILITY AUDIT TEAM DURING THE FLOWSERVE AUDIT

On August 22-27, 2004, Richard McIntyre, Paul Prescott and Frank Talbot of the Quality and Maintenance Section observed the performance of a NUPIC joint utility audit conducted at the Flowserve manufacturing facility in Raleigh, North Carolina. The purpose of the observation was to assess the NUPIC audit process used for approving suppliers of safety-related and commercial grade components to the nuclear industry. Attached is the trip report of the NRC staff's observation of the NUPIC audit.

TAC No.: M91503

Attachment: As stated

CONTACT: Richard McIntyre, NRR/DIPM/IPSB  
301-415-3215

MEMORANDUM TO: Bruce Boger, Director  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

September 15, 2004

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THRU: Theodore R. Quay, Chief  
Emergency Preparedness and Plant Support Branch  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

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FROM: Richard P. McIntyre, Senior Reactor Engineer  
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DATE	9/13/04	9/13/04	9/13/04	9/14/04	9/15/04

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## **NRC TRIP REPORT**

### **Subject**

This trip report documents observations by members of the NRC Office of Nuclear Reactor Regulation (NRR), Plant Support Branch, Quality and Maintenance Section (QMS) of a Nuclear Procurement Issues Committee (NUPIC) joint utility audit team during their audit conducted on August 22-27, 2004, at the Flowserve valve manufacturing facility.

### **Dates of Travel and Organization Visited**

August 22-27, 2004  
Flowserve Flow Control Division  
Raleigh, North Carolina

### **Author, Title and Agency Affiliation**

Richard P. McIntyre, Team Leader  
Quality & Maintenance Section (QMS)  
Plant Support Branch (IPSB)  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

### **Sensitivity**

There were no documents removed from the facility during the conduct of the audit. This document is available to the public (ADAMS Accession # ML042580511).

### **Background/Purpose**

The purpose of this trip report is to document the QMS staff assessment of a NUPIC audit conducted on August 22-27, 2004. The NUPIC audit team performed a joint utility audit of the Flowserve valve facility in Raleigh, North Carolina. The Flowserve Flow Control Division facility in Raleigh supplies both safety-related and commercial grade valve assemblies and replacement parts to U.S. nuclear utilities. Flowserve currently holds American Society for Mechanical Engineering (ASME) Section III Nuclear Certificates for supply of Class 1, 2 and 3 valves (including material supply). Flowserve closed their valve manufacturing facility in Williamsport, Pennsylvania and has consolidated it with the Flowserve facility in Raleigh, North Carolina. The QMS staff chose to observe this particular NUPIC audit based on the wide use of Flowserve valves by utilities and the NUPIC reports of problems with Flowserve valves following consolidation of the two facilities. At the time of the audit, Flowserve was manufacturing valves for several U.S. nuclear facilities.

NUPIC was formed in 1989, by a partnership involving all domestic and several international nuclear utilities. The NUPIC program evaluates suppliers furnishing safety-related components and services and commercial grade items to nuclear utilities.

### **NUPIC/NRC Interface Protocol**

Recently, the NRC staff and NUPIC developed a draft memorandum of understanding which describes the NRC/NUPIC interface protocol for NRC observation of NUPIC audit teams while conducting joint utility supplier audits. The purpose of the QMS observation of the NUPIC audit was to continue to ensure the NUPIC audit process is an acceptable alternative to the NRC vendor inspection program.

The QMS assessment was the second of at least two such assessments to be conducted annually to verify the adequacy of the NUPIC audit process. The NRC staff continues to rely on the effectiveness of the NUPIC audit process for evaluating the quality assurance (QA) program adequacy of suppliers to the nuclear industry.

### **Abstract: Summary of Pertinent Points/Issues**

Oversight of the NUPIC audit process was viewed by the QMS staff as particularly relevant for two reasons: (1) NRC continues to rely on NUPIC for oversight of suppliers to the nuclear industry and; (2) the NRC may rely heavily on NUPIC for oversight of suppliers to future reactors. The QMS staff anticipates that new suppliers, both domestic and international, will enter the nuclear supplier business due to an expanded nuclear market. The QMS will continue to hold discussions with the NUPIC Steering Committee on the role NUPIC may take in evaluating new suppliers. The QMS will need to evaluate NUPIC's capabilities and plans for oversight of the potential expanding supplier base for the next generation of nuclear plants.

### **Discussion**

The NUPIC audit scope was to determine the acceptability and verify the effective implementation of the Flowserve quality assurance requirements in accordance with the requirements of 10 CFR 50 Appendix B, American National Standards Institute (ANSI) N45.2, 10 CFR Part 21, ASME NQA-1, and ASME Code Section III. NUPIC has developed an audit checklist that was essentially divided into the 18 criteria of Appendix B. This checklist was supplemented by ASME, ANSI and other recognized consensus standards relevant to the supplier being audited. The NUPIC audit checklist can be downloaded from the NUPIC web site ([www.nupic.com](http://www.nupic.com)). After an audit report is issued, the completed checklist is maintained in an electronic database, which is accessible and can be downloaded by NUPIC members.

Additionally, an informal self-assessment was conducted by NUPIC team members on areas of strengths and weaknesses of the supplier from previous audits and individual team member interactions with the supplier. A Performance Based Supplemental Audit Checklist was also used by a technical specialist added to the team to cover ASME Code areas of fabrication and testing. An additional area not explicitly addressed by Appendix B which was covered by the NUPIC audit team and checklist was software verification and validation. QMS staff also reviewed the NUPIC Training/Qualification Form for each team member. The form covered such areas as NUPIC training completed, NUPIC procedures familiarization and areas of experience (design, commercial grade dedication, software, special processes, etc.).

The QMS observed all aspects of the NUPIC team's conduct of the audit at Flowserve. This started with the team meeting conducted the day before the audit commenced, to go over details of the audit and audit expectations. For observance of the conduct of the audit, the QMS divided the audit checklist review areas between the three observers. The QMS then observed performance of the NUPIC auditors as they conducted a review of a specific audit checklist section. The QMS staff observed how documents were selected for review and the adequacy of the review, interviews conducted of Flowserve personnel, and observed on-going activities in the Flowserve manufacturing facility. The QMS observed the daily meetings the audit team conducted internally and with Flowserve management, and the formal exit meeting. The QMS staff also reviewed the NUPIC audit checklist and observed NUPIC auditors completion of the checklist.

The NUPIC audit team included seven utility auditors, including two technical specialists, each assigned with specific sections of the checklist to complete. The sections of the checklist comport to the 18 criteria of Appendix B. The audit team was led by Constellation Energy Group (CEG). Two additional auditors from CEG and the CEG team leader covered the implementation of Flowserve's QA program

for design control, software QA, special processes, nonconforming items/Part 21, corrective actions and training/certification. The two auditors from PPL Corporation covered the NUPIC Performance Based Supplemental Audit Checklist, vendor document control, procedure adequacy, field services and supplier records. The auditor from Progress Energy covered the review of order entry, procurement, and supplier audits. The auditor from Entergy covered fabrication and assembly activities, material control and handling, storage and shipping, and special processes such as non-destructive examination (NDE) and welding. The auditor from Southern California Edison covered the review of testing, inspection, calibration, document control, and procedure adequacy. Due to the illness of one NUPIC auditor, an additional Progress Energy auditor was added to the team for the last two days of the audit to cover Flowserve internal audits. All NUPIC team members reviewed and discussed the adequacy of the QA organization and program.

Flowserve provided the quality assurance program description and other lower tier documents as necessary. Auditors selected documents from lists of plant internal operating procedures (PIOPs) and standard operating instructions (SOPs). The audit was performed by reviewing the requirements of the QA program and supporting implementing procedures, evaluating the documentation associated with the activities that had been performed and discussing the activities with Flowserve personnel. Observations of ongoing manufacturing and inspection activities were also performed.

At the exit meeting, the NUPIC audit team identified issues that resulted in numerous audit findings and a number of recommendations. The audit team identified findings in the following areas: commercial grade dedication, procurement and supplier audits, material handling and storage, special processes such as NDE and welding, tests and inspection, calibration, document control, control of records, internal audits, and one overall QA program issue concerning recurring inadequate corrective actions. These NUPIC findings were preliminary and the NUPIC audit report had not yet been issued as final when this trip report was written. Some of the findings may be combined prior to issuance of the NUPIC audit report.

The NUPIC audit team explained to Flowserve that it was recommending a 12-month audit frequency until Flowserve's corrective actions are verified to be effectively implemented. Finally, the audit team stated it would recommend that utilities consider invoking surveillance requirements on purchase orders, if not already doing so.

### Conclusions

All audit team members were observed in part or in whole on their portion of the audit conducted. Specific areas of the checklist that the QMS focused on for review were adequately addressed by members of the audit team. Training and qualifications of the audit team members were reviewed. All audit team members were fully trained and qualified to conduct the audit.

During the first two days of the audit, the NUPIC audit team did not hold a team meeting at the end of the day. The audit team leader met individually with each audit team member and then met separately with Flowserve personnel to discuss the ongoing team issues and findings. On the morning of the third day of the audit, the QMS team leader provided feedback to the team leader and recommended that the NUPIC team leader conduct daily team meetings with the audit team to discuss the ongoing issues and therefore allow the NRC observers to remain cognizant of issues and audit findings and also allow the NRC to observe the daily briefing with Flowserve personnel. We believe these daily meetings with the team and the supplier enhance the audit team's understanding of the issues, provide a feedback mechanism from experienced audit team members on the significance of individual team findings, improve audit team communications and synergism, and allow the NRC observers to judge the overall audit quality. Based on this QMS feedback to the NUPIC team leader, the team conducted end of the day meetings with audit team members in which several additional team findings were discussed. These NUPIC findings and issues were clearly and thoroughly communicated to Flowserve

management at the subsequent daily debrief. The NUPIC auditors supported their findings with comprehensive objective evidence and went to sufficient depth in their respective areas of focus.

Based on the observation of the joint utility audit at Flowserve, the NRC staff recommends, that to enhance NRC efficiency and effectiveness in future observation of NUPIC audits, the NUPIC team leader should conduct daily wrap-up meetings with the entire audit team to discuss the issues and findings and also allow the entire team to hear the suppliers response to these issues and findings at the daily debrief.

Based on the staff assessment of the performance of the joint utility audit team and the relatively significant NUPIC audit team recommendations resulting from the Flowserve audit, the QMS staff concluded that the NUPIC audit process was effectively implemented by the audit team and resulted in a thorough review of the areas covered.

**Pending Actions/Planned Next Steps for NRC**

This assessment was the second of two planned for this year. The NRR goal is to conduct at least two assessments a year of NUPIC joint utility audits to ensure the adequacy of the NUPIC audit process. In addition, QMS plans to attend the October 12-14, 2004 NUPIC meeting in Myrtle Beach to present staff observations of the Flowserve audit as discussed with the NUPIC members at the March 2004 meeting in Indianapolis.

**Points for Commission Consideration/Items of Interest**

None.