

December 28, 2007

MEMORANDUM TO: Glenn M. Tracy, Director
Division of Construction Inspection
& Operational Programs
Office of New Reactors

THRU: John Nakoski, Chief */RA/* for Sabrina Cleavenger
Quality and Vendor Branch 2
Division of Construction Inspection
& Operational Programs
Office of New Reactors

FROM: Richard P. McIntyre, Senior Reactor Engineer
Quality and Vendor Branch 2
Division of Construction Inspection
& Operational Programs
Office of New Reactors

SUBJECT: TRIP REPORT BY DIVISION OF CONSTRUCTION INSPECTION AND
OPERATIONAL PROGRAMS STAFF OF THE NUCLEAR
PROCUREMENT ISSUES COMMITTEE AUDIT AT FLOWSERVE,
VERNON, CA

On October 22 -25, 2007, Richard P. McIntyre and Aida Rivera-Varona of the Division of Construction Inspection and Operational Programs (DCIP), Office of New Reactors (NRO), and Carla Roquecruz of Division of Engineering (DE), Office of Nuclear Reactor Regulation (NRR), observed the performance of a Nuclear Procurement Issues Committee (NUPIC) joint utility audit conducted at the Flowserve Pump Division located in Vernon, California. The purpose of the observation was to assess the NUPIC quality assurance audit process used for suppliers of components to the nuclear industry. The DCIP and DE staff also provided clarification on issues related to Nuclear Regulatory Commission (NRC) regulations. Enclosed is the trip report of the NRC staff's observations and a list of the persons contacted during the trip.

Enclosure: As stated

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DISTRIBUTION:

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ADAMS Accession No.: ML073610331

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DATE	12/ /2007	12/ /2007

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NRC TRIP REPORT

Subject

This trip report documents observations by members of the Nuclear Regulatory Commission (NRC) Office of New Reactors (NRO), Division of Construction Inspection and Operational Programs (DCIP) and Nuclear Reactor Regulation (NRR), Division of Engineering (DE) of a Nuclear Procurement Issues Committee (NUPIC) joint utility audit conducted on October 22-25, 2007, at the Flowserve Pump Division located in Vernon, California.

Dates of Travel and Organization Visited

October 22 -25, 2007
Flowserve Pump Division

Author, Title and Agency Affiliation

Richard P. McIntyre, Team Leader
Senior Reactor Engineer
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Division of Construction Inspection and Operational Programs
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Sensitivity

There were no documents removed from the facility during the conduct of the audit.

Background/Purpose

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 U.S. nuclear utilities.

This trip report documents the staff assessment of a NUPIC joint utility audit conducted at Flowserve Pump Division on October 22-25, 2007. The Flowserve Pump Division in Vernon, CA designs, manufactures, and supplies various pump types to U.S. nuclear utilities in accordance with Appendix B to 10 CFR Part 50 requirements.

The purpose of the staff's observation of NUPIC audits is to verify the effectiveness of the NUPIC joint utility audit process. In addition, the NRC staff piloted draft NRC Inspection Procedure (IP) 43005, "NRC Oversight of Third-Party Organizations Implementing Quality Assurance Requirements." This draft inspection procedure documents the NRC staff's direct observation of third-party organizations' independent oversight activities to qualify vendors and directs the NRC staff to verify that the vendor has established and implemented an adequate system for evaluating deviations and reporting defects and noncompliance in accordance with 10 CFR Part 21 requirements. The results of the staff's inspection of Flowserve's implementation of 10 CFR Part 21 requirements is documented in NRC inspection report 99901360/2007-201 (ADAMS Accession # ML073230379).

Discussion

The NUPIC audit scope was to determine the acceptability and verify the effective implementation of Flowserve's quality assurance programs in accordance with the requirements of Appendix B to 10 CFR Part 50. The NUPIC audit team utilized the NUPIC audit checklist for this audit, which is 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).

The performance-based NUPIC checklist was used by the audit team to assess the adequacy and effectiveness of the Flowserve's quality programs. The audit checklist delineated the activities to be examined within each section and how to utilize the referenced data sheets to record the objective evidence reviewed for each section. The review included an analysis of Flowserve's order entry process, an examination of design (including a review of commercial grade item dedication), software, QA, procurement and material controls associated with specific utility orders, and shop observations of fabrication, assembly, special processes (welding and nondestructive examination - NDE), tests, and inspection activities. Also, the NUPIC audit team completed a review of calibration of measuring and test equipment and handling, storage, and shipping activities.

A Performance Based Supplemental Audit (PBSA) worksheet was also used by the technical specialist and an audit team member to 1) review the physical and technical characteristics of various models of ASME and non-ASME safety related pumps and spare parts, including testing and repair services, 2) review pump performance test reports, 3) review pertinent fabrication controls, and 4) review 10 CFR Part 21 implementation. The PBSA worksheets were specific to Flowserve-supplied ASME and non-ASME safety related pumps and spare parts. The review of Flowserve's implementation of 10 CFR Part 21 was performed since the next revision of the NUPIC checklist, which has been approved by the membership, will incorporate this review.

The staff observed all aspects of the team's conduct of the audit at the Flowserve facility. This started with the audit team meeting, conducted the day before the audit commenced, to go over details of the audit and all audit expectations. For observance of the conduct of the audit, the staff divided the audit checklist review areas between the three staff members. The staff then observed performance of the auditors as they conducted a performance-based review of a specific audit checklist section. The staff observed how documents were selected for review and interviews conducted with various Flowserve technical and quality personnel. The staff also observed ongoing work activities on the manufacturing floor, including welding, nondestructive examination, receipt and final inspection, testing, and calibration. The staff observed the daily meetings the audit team conducted internally, the daily debrief with Flowserve personnel, and the formal exit meeting with Flowserve management.

The NUPIC audit team included 11 utility auditors and a technical specialist. The twelve-person NUPIC audit team included representatives from FirstEnergy (FEC), Constellation Energy, Progress Energy, Pennsylvania Power and Light (PPL) Susquehanna, South Texas Project Nuclear Operating Company (STP), Southern California Edison (SCE), Pacific Gas & Electric, Arizona Public Service (APS), and Comision Federal De Electricidad (Mexico). The checklist sections were divided among the audit team members, with one of the four FirstEnergy auditors acting in a managerial function in support of the audit team leader. In addition to the generic audit checklist, the NUPIC audit team focused on design controls for software verification and

validation, commercial grade item dedication, calibration of measuring and test equipment, inspection, testing, and welding activities.

This audit location at Vernon, CA was the last of the four (4) Flowserve locations that were reviewed. NUPIC previously performed reviews in September 2007 at Charlotte, NC; Phillipsburg, NJ, and Memphis, TN.

The audit team reviewed the Flowserve QA manual and other lower-tier implementing documents such as procedures and work instructions. 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 work and inspection activities were also performed.

All NUPIC audit team members were observed by the staff in part or in whole on their portion of the audit conducted. Specific areas of the checklist that the staff focused on for review were adequately addressed by members of the audit team. In general, the audit team performed a sound, thorough, performance-based review of the audited areas. One staff member also observed the separate NUPIC exit meeting with Flowserve for the results and findings from the other Flowserve facility audits.

At the Pump Division exit meeting, the NUPIC audit team identified instances where Flowserve failed to adequately implement the quality program and regulatory requirements that resulted in four potential audit findings. These findings in Flowserve's implementation of quality program controls included design control activities (computer software control and commercial grade dedication), the internal audit program, and the 10 CFR Part 21 program.

The NUPIC audit report was issued to Flowserve on November 20, 2007, and also included the results and findings for the audits performed at the at the Charlotte, NC; Phillipsburg, NJ, and Memphis, TN, facilities.

Conclusions

The NUPIC audit team leader conducted effective daily briefings with the audit team and Flowserve on each day's issues and potential findings. These daily briefings enhanced the audit team's understanding of issues and findings and provided an effective feedback mechanism from experienced audit team members on the significance of individual team findings. The staff noted that the NUPIC team leader was effective at communicating findings to Flowserve's management. The auditors supported their findings with objective evidence and went to sufficient depth in their respective areas of focus. Overall, the staff concluded, based on the review of the audit areas covered, that the NUPIC audit process was effectively implemented by the audit team and resulted in sound performance-based findings for failure to adequately implement QA program and 10 CFR Part 21 requirements.

The staff noted to the NUPIC audit team that the extremely large size of the audit team (12 members) in some cases limited the effectiveness of the audit process based on the availability of Flowserve personnel supporting the audit.

Pending Actions/Planned Next Steps for NRC

This NRC assessment was third of the planned NUPIC audit observations for 2007. This assessment process is documented in IP 43005, as described earlier. Minor revisions of draft IP 43005 and its associated inspection manual chapter may be required based on the NUPIC observations/NRC Part 21 inspections performed to date. In addition, the NRO and NRR staff plan to attend and participate in the February 11-14, 2008 NUPIC meeting and auditor training to discuss staff observations of the Flowserve audit and NRC perspectives on 10 CFR Part 21 and commercial grade dedication as described in the recently issued inspection procedures IP 36100, "Inspection of 10 CFR Part 21 and 10CFR 50.55(e) Programs for Reporting Defects and Noncompliance," and IP 43004, "Inspection of Commercial-Grade Dedication Programs."

Points for Commission Consideration/Items of Interest

None.

List of Meeting Participants

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Team Leader, Lead Auditor, FirstEnergy (FEC)
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PPL Susquehanna, (PPL)
Constellation Energy, (CEG)
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Comision Federal De Electricidad (Mexico)
STP Nuclear Operating Company, (STP)
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