



STATE OF NORTH CAROLINA

PERFORMANCE AUDIT

DEPARTMENT OF ENVIRONMENT AND NATURAL
RESOURCES

DIVISION OF AIR QUALITY
TITLE V AIR QUALITY PERMIT REVIEW PROCESS

APRIL 2008

OFFICE OF THE STATE AUDITOR

LESLIE W. MERRITT, JR., CPA, CFP

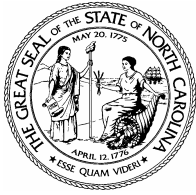
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April 17, 2008

The Honorable Michael F. Easley, Governor
Members of the North Carolina General Assembly
Mr. William G. Ross, Jr., Secretary, Department of Environment and Natural Resources
Mr. Keith Overcash, Director, Division of Air Quality

Ladies and Gentlemen:

We are pleased to submit this performance audit entitled *Department of Environment and Natural Resources, Division of Air Quality – Title V Air Quality Permit Review Process*. The objective of the audit was to determine whether the Title V air quality permit review process could be more efficient. Mr. Overcash has reviewed a draft copy of this report. His written comments are included in the appendix of the report.

This audit was initiated by the Office of the State Auditor. The Division of Air Quality was selected for this audit because of their expressed interest in process improvement.

We wish to express our appreciation to the staff of the Division of Air Quality Permitting Section for the courtesy, cooperation, and assistance provided us during the audit.

Respectfully submitted,

A handwritten signature in black ink that reads "Leslie W. Merritt, Jr." in a cursive script.

Leslie W. Merritt, Jr., CPA, CFP
State Auditor

Table of Contents

	PAGE
SUMMARY	1
INTRODUCTION	
BACKGROUND	2
OBJECTIVE AND SCOPE	2
METHODOLOGY	3
FINDING AND RECOMMENDATIONS	5
APPENDIX	7
ORDERING INFORMATION	9

PERFORMANCE AUDIT

SUMMARY

PURPOSE

This audit report evaluates the efficiency of the Title V air quality permit review process and makes recommendations so management can take appropriate action.

RESULTS

We identified efficiency opportunities in the Division of Air Quality (DAQ) Title V air quality permit review process that, if implemented, will increase the number of applications processed by each full time equivalent employee by 52%. On average, applicants will receive permits approximately 40% sooner using the improved process. The increased productivity will effectively eliminate the existing permit and renewal application backlog by the end of 2009. To obtain the same cumulative results using the current permitting process, it would require 7.2 additional full-time staff at an annual cost of \$572,439.

RECOMMENDATIONS

DAQ management should implement the identified process improvements according to their six-month implementation schedule. As part of the implementation process, management should gather relevant performance measures on the key improvement areas and monitor the status of planned action items. Managing key improvement areas will increase the effectiveness of the process improvement effort.

After implementing the process improvements and analyzing the impact on productivity, management should apply the successful improvements to other areas with similar permitting processes.

AGENCY'S RESPONSE

The Agency's response is included in the appendix.

PERFORMANCE AUDIT

INTRODUCTION

BACKGROUND

Under Title V of the 1990 Clean Air Act Amendments, the Environmental Protection Agency (EPA) requires all major sources of air pollution to obtain a Title V operating permit. A Title V facility is any type of facility that has the potential to emit 10 tons or more per year of any single hazardous air pollutant, 25 tons or more per year of combined hazardous air pollutants, or 100 tons or more per year of a common regulated air pollutant. Title V air quality permit holders include electric utilities, military and other government installations, textile mills, manufacturing facilities, and other similarly sized institutions and facilities. Air quality permit requirements for major source emissions are codified in Title 15A of the North Carolina Administrative Code.

DAQ is designated by EPA as the lead agency for enforcing federal and State laws and regulations related to air pollution in North Carolina. The DAQ Title V air quality Permitting Section is located in Raleigh and has a staff of 32. Title V air quality permit applications often flow through one of seven regional offices throughout the State before reaching the Permit Section.

Currently, 338 facilities in North Carolina hold a Title V air quality permit. During the 2007 calendar year, the DAQ Permit Section received 331 Title V air quality permit applications and processed 357 permit applications. The average processing time for renewal and significant permit modifications issued during the year was approximately 421 days. The permit application backlog (mainly permit renewal applications) totaled 229 on December 31, 2007. The user fee supported program (permitting and facility inspection) had an operating budget of \$8.8 million for the fiscal year ending June 30, 2007.

OBJECTIVE AND SCOPE

The objective of the audit was to determine whether the Division of Air Quality (DAQ) Title V air quality permit review process could be more efficient.

This audit was initiated by the Office of the State Auditor to identify cost savings and improve efficiency and effectiveness in State government. We selected the Division of Air Quality for this audit because of their expressed interest in improving the Title V air quality permit review process.

The scope of the audit included a review of the DAQ Title V air quality permit review process in place as of January 2008. We also reviewed the permit application, permit issuance, and backlog level for the calendar year ending December 31, 2007.

PERFORMANCE AUDIT

METHODOLOGY

To accomplish our audit objective, we used a process improvement methodology called LEAN to document the current permitting process, identify non-value added activities, and design a revised process that improves overall efficiency.

LEAN is an established and widely accepted process improvement technique modeled after the Toyota Production System. LEAN is a systematic approach for identifying and eliminating waste (non-value added activities) from a customer perspective. While LEAN concepts originated many years ago in manufacturing processes, the principles apply to any process including: inspections, eligibility determination, permitting, accounts payable, and accounts receivable.

Government agencies are increasingly using LEAN principles and techniques to improve administrative processes. Environmental agencies in other states¹ have significantly reduced permitting backlogs and issuance timeframes through process improvement initiatives. The Environmental Protection Agency encourages state environmental agencies to adopt continuous improvement processes that increase productivity without compromising environmental protection standards.²

We contracted with the [Industrial Extension Service](#) (IES) at North Carolina State University to provide a LEAN workshop for this audit. Established in 1955, the IES mission is to help North Carolina industries grow and prosper. IES's aim is to increase productivity, efficiency, and quality at the organizations they serve. IES customers report realizing \$500 million in economic value through IES outreach services. Within their broad spectrum of services, IES offers an entire suite of LEAN products, including LEAN Office.

To identify improvement opportunities in the Title V air quality permit review process, we coordinated with the IES LEAN facilitator and DAQ management to identify the appropriate blend of staff subject matter experts and decision makers. For process improvements to be successful, the group had to possess the knowledge to accurately capture the current process, as well as the authority to implement the improvement opportunities identified. Participants included the division director, permit supervisors, and permitting staff from the central and regional offices.

Prior to the workshop, the IES LEAN facilitator conducted a one day orientation to introduce LEAN concepts to the workgroup. At a follow-up meeting with the LEAN facilitator and the audit team, DAQ managers identified and agreed to key goals for this effort such as: elimination of non-essential tasks, effective human resource management, shorter permit processing time, and diminished application backlog. The DAQ managers stressed that achieving the stated goals can not compromise the environmental standards of the Title V air quality program.

¹ Environmental agencies in Delaware, Iowa, Michigan, Minnesota, Nebraska, Tennessee, and Virginia have implemented similar permit process improvements.

² EPA report - Working Smart for Environment Protection: Improving State Agency Process with LEAN and Six Sigma September 2006.

PERFORMANCE AUDIT

The three-day workshop began with the documenting of current application review process, the estimated average completion time for each step, the number of applications awaiting processing at each step, and the percentage of permits that pass to the next step.

The workshop also included a brainstorming session that identified the causes of permit delays. A follow-up analysis determined which type of delay had the most adverse impact on the overall permit processing time. DAQ discussed the feasibility of proposed actions to streamline those particular processes.

After identifying the areas where improvements can be made, the work group developed a future process map that included the proposed changes and estimates for improved timeliness of application reviews. The DAQ workgroup established a detailed action plan with staff assignments and implementation timeframes for each improvement item.

We documented the current permitting process, estimated time requirements and current backlogs, evaluated efficiency opportunities, and identified specific improvements for agency analysis and implementation. We quantified the impact of the proposed improvements and made calculations to measure the overall effect on productivity. We also met with DAQ and other stakeholders during the audit to strengthen our understanding of the Title V air quality permit review process.

We conducted this performance audit according to generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence that provides a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

This report contains the results of the audit including conclusion and recommendations. We also detected deficiencies in financial related internal controls that were not significant to the objective of this audit. We communicated that issue to management in a separate letter dated February 25, 2008. Because of the test nature and other inherent limitations of an audit, together with the limitations of any system of internal and management controls, this audit would not necessarily disclose all weaknesses in the systems or lack of compliance.

We conducted the fieldwork from November 2007 to January 2008. We conducted this audit under the authority vested in the State Auditor of North Carolina by Section 147-64.6 of *North Carolina General Statutes*.

FINDING AND RECOMMENDATION

Title V Air Quality Permit Review Efficiency Can Improve

We identified efficiency opportunities in the Division of Air Quality (DAQ) Title V air quality permit review process that, if implemented, will increase the number of applications processed by each full time equivalent employee by 52%. On average, applicants will receive permits approximately 40% sooner using the improved process. The increased productivity will effectively eliminate the existing permit and renewal application backlog by the end of 2009. To obtain the same cumulative results using the current permitting process, it would require 7.2 additional full-time staff at an annual cost of \$572,439.

Problems

Our review of the Title V air quality permit review process revealed several issues that have an adverse impact on the timely processing of permit applications. Coupled with a surge of permit application renewals, the permit application backlog reached 255 on January 1, 2007, and stood at 229 on December 31, 2007. While the backlog decreased by 26 during 2007, it would take more than eight years to eliminate the backlog at the rate of decrease experienced during that year.

One of the primary factors affecting the timely processing of permit applications is incomplete permit and renewal applications. Incomplete applications cause reviewers and permit writers to stop their reviews and go back to the applicants for more information and clarification. In the current process, this means that a single application could require multiple additional information requests as the application moves through the technical review process. The time it takes to make the request and receive satisfactory responses can vary significantly depending on the issue and the permit applicant. This back and forth flow of information, including the time it takes for the permit writers to re-familiarize themselves with the specifics of the applications, causes significant delays in permit and renewal application processing.

Another key factor affecting the timeliness of permit application reviews focuses on the permit writers' review. DAQ has not established standardized review methods. As a result, the level of review varies among individual staff. While supervisors ensure that the draft permits meet regulatory requirements, some reviews go beyond these requirements, adding additional time to the review process. The lack of standardized wording, where applicable, also adds to the time it takes to process a permit or renewal application.

Solutions

Working in partnership with North Carolina State University's Industrial Extension Service (IES) LEAN³ facilitator and the audit staff, DAQ focused on the most time-consuming issues in the application review and permitting process. DAQ staff analyzed the specifics of these steps and reformulated the processes so that the permitting section can perform permit application and renewal reviews more efficiently.

³ See the methodology section of this report for an explanation of LEAN and mission of IES.

FINDING AND RECOMMENDATION (CONCLUDED)

In the revised permit application review process, DAQ plans on conducting a managerial review of the permit or renewal application at the beginning of the technical review in conjunction with the review engineer. This will allow DAQ to communicate all application significant deficiencies and questions to the applicant at one time. By adding and enforcing a defined response time, applicants who do not respond in a timely manner will run the risk of having their application returned. DAQ expects that the revised process will significantly reduce the overall amount of time required to process an application. In the long term, DAQ expects the revised process to improve the initial completeness of the applications coming in the door.

Additional process improvement steps will further reduce the amount of time it takes a permit writer to complete the technical review. The additional process improvements include: a strategy meeting with a permit supervisor at the beginning of the technical review process, improved work sharing between permit writers, standardization of permit content, and the creation of a permit consolidation process.

Results

DAQ estimates that the improved permitting process will reduce the average number of days it takes to review an application and issue a permit by approximately 40% (or 168 days). While the actual improvements achieved may be slightly higher or lower, overall the improved process is estimated to equal a 52% increase in productivity. Using the permitting activity levels of 2007 as a guide, the improved process will allow DAQ to process an estimated 185 more applications per year. If DAQ fully implements the improved process by July of 2008, the division can effectively eliminate the current backlog of permit applications before the end of calendar year 2009.

There are many benefits of implementing the process improvements identified. The estimated increase in productivity is the equivalent of hiring an additional 7.2 full time employees without incurring the associated \$572,439 in annual salary costs. Facilities and institutions that must obtain a Title V air quality permit should receive permits faster, potentially saving them money. If realized, the increased productivity should help to lessen the frequency and amount of future fee increases for emissions permit holders. Additional benefits include enhanced job satisfaction within the DAQ permitting section and increased capacity to address future regulatory requirements or other management priorities.

Recommendations

DAQ management should implement the identified process improvements according to their six-month implementation schedule. As part of the implementation process, management should gather relevant performance measures on the key improvement areas and monitor the status of planned action items. Managing key improvement areas will increase the effectiveness of the process improvement effort.

After implementing the process improvements and analyzing the impact on productivity, management should apply the successful improvements to other areas with similar permitting processes.

APPENDIX



North Carolina Department of Environment and Natural Resources
Division of Air Quality

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
B. Keith Overcash, P.E.,
Director

April 8, 2008

The Honorable Leslie W. Merritt, Jr.
N. C. Office of the State Auditor
2 S. Salisbury Street
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Dear Mr. Merritt:

Thank you for the opportunity to review and respond to the assessment of the Division of Air Quality Title V Permitting Process.

I am pleased with the overall audit and Lean Office processes and the Division looks forward to implementing the improvements identified. In fact, the Permitting Section has already begun using some of the techniques developed from the audit with positive feedback from staff and external stakeholders.

Attached you will find our response to specific audit findings and recommendations.

I also want to thank you for the professionalism demonstrated by your staff and the consultants on this project, and I look forward to a continued positive working relationship with your office.

Sincerely,



B. Keith Overcash, P.E.

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APPENDIX

Agency Response

General

The DAQ Permitting Section was pleased with the overall analysis performed during the audit and looks forward to implementing the improvements identified. The staff from the Office of the State Auditor and the Industrial Extension Service were professional and helped DAQ staff and management better understand our own internal processes and where opportunities for a more efficient operation could be found.

Improvements to Date

Feedback from individual contributors within DAQ has been positive. Some of those involved in the Lean Office exercise admitted to initial skepticism but left believing that change for the better was both possible and forthcoming.

Steps have been taken to encourage interaction among the permit engineers and informal observation seems to indicate that this improvement has been taken to heart. Work toward more efficient review language has begun and resources are being collected to allow additional efficiency improvements in the review process.

DAQ has secured a contract with BNA for their online statutory and regulatory database. Feedback from DAQ staff during the trial was overwhelmingly positive.

Feedback from applicants whose applications have undergone the preliminary managerial reviews has been very positive. Consultants have indicated that this improvement will help them better respond to additional information requests as the information in the applications has not grown stale with the passage of time since the application was submitted.

While the report emphasizes a six-month process, it should be noted that DAQ has established additional action items extending to the end of 2008. Beyond that, DAQ will continue to look for ways to improve our processes.

On March 12, 2008, DAQ responded satisfactorily to the issue raised in the February 25, 2008 letter and has taken appropriate steps to address this issue.

Results

While we believe the improvements in the audit will positively impact the DAQ permitting process, it should be noted that each permit application and permitting situation is unique. As such, not every application or permit will see identical benefits from the process improvements previously identified. In many cases, we can better measure our success and increased productivity based on individual events within the permitting process and not on the total number of permits issued during a certain time period.

ORDERING INFORMATION

Audit reports issued by the Office of the State Auditor can be obtained from the web site at www.ncauditor.net. Also, parties may register on the web site to receive automatic email notification whenever reports of interest are issued. Otherwise, copies of audit reports may be obtained by contacting the:

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