



**OFFICE OF THE CITY AUDITOR**  
**COLORADO SPRINGS, COLORADO**

# 14-09 Drake Scrubber Audit Report

April 2014



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## COLORADO SPRINGS, COLORADO

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#### **Purpose**

The purpose of this audit was to review the control framework that was in place to manage the sulfur dioxide scrubber project as construction occurred at the Martin Drake Power Plant Units 6 and 7 in 2013.

#### **Highlights**

We concluded that while no significant deficiencies in the execution of this project have been noted to date, the organizational project management control framework could be strengthened. Two observations are detailed in the full report. We have also included two opportunities for improvement.

The Regional Haze Rule of the U.S. Environmental Protection Agency (EPA) required states to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment. To comply with Colorado's plan, one of the requirements Colorado Springs Utilities must meet is to have equipment to control sulfur dioxide emissions installed and operating at the Martin Drake Power Plant no later than January 30, 2018.

A contract for Neumann Systems Group, Inc. (NSG) to provide development, design, engineering and procurement for the installation of a sulfur dioxide emission control system at Drake Units 6 and 7 was executed on September 29, 2011. Additional contracts have been or will be executed directly with contractors for demolition or relocation of existing structures, site preparation, foundation work, heavy construction, installation, and engineering services. Some equipment was obtained directly by Colorado Springs Utilities from vendors with whom contracts were already in place.

As of September 2013, costs were projected to be \$130.8 million, with construction to be completed in June 2016. As of August 31, 2013, \$68.3 million in costs had been incurred.

*(Continued on page 2)*

#### **Management Response**

Management was generally in agreement with our recommendations. Responses can be found in the attached report.

#### **Recommendations**

1. The Neumann contract should be brought up to date via change order or written amendment, and kept updated throughout the project duration.
2. Colorado Springs Utilities should ensure that there is clarity and accountability surrounding the responsibilities of the parties for providing oversight of the various project components. The NSG Project Management Plan (PMP) should be updated. We recommend that Colorado Springs Utilities create a PMP covering the entire project, not just the NSG portion, and ensure it includes budget, schedule, staffing plan, and clearly delineated responsibilities.

#### **Opportunities for Improvement**

1. We recommend that minimum required standards for the management of projects be communicated to all project managers, that adherence to these standards be monitored and actions taken to promote

*(Continued on page 2)*

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*(Highlights continued from page 1)*

The audit period for this report was 2013 and the audit focus this year was on project management. The audit included a review of capital project management policies and procedures in place. We reviewed several contracts for controls and compliance with policies and procedures related to procurement, payment approval, change orders, and communication and reporting. Two of our recommendations are specific to this project while the two opportunities for improvement are more broadly applicable to Colorado Springs Utilities processes and will be further explored in other audits scheduled for later in 2014.

The Office of the City Auditor (OCA) intends to provide auditing and continuous monitoring of the NeuStream™ sulfur dioxide scrubber project at the Martin Drake Power Plant and provide an annual report on the project until it is completed.

*(Recommendations continued from page 1)*

compliance. We recommend standardized tools and training be provided to assist project managers.

2. In construction contracts, Colorado Springs Utilities should specify the allowable overhead and profit markups for change order costs and the responsibility of contractors to provide cost and pricing data in support of change orders. Standard processes or parameters should be developed to assist project managers in evaluating change order costs and determining what support to require.



## Office of the City Auditor Drake Scrubber Audit Report

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Date: April 2, 2014

To: President King, President Pro-Tem Bennett, and Members of City Council

Re: 14-09 Drake Scrubber Audit Report

We conducted an audit of the sulfur dioxide scrubber project as construction occurred at the Martin Drake Power Plant Units 6 and 7 in 2013. Colorado Springs Utilities engaged the accounting firm of Baker Tilly Virchow Krause, LLP to perform project accounting and contract analysis services related to the Development, Design, Engineering and Procurement Contract with Neumann Systems Group, Inc. To avoid duplication, we excluded a detailed review of this contract from our audit.

The purpose of this audit was to review the control framework that was in place to manage the project. The audit included a review of capital project management policies and procedures in place. We reviewed several contracts for controls and for compliance with policies and procedures related to procurement, payment approval, and change orders, as well as communication and reporting.

We concluded that while no significant deficiencies in the execution of this project have been noted to date, the organizational project management control framework could be strengthened. We identified two main observations and two opportunities for improvement. We have listed our recommendations for each in the attached report.

The Office of the City Auditor intends to provide auditing and continuous monitoring of the NeuStream™ sulfur dioxide scrubber project at the Martin Drake Power Plant and provide an annual report on the project until it is completed. The audit period for this report was 2013.

As always, feel free to contact me if you have any questions.

Sincerely,

Denny L. Nester, MBA CPA CIA CGFM CFE CGAP  
City Auditor

Cc: Jerry Forte, Chief Executive Officer  
George Luke, Interim Chief Energy Services Officer  
Dan Higgins, Interim General Manager, Energy Supply Department  
Bill Cherrier, Chief Planning and Financial Officer  
Dave Maier, Manager, Enterprise Risk Management  
Patricia Van Meter, Lead Analyst, Enterprise Risk Management



# Office of the City Auditor Drake Scrubber Audit Report

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## REPORT DETAILS

### PURPOSE AND SCOPE

The purpose of this audit was to review the control framework that was in place to manage the sulfur dioxide scrubber project as construction occurred at the Martin Drake Power Plant Units 6 and 7 in 2013. The audit included a review of capital project management policies and procedures in place. We reviewed several contracts for controls and compliance with policies and procedures related to procurement, payment approval, change orders, and communication and reporting. The contracts reviewed included those for preliminary foundation work, two equipment contracts, the owner's engineer, and certain aspects of the Neumann Systems Group contract. We conducted interviews of Colorado Springs Utilities staff as appropriate, and conducted a site visit. Colorado Springs Utilities engaged the accounting firm of Baker Tilly Virchow Krause, LLP to perform project accounting and contract analysis services related to the Development, Design, Engineering and Procurement Contract with Neumann Systems Group, Inc. To avoid duplication, we excluded a detailed review of this contract from our audit.

The Office of the City Auditor (OCA) intends to provide auditing and continuous monitoring of the NeuStream scrubber project at the Martin Drake Power Plant and provide an annual report on the project until it is completed. The audit period for this report was 2013.

### CONCLUSION

We concluded that while no significant deficiencies in the execution of this project have been noted to date, the organizational project management control framework could be strengthened. We identified two main observations and two opportunities for improvement. We have listed our recommendations for each in this report.

### BACKGROUND

In 1999, the U.S. Environmental Protection Agency (EPA) announced a major effort to improve air quality in national parks and wilderness areas. The Regional Haze Rule called for state and federal agencies to work together to improve visibility in 156 national parks and wilderness areas. The rule required states to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment. The EPA required states to submit source-specific plans for regional haze reduction in 2012. Colorado's plan included the requirement for the Martin Drake and Ray Nixon Power Plants to have a compliance schedule filed in 2013. Equipment to control particulate matter, sulfur dioxide and nitrogen oxides was required to be installed and operating no later than December 31, 2017, for Nixon's unit 1 and January 30, 2018, for Drake's units 5, 6 and 7.

In anticipation of these requirements, Colorado Springs Utilities analyzed various emission control system options. In 2008, Colorado Springs Utilities contracted with Neumann Systems Group, Inc. (NSG)



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to perform a series of tests to determine the effectiveness of its experimental NeuStream™ emission control system. The final pilot test at 20 megawatts in size was deemed successful and a contract for NSG to provide development, design, engineering, and procurement for the installation of a sulfur dioxide emission control system at Drake Units 6 and 7 was executed on September 29, 2011. Sulfur dioxide emission control systems at Nixon and Drake 5 have been set up as separate projects, which were not included in this audit. Colorado Springs Utilities coal fired plants already met the particulate matter standard established, and separate projects have been created for nitrogen oxide emission controls at both plants.

In addition to the NSG contract, separate contracts have been or will be executed directly with contractors for demolition or relocation of existing structures, site preparation, foundation work, heavy construction, installation and engineering services. Some equipment was obtained directly by Colorado Springs Utilities from vendors with whom contracts were already in place.

The total project cost for Drake 6 and 7 sulfur dioxide emission control was initially projected to be \$121 million, which included approximately \$10 million of necessary plant improvements. Construction, testing and startup were originally expected to be completed by April 2014. As of August 31, 2013, \$68.3 million in costs had been incurred. As of the September 18, 2013, presentation to the Utilities Board, costs were projected to be \$130.8 million, with construction to be completed on Drake 7 in May 2015, on Drake 6 in May 2016, and full system testing to be completed in June 2016, 18 months ahead of the Colorado regional haze plan requirement.

As of the completion of fieldwork for this 2013 audit, the initial construction contract for foundation work was nearing completion. Most equipment had been procured. The major construction contract was out for bid, and the drawings for the installation contract were at 90% review.



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## OBSERVATIONS, RECOMMENDATIONS AND RESPONSES

### OBSERVATION 1 – COSTS AND SCHEDULE AS STATED IN A CONTRACT HAD NOT BEEN UPDATED

Colorado Springs Utilities executed a contract with Neumann Systems Group for development, design, engineering and procurement of the NeuStream™ sulfur dioxide scrubber on September 29, 2011. The Statement of Work for this contract included a Project Schedule that had not been updated to reflect schedule changes. As an example, the project schedule in the contract anticipated major construction starting on April 6, 2012, but the major construction contract was out for bid in the fourth quarter of 2013. Therefore, this construction had not yet begun. Similarly, costs for the project had changed since the contract was executed. Schedule and costs for the project as stated in the contract were known to be outdated, but no change orders or written amendments had been executed to update the contract. Change orders or written amendments should be executed in a timely manner, at least annually on multi-year contracts, to ensure contracts reflect the current understanding of the parties regarding cost and schedule.

#### AUDITOR'S RECOMMENDATION

The Neumann contract should be brought up to date via change order or written amendment, and kept updated throughout the project duration.

#### COLORADO SPRINGS UTILITIES RESPONSE

Colorado Springs Utilities agrees with the recommendation.

Within the structure of the contract, payments are made to NSG for costs incurred and are not tied directly to milestones or schedule. Changes impacting project cost are well documented, understood, and communicated. Once the overall project impact is finalized, a contract amendment will be executed.





**OBSERVATION 2 – PROJECT MANAGEMENT RESPONSIBILITIES WERE NOT CLEARLY DELINEATED**

The Neumann Systems Group contract stated that NSG had a responsibility to provide project management in addition to the project management oversight provided by Colorado Springs Utilities project team. Project team members appeared committed to successful implementation of the project as a team. However, clearer delineation of responsibility and accountability, both between some team members and with third parties, was needed. The Project Management Plan (PMP) provided to the auditors was prepared by NSG and was limited to the NSG scope of work. As such, it did not address other project components such as construction activities or procurements made by Colorado Springs Utilities. A PMP typically includes complete scope of work, budget, schedule, staffing plan and management responsibilities. The NSG PMP stated incorrectly that NSG had been awarded the installation contract. The NSG PMP had not been updated since it was created in December 2011.

**AUDITOR'S RECOMMENDATION**

Colorado Springs Utilities should ensure there is clarity and accountability surrounding the responsibilities of the parties for providing oversight of the various project components. The NSG PMP should be updated. Colorado Springs Utilities should create a PMP covering the entire project, not just the NSG portion. This PMP should include budget, schedule, staffing plan and clearly delineated responsibilities.

**COLORADO SPRINGS UTILITIES RESPONSE**

Colorado Springs Utilities agrees with the recommendation.

The scrubber project team believes that roles and responsibilities are clear within the team as well as with all involved third parties. As the project moves into the construction phase, the project team will produce a project management plan detailing scope, budget, schedule, staffing and responsibilities. The NSG PMP update and overall project PMP will be completed by May 1, 2014.



## OPPORTUNITIES FOR IMPROVEMENT

### OPPORTUNITY 1 – PROJECT MANAGERS WERE NOT REQUIRED TO FOLLOW ORGANIZATIONAL PROJECT MANAGEMENT STANDARDS

Colorado Springs Utilities used a set of documents called QBDs – Quality by Design – to communicate policies and procedures. QBD 00026 documented the Enterprise Project Management Process. Project management is a profession with established standards of best practices, tools and techniques to provide effective, efficient and consistent administration of projects. We found the QBD to be consistent with those professional standards. However, project managers were not required to follow the Enterprise Project Management Process and did not follow the program management QBD for this project. There was no enterprise-level mechanism in place to monitor the quality of project management processes. In addition, individual project managers developed their own tools to accomplish tasks such as evaluating change orders and managing the flow of information such as requests for information (RFIs) and transmittals. Opportunities may have been missed to build and transfer knowledge within the organization. Consequently, the opportunity to most efficiently and effectively manage a variety of projects, both capital and O&M (operations and maintenance), using best practices has also been missed. Finally, communication of project status to management did not follow a required, consistent format which would facilitate management's assessment of projects.

While we did not note any significant deficiencies in the management of this project, we noted instances requiring interpretation of contract requirements that were unclear concerning topics such as liquidated damages and contractor fees. Most Project Managers at Colorado Springs Utilities have an engineering or operations background, and may benefit from additional guidance and support concerning accounting and business aspects of their assigned projects. We believe the organization as a whole would benefit from required minimum standards, standardized Project Manager training regarding contract provisions, and use of standardized tools.

### AUDITOR'S RECOMMENDATION

Colorado Springs Utilities should ensure that:

- minimum required standards are communicated to all project managers,
- adherence to these standards are monitored,
- compliance with standards are encouraged, and
- standardized tools and training are provided to assist project managers.

As an opportunity for improvement that could impact all Colorado Springs Utilities capital projects, we are not asking for a response from management at this time. This area will be further examined as part of "Review and Monitor Other Capital Projects," which is included in the 2014 Audit Plan.



**OPPORTUNITY 2 – A CONSTRUCTION CONTRACT DID NOT SPECIFY THE PERCENTAGE MARKUP ALLOWABLE FOR CHANGE ORDERS**

Colorado Springs Utilities' lump sum construction contracts typically do not address allowable overhead and profit markups for change orders. Leaving change order allowable markups undefined in the contract opens these matters to interpretation, negotiation and possible overpayment, as well as inconsistent treatment of contractors. Change orders could be considered a non-competitive procurement in which Colorado Springs Utilities is negotiating at a disadvantage. For this reason, even on fixed price (lump sum) contracts, the allowable markup on change order costs should be included in the contract, and contractors should be required to provide documentation of proposed change order costs sufficient for Colorado Springs Utilities personnel to evaluate the proposed costs.

We reviewed the first construction contract, which covered foundation and other preliminary work. Our review included an examination of invoices and change orders. The contract provided for change orders at a mutually agreed lump sum cost, which could include an allowance for overhead and profit; however, the allowable markup for overhead and profit was not stated. The contractor assessed markups of 10% for overhead and 5% for profit. The subcontractor who performed the work had also added a 15% fee to the costs itemized, resulting in a cumulative 32.25% in markups. The total markup on this particular change order was only \$3,129, making it immaterial; however, the percentage allowed was not clearly communicated.

Colorado Springs Utilities had not developed a standard process or parameters to assist project managers in evaluating the reasonableness of change order costs, determining what support to require, or obtaining comparable cost data. The process appeared to depend on the project managers, who may not have appropriate training or experience to negotiate change orders. This lack of standardization may result in uneven treatment of contractors on different projects for Colorado Springs Utilities, and potentially higher costs to some projects.

**AUDITOR'S RECOMMENDATION**

In construction contracts, Colorado Springs Utilities should specify the allowable overhead and profit markups for change order costs and the responsibility of contractors to provide cost and pricing data in support of change orders. Standard processes or parameters should be developed to assist project managers in evaluating change order costs and determining what support to require.

As an opportunity for improvement that could impact all Colorado Springs Utilities capital project contracts, we are not asking for a response from management at this time. This area will be further examined as part of "Purchasing— Financial System Review," which is included in the 2014 Audit Plan.

# CITY COUNCIL'S OFFICE OF THE CITY AUDITOR

## **About our Office**

The mission of the Office of the City Auditor is to provide City Council with an independent, objective and comprehensive auditing program for operations of the City. Our auditing program includes:

- Evaluating the adequacy of financial controls, records and operations
- Evaluating the effectiveness and efficiency of organizational operations
- Providing Council, management and employees objective analysis, appraisals, and recommendations for improving systems and activities

The Office of the City Auditor is responsible for auditing the systems used by the City of Colorado Springs and its enterprises, including Colorado Springs Utilities. We perform a variety of audits for these entities, including financial audits, performance audits, contract audits, construction audits, and information system audits. We also perform follow-up on a periodic basis to monitor and ensure management actions have been effectively implemented.

## **Authorization and Organizational Placement**

Our audits are conducted under the authority of Chapter 1, Article 2, Part 7 of the Colorado Springs City Code, and more specifically parts 703, 705 and 706 of the Code. The Office of the City Auditor is structured in a manner to provide organizational independence from the entities it audits. This independence is accomplished by the City Auditor being appointed by and reporting directly to the City Council.

## **Audit Standards**

The audit was conducted in a manner that conforms with the International Standards for the Professional Practice of Internal Auditing, a part of the Professional Practices Framework promulgated by the Institute of Internal Auditors.

The audit included interviews with appropriate personnel and such tests of records and other supporting documentation as deemed necessary in the circumstances. We reviewed the internal control structure and compliance tests. Sufficient competent evidential matter was gathered to support our conclusions.