

# **AQUA PENNSYLVANIA, INC.**

## **MANAGEMENT EFFICIENCY INVESTIGATION**

### **Evaluating the Implementation of Selected recommendations from the 2013 Focused Management and Operations Audit Report**

Prepared By The  
Pennsylvania Public Utility Commission  
Bureau of Audits  
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**AQUA PENNSYLVANIA, INC.  
MANAGEMENT EFFICIENCY INVESTIGATION**

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## I. INTRODUCTION

### A. Background

On August 20, 2012, the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission's (PUC or Commission) Bureau of Audits began a Focused Management and Operations Audit of Aqua Pennsylvania, Inc. (Aqua PA or Company). The Audit Staff subsequently completed its work, and in April 2013, issued a final report containing 27 recommendations for improvement. Aqua PA submitted its Implementation Plan on May 13, 2013, indicating that 20 recommendations were fully accepted and seven recommendations were accepted in part. On May 23, 2013, at D-2012-2312432, the Commission made both the audit report and Implementation Plan public and directed Aqua PA to:

- Proceed with its May 2013 Implementation Plan.
- Submit implementation progress reports annually, by May 1, for the next three years.

Since May 2013, Aqua PA has submitted three Implementation Plan updates as requested by the Commission to ascertain the Company's progress in implementing the recommendations contained in the previous Focused Management and Operations Audit report. Based on a review of these updates, the Audit Staff elected to conduct a Management Efficiency Investigation (MEI) of Aqua PA's progress in implementing 22 of the 27 original recommendations. Specific items of management effectiveness and operation may be investigated pursuant to Title 66 Pa. C.S. §516(b).

### B. Objective and Scope

The objective of this MEI was to review and evaluate the effectiveness of Aqua PA's efforts to implement the recommendations contained in the Focused Management and Operations Audit report released in May 2013. The scope of this evaluation was limited to Aqua PA's efforts in implementing 22 prior management audit recommendations in the functional areas of:

- Executive Management
- Affiliated Interests and Cost Allocations
- Financial Management
- Water Operations
- Emergency Preparedness
- Materials Management
- Customer Service
- Human Resources and Safety Programs
- Diversity

Additionally, the Audit Staff deemed it prudent to review Aqua PA's compliance with PUC regulations at 52 Pa. §101 regarding its physical security, cyber security, emergency response, and business continuity plans.

### **C. Approach**

This MEI was performed by the Management Audit Staff of the PUC's Bureau of Audits (Audit Staff). Actual fieldwork began on October 13, 2015 and continued through March 9, 2016. The fact gathering process included:

- Interviews with Aqua PA personnel.
- Analysis of selected Aqua PA records, documents, reports, and other information for the period 2011 through year-end 2015.
- Visits to select Company facilities such as offices, water treatment plants, water storage towers, material warehouses, etc.

## **II. SUMMARY OF MANAGEMENT EFFECTIVENESS AND OPERATING EFFICIENCY**

The Audit Staff found that Aqua Pennsylvania, Inc. (Aqua PA or Company) has effectively or substantially implemented eight of the 22 prior management audit recommendations reviewed and has taken some action on the 14 other recommendations. The Audit Staff identified 21 follow-up recommendations for Aqua PA to implement. Among the more notable improvements achieved by the management of Aqua PA are:

- Improved average inventory turnover rates company-wide, including many smaller satellite warehouse locations.
- Established emergency stock levels for each warehouse and reduced inactive inventory by approximately \$77,000 and reduced annual carrying costs by \$13,860.
- Expanded the Aqua PA Damage Prevention Manual to include all relevant policies and procedures.
- Updated the Aqua PA Cross Connection Control Manual.
- Conducted an initial internal audit of affiliate transactions and incorporated a review of cost allocations and shared services into its three year audit cycle.
- Implemented enhancements to the Company's inventory management and accounting software to eliminate the need for multiple systems to track meter inventory.
- Developed a set of operating policies and procedures for the Internal Audit Department which helped clarify accountability, expectations, and established consistency for audit plans and reports.
- Submitted and received Commission approval for a new AIA which outlined services and affiliates not included in previous AIA agreements.
- Established a process for, and began actively tracking operational audit recommendations and performing follow-up testing and verification as necessary.
- Developed an internal dividend policy to govern payments from Aqua PA to Aqua America.

While these accomplishments are commendable, the Audit Staff has identified further improvement opportunities in certain areas. In particular, Aqua PA needs to:

- Take corrective action to reduce non-revenue water levels to at least 25% within the Greater PA region which could result in annual savings of approximately \$465,000.
- Create a more comprehensive company-wide succession plan.
- Ensure Emergency Response Plans, Crisis Plans, and Integrated Contingency Plans are annually reviewed and updated.
- Develop and implement a cyber security awareness training program.

- Actively ensure third-party contract compliance with Company security standards.
- Fully automate the theft of service program.
- Correct physical security deficiencies and continue to perform ongoing physical security reviews of facilities.
- Reduce the number of 1:1 reporting relationships and maintain sufficiently detailed justifications for all instances of narrow spans of control.
- Establish methods to improve cost assignment in order to increase the level of costs directly charged between affiliates.
- Document all lease agreements currently in place between Aqua PA and its affiliates.
- Expand the scope of future market analysis to include all services provided by Aqua PA to affiliates, and services provided by other affiliates to Aqua PA.
- Perform a cost benefit analysis to assess the net benefits of automating the Company's damage prevention program.
- Perform a vulnerability assessment at least every ten years and revise the Physical Security, Emergency Response, and Business Continuity Plans as necessary.
- Document the training process and develop a procedure to review training administered outside the HR Department and annually reconcile Safety Administrator and HR Department training records for accuracy and completeness.
- Establish a policy to govern the automated dispatch process for shut-off collection order notices for all districts.
- Strive to increase representation in deficient or underutilized job categories to meet Company goals.

Exhibit II-1 summarizes the 22 prior recommendations reviewed and the Audit Staff's follow-up findings, conclusions, and recommendations.

**AQUA PENNSYLVANIA, INC.  
MANAGEMENT EFFICIENCY INVESTIGATION  
SUMMARY OF THE APRIL 2013 MANAGEMENT AUDIT RECOMMENDATIONS AND  
STAFF'S FOLLOW-UP FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

Prior MA Recommendations	MEI Follow-up Findings And Conclusions	MEI Follow-up Recommendations
<b>III. EXECUTIVE MANAGEMENT</b>		
Strive to reduce the number of reporting relationships that are below a 1:4 ratio and maintain sufficient documentation to adequately justify each narrow reporting relationship.	Narrow spans of control, specifically 1:1 reporting relationships, are excessive throughout the organization.	Reduce the number of 1:1 reporting relationships while striving to decrease the overall number of reporting relationships below a 1:4 ratio, and maintain sufficiently detailed justifications for all instances of narrow spans of control.
<b>IV. AFFILIATED INTERESTS AND COST ALLOCATIONS</b>		
Conduct periodic internal audits of affiliated transactions including cost allocations for shared services.	The Aqua Services IA Department has conducted an initial internal audit of affiliate transactions and plans to incorporate a review of cost allocations for shared services into its audit plan every three years.	None.
Submit Affiliated Interest Agreements for Commission review and approval that cover all services Aqua PA receives from affiliates and each service Aqua PA provides to affiliates in accordance with 66 Pa.C.S. §2102.	Commission approved affiliated interest agreements are maintained for all Aqua PA affiliate transactions.	None.
Compare the internal cost of services provided between Aqua PA and their corporate affiliates to market rates on a periodic basis and document the savings realized from any resultant changes.	Aqua Services performed a market study analyzing key services provided to Aqua PA; however, the study did not include an analysis of services provided by Aqua PA to its affiliates.	Expand the scope of the market analysis to include all services provided by Aqua PA to affiliates and services provided by affiliates (other than Aqua Services) to Aqua PA.



**AQUA PENNSYLVANIA, INC.  
MANAGEMENT EFFICIENCY INVESTIGATION  
SUMMARY OF THE APRIL 2013 MANAGEMENT AUDIT RECOMMENDATIONS AND  
STAFF'S FOLLOW-UP FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

Prior MA Recommendations	MEI Follow-up Findings And Conclusions	MEI Follow-up Recommendations
<b>IV. AFFILIATED INTERESTS AND COST ALLOCATIONS (continued)</b>		
	Aqua PA does not have documented lease agreements in place with its affiliates.	Document all lease agreements between Aqua PA and its affiliates, and submit them to the Commission for approval.
	Charges from Aqua Services to Aqua PA are predominately allocated or indirectly charged.	Establish methods or techniques to improve cost assignment and where feasible increase the level of costs directly charged between affiliates.
<b>V. FINANCIAL MANAGEMENT</b>		
Perform follow-up testing to verify that corrective action has been taken in a timely manner on prior Internal Audit findings and recommendations.	The IA Department is actively tracking Operational Audit recommendations and performing necessary follow-up testing and verification to validate corrective actions.	None.
Develop and follow a more comprehensive set of operating policies and procedures for the Internal Audit Department.	The Internal Audit Department has developed a set of operating policies and procedures, but additional enhancements can be made.	Enhance Internal Audit Department operating policies and procedures.
Document Aqua PA's internal dividend policy.	Aqua PA created an internal dividend policy for Aqua PA dividend payments to Aqua America.	None.
<b>VI. WATER OPERATIONS</b>		
Expand the Damage Prevention Manual to include all relevant policies and procedures, review and update as appropriate.	Aqua PA's Damage Prevention Manual has been expanded to include all relevant policies and procedures.	None.

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MANAGEMENT EFFICIENCY INVESTIGATION  
SUMMARY OF THE APRIL 2013 MANAGEMENT AUDIT RECOMMENDATIONS AND  
STAFF'S FOLLOW-UP FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

Prior MA Recommendations	MEI Follow-up Findings And Conclusions	MEI Follow-up Recommendations
<b>VI. WATER OPERATIONS (continued)</b>		
Perform a cost benefit study to assess the net benefit of automating the damage prevention program.	Aqua PA has not documented the cost benefits of automating its damage prevention program.	Perform and document a cost-benefit analysis to assess the net benefit of automating the damage prevention program.
Update the Cross Connection Control Manual on a periodic basis.	Aqua PA has updated its Cross Connection Control Manual.	None.
Establish a valve inspection program for critical valves.	Aqua PA has initiated efforts to develop a critical valve inspection program, and projects that it will become operational in the first quarter of 2016.	Complete development of a valve inspection manual and implement the planned critical valve inspection program in a timely manner.
Expand Aqua PA's Non-Revenue Water (NRW) program to include a review of apparent losses.	Aqua PA performed a comprehensive UFW/NRW review of its Southeast Pennsylvania Region, but NRW trends for its Greater PA Region have been increasing.	Take corrective actions to reduce NRW levels to 25% or lower within the Greater PA region.
<b>VII. PUBLIC UTILITY EMERGENCY PREPAREDNESS</b>		
	Minor deficiencies or inconsistencies in physical security and policies were noted during inspections of Aqua PA's facilities.	Correct minor physical security deficiencies and continue to perform on-going physical security reviews of all facilities.
	The Emergency Response Plans, Crisis Plans, and Integrated Contingency Plans have not been reviewed or revised within the last year.	Annually review and update the Emergency Response Plans, Crisis Plans, and Integrated Contingency Plans.

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MANAGEMENT EFFICIENCY INVESTIGATION  
SUMMARY OF THE APRIL 2013 MANAGEMENT AUDIT RECOMMENDATIONS AND  
STAFF'S FOLLOW-UP FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

Prior MA Recommendations	MEI Follow-up Findings And Conclusions	MEI Follow-up Recommendations
<b>VII. PUBLIC UTILITY EMERGENCY PREPAREDNESS (continued)</b>		
	Aqua PA's Security Vulnerability Assessment is outdated.	Strive to perform a VA at least every ten years, and more often as appropriate due to circumstances, and revise the Physical Security Plan, Emergency Response Plan, and Business Continuity Plan to address any new threats or vulnerabilities identified.
	Aqua PA does not have a consistent cybersecurity training program for all employees.	Develop and implement a company-wide cyber security awareness training regimen, including both first time and refresher training programs.
	Aqua PA does not actively ensure cybersecurity standards compliance with its third-party vendors.	Actively ensure third-party contractor compliance with company security standards.
<b>VIII. MATERIALS MANAGEMENT</b>		
Establish emergency stock levels for Aqua PA.	Aqua PA has established emergency stock levels and reduced its inactive inventory.	Continue to periodically identify and eliminate obsolete/inactive inventory.
Strive to achieve average inventory turnovers of 4.0 turns at all warehouse locations.	Aqua PA has improved its average inventory turnover rates company-wide and for many of its satellite warehouse locations.	None.
<b>IX. CUSTOMER SERVICES</b>		
Initiate a comprehensive theft of service program for all customers.	Aqua PA has initiated a pilot theft of service program for limited customer classes.	Complete deployment of the theft of service program.

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MANAGEMENT EFFICIENCY INVESTIGATION  
SUMMARY OF THE APRIL 2013 MANAGEMENT AUDIT RECOMMENDATIONS AND  
STAFF'S FOLLOW-UP FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

Prior MA Recommendations	MEI Follow-up Findings And Conclusions	MEI Follow-up Recommendations
<b>IX. CUSTOMER SERVICES (continued)</b>		
Customize the Lawson System to track meter inventory effectively and eliminate redundant computerized tracking systems.	Aqua PA is now using a single system to track its meter inventory.	None.
Automate the creation of shut-off collection order notices in the Company's Northeast and Western Regions.	Aqua PA has increased automation of its shut-off collection order notices, but there is no policy for when a district should utilize automation or manual procedures.	Establish a policy governing the automated dispatch process for all districts including the satellite districts.
<b>X. HUMAN RESOURCES AND SAFETY PROGRAMS</b>		
Expand the current emergency succession plan into a formal company-wide succession plan which includes not only executive, but middle level management, and is periodically reviewed and updated by the Board of Directors Executive Committee.	Aqua PA has not taken steps toward developing a formal management succession plan.	Create a more comprehensive company-wide succession plan.
Clarify all ongoing reporting relationships throughout the Company and strive to make a basic, easy to follow, Organizational Chart that fully depicts the organization available to all employees.	Aqua PA has not made changes to its organizational charts but plans to transition to a new Human Resource Information System (HRIS) with enhanced organizational charting features.	Complete efforts to create easy to follow organizational charts that are available to all employees and continue to streamline the cross-company reporting structure.

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SUMMARY OF THE APRIL 2013 MANAGEMENT AUDIT RECOMMENDATIONS AND  
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Prior MA Recommendations	MEI Follow-up Findings And Conclusions	MEI Follow-up Recommendations
<b>X. HUMAN RESOURCES AND SAFETY PROGRAMS (continued)</b>		
Restructure the HR Department to include the Safety Administrator and ensure all training, including safety related training, is administered and tracked through the HR Department.	Aqua PA developed a yet undocumented process to help ensure all training records are forwarded to Human Resources but did not restructure the Human Resources department to include the Safety Administrator.	Document the training process and develop a procedure to review training administered outside the HR Department and annually reconcile Safety Administrator and HR Department training records for accuracy and completeness.
<b>XI. DIVERSITY</b>		
Strive to increase the utilization of minorities and females in underutilized job categories through hiring and promotion.	Aqua PA appears to have achieved some improvement in female and minority utilization but has fallen short of its goals.	Strive to increase representation in deficient or underutilized job categories to meet Company goals.
Initiate additional efforts to increase purchases from minority owned business enterprise (MBE) vendors.	Aqua PA increased MBE spending compared to the lower levels experienced in 2010-2011, but additional work is needed.	Continue efforts to identify new MWDBE vendors and strive to increase MWDBE spend levels.

### III. EXECUTIVE MANAGEMENT AND ORGANIZATIONAL STRUCTURE

**Background** – The Focused Management and Operations Audit (Management Audit) of Aqua Pennsylvania (Aqua PA or Company) conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits released on May 23, 2013, at D-2012-2312432, contained one recommendation within the Executive Management and Organizational Structure functional area. The Audit Staff rated this functional area as needing minor improvement. In this chapter, one prior recommendation and prior situation is reviewed and one follow-up finding and recommendation is presented.

**Prior Recommendation** – Strive to reduce the number of reporting relationships that are below a 1:4 ratio and maintain sufficient documentation to adequately justify each narrow reporting relationship.

**Prior Situation** – A span of control analysis is a tool used to monitor management efficiency. Ideal spans of control fall within the range of 1:4 to 1:10 to maximize operating efficiency and allow for effective communication. Narrow spans of control can lead to micro-management and excessive layers of management which result in higher compensation costs. In contrast, wide spans of control (i.e., greater than 1:10) often result in lack of management oversight and/or control.

Aqua PA had an unusually high percentage of reporting relationships with narrow or low spans of control (i.e., less than 1:4). From 2005 to 2013, Aqua PA’s overall spans of controls had generally remained the same, as the number of reporting relationships with narrow spans of control had increased due to an increase in the number of management positions the percentage of narrow spans of control had decreased slightly. As a result, the concern regarding excessive number of management employees had not improved since the 2005 Management Audit. Additionally, while some explanation was provided for most of the narrow reporting relationships, many of the documented justifications provided to the Audit Staff were vague and provided little insight into the rationale for the positions.

**Follow-up Finding and Conclusion No. III-1** – **Narrow spans of control, specifically 1:1 reporting relationships, are excessive throughout the organization.**

An unusually high percentage of narrow spans of control, and in particular 1:1 spans of control, still exist throughout the organization. Although documentation to justify narrow or wide spans of control has improved slightly in terms of the percentage of atypical reporting relationships for which justification is documented by the Human Resources (HR) Department, similar to the situation noted during the 2013 Management Audit review, the Audit Staff noted many instances for which inadequate or no justification was available.

HR continues to perform annual spans of control analysis by distributing organization charts to all departments requesting an internal review of reporting

relationships. For ratios that are below 1:4 or above 1:10, HR documents the justification for each position in this category to substantiate the reporting relationship. Due to the interwoven reporting structure of Aqua PA and its affiliated Corporate Service Company, Aqua Services, the Audit Staff reviewed the spans of control for both entities as shown in Exhibit III-1 from 2012 through 2015. There are instances where Aqua Services employees report to Aqua PA management and conversely Aqua PA employees report to Aqua Services management.

**Exhibit III-1**  
**Aqua Pennsylvania and Aqua Services**  
**Span of Control Comparison**  
**As of December 31, 2005, 2012, 2014 and 2015**

Ratio	2005		2012		2014		2015	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
Less than 1:4	62	45%	67	43%	79	47%	73	48%
1:4 to 1:10	64	46%	74	47%	67	40%	53	35%
Greater than 1:10	12	9%	15	10%	21	13%	27	18%
Totals	138	100%	156	100%	167	100%	153	100%

Source: Data Request EM-1

The Company indicated that many of the narrow spans of control (i.e., those less than 1:4) are due to specialized departments providing unique services such as specific engineering duties, water quality lab work, etc. Nonetheless, the Audit Staff noted that Aqua continues to have an abnormally high number of narrow spans of control within its management structure. More specifically, 1:1 reporting relationships constitute an unusually high portion of the narrow spans of control. In 2014 and 2015, there were 33 and 28 reporting relationships with spans of control of 1:1 which represented approximately 19.8% and 18.3% of all reporting relationships, respectively. The Audit Staff has observed 1:1 spans of control typically ranging from 6% to 8% of all reporting relationships for other major PUC jurisdictional utility companies. The Audit Staff questions the efficiency of maintaining such a high percentage of 1:1 reporting relationships. The Audit Staff recognizes that a 1:1 reporting relationship may be needed for a few very specific situations, but contends that 1:1 reporting relationships can often be made more efficient while maintaining their effectiveness by being combined within similar departments. For example: Aqua PA's Information Technology (IT) Contract and Requisitions Coordinator supervises one employee in the mailroom. In such an instance, the Company could consolidate the mailroom employee within the IT, HR or some other department.

It is important to note that reducing 1:1 reporting relationships does not necessarily directly reduce the number of employees but rather helps to optimize reporting structure and helps contain the levels of management.

**Staff's Follow-up Recommendation – Reduce the number of 1:1 reporting relationships while striving to decrease the overall number of reporting relationships below a 1:4 ratio, and maintain sufficiently detailed justifications for all instances of narrow spans of control.**



## IV. AFFILIATED INTERESTS AND COST ALLOCATIONS

**Background** – The Focused Management and Operations Audit of Aqua Pennsylvania, Inc. (Aqua PA or Company), conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits, released on May 23, 2013, at D-2012-2312432, contained three recommendations within the Affiliated Interests and Cost Allocations functional area. The Audit Staff rated this functional area as needing moderate improvement. In this chapter, the three prior recommendations and prior situations are reviewed and five follow-up findings and three follow-up recommendations are presented.

**Prior Recommendation** – Conduct periodic internal audits of affiliated transactions including cost allocations for shared services.

**Prior Situation** – Internal audits of affiliate transactions and cost allocations for shared services were not being performed. Operational audits were a relatively new and developing function of the Aqua Services’ Internal Audit (IA) Department. The accuracy of cost allocations among affiliates were not identified as a material risk by the IA Department since affiliated transactions are consolidated for financial reporting purposes. As a result, the Audit Staff found that reviews of affiliate transactions and cost allocations were not being conducted on Aqua PA.

**Follow-up Finding and Conclusion No. IV-1** – **The Aqua Services IA Department has conducted an initial internal audit of affiliate transactions and plans to incorporate a review of cost allocations for shared services into its audit plan every three years.**

The Aqua Services, Inc. (Aqua Services) IA Department began performing operational audits during 2009 by utilizing contracted audit staff under the oversight of the Director of Internal Audit. During 2013, the IA Operational Audit Contractor completed an Affiliate Cost Audit (Audit) of Aqua PA’s affiliated interests’ processes. The Audit included the following key work steps: a review of Aqua PA’s affiliated interest agreements; interviews with key personnel on cost allocation processes and procedures within their areas of control; and testing a sample of affiliate transactions and their supporting documentation. The Audit report identified one observation and recommendation regarding inconsistency in the application of overhead rates charged between affiliates. The Audit Report was presented to the Audit Committee of the Aqua America, Inc. (Aqua America) Board of Directors in June 2013.

Moving forward the IA Department plans to conduct audits of affiliate transactions every three years with the next affiliate cost audit scheduled to begin in March 2016. During 2013, Aqua Services hired two new IA staff to perform the operational audit functions internally. For more information on the Internal Audit Department’s structure and new follow-up process, see Chapter V – Financial Management, Follow-up Finding and Conclusion No. V-1. Testing and evaluation of intercompany transactions are an integral component of rate case proceedings, as well as financial and compliance based

audits for many of Aqua America's subsidiaries, including Aqua PA. As a result, the IA Plan is created in connection with Aqua America's Enterprise Risk Management (ERM) function which identifies and monitors key risks. The IA Plan incorporates audits of key functions with more inherent risk profiles, such as affiliate transactions, into a three year audit cycle, with emergent risks included in the Audit Plan when IA and the Audit Committee determine that additional attention should be given to an area or function within Aqua America or its subsidiaries.

In general, internal audits of affiliate transactions, including the appropriateness of cost allocation policies and processes, and their application, should be incorporated into the internal audit schedule approximately every three years, or sooner, if significant changes occur, or risk of error increases. This will allow the Company to identify and correct any shortcomings in the allocation process and better substantiate fair allocations between affiliates.

**Staff's Follow-up Recommendation – None.**

**Prior Recommendation** – Submit affiliated interest agreements for Commission review and approval that cover all services Aqua PA receives from affiliates and each service Aqua PA provides to affiliates in accordance with 66 Pa. C.S. §2102.

**Prior Situation** – Aqua PA was providing services to, and receiving services from, several affiliates beyond those identified in its approved affiliated interest agreements (AIA's) with Aqua Services and Aqua Resources. During their review of affiliate transactions, the Audit Staff found that Aqua PA was receiving accounting, engineering, drafting services, etc. from Aqua OH and Aqua NJ. In addition, Aqua PA was providing fleet, lab testing, and various professional and management services to several affiliates without an approved AIA.

**Follow-up Finding and Conclusion No. IV-2 – Commission approved affiliated interest agreements are maintained for all Aqua PA affiliate transactions.**

Aqua PA has three affiliated interest agreements approved by the Commission covering services provided to/from affiliates:

- Aqua Services – approved October 13, 2010, at Docket G-2009-2138286
- Aqua Resources – approved December 19, 2012, at Docket G-2012-2301704
- Aqua America Companies – approved January 14, 2014, at Docket G-2013-2350016

The AIA's between Aqua PA and Aqua Services and Aqua Resources remain unchanged since the Audit Staff's review during the 2013 Focused Management and Operations Audit at Docket D-2012-2312432. The AIA between Aqua PA and the Aqua

America Companies<sup>1</sup> was filed since the Management Audit to address the concerns raised by the Audit Staff. According to the agreements, the following services may be provided between affiliates:

- Aqua Services Agreement – Enables Aqua Services to provide Aqua PA with accounting and finance, administration, communications, customer service, engineering, fleet, human resources, information systems, legal, operations, purchasing, rates and regulatory, risk management, secretarial, and water quality related services.
- Aqua Resources Agreement – Enables Aqua Resources to provide Aqua PA with various wastewater and sludge services including, but not limited to, wastewater sludge hauling; cross connection control program management; digester, lagoon, filter, and tank cleaning; and pit, vault, and wet well cleaning.
- Aqua America Companies Agreement – Covers for administration, engineering, fleet maintenance, labor, lab testing, metering, regulatory, and water quality services. The agreement has been executed by the following Aqua America subsidiaries, enabling Aqua PA to provide services to, or receive services from, these specific affiliate companies and subsidiaries:
  - Aqua New Jersey
  - Aqua Indiana
  - Aqua Virginia
  - Aqua Texas
  - Aqua Ohio
  - Aqua Illinois
  - Aqua North Carolina
  - Aqua Utilities Florida<sup>2</sup>
  - Aqua Infrastructure
  - Little Washington Wastewater Company<sup>3</sup>
  - Aqua Resources (Affiliated Companies).

A review of the charges between affiliates revealed that, predominantly, the services provided between Aqua PA and its affiliates were provided for in the approved AIA agreements. Focusing on the charges between Aqua PA and Aqua America Companies, the Audit Staff did identify minimal charges from Aqua PA to Aqua New Jersey related to the allocation of the Controllers salary<sup>4</sup> (Accounting Services) that were not subject to the AIA. Additionally, minimal charges were made from Aqua Pa to Aqua Services, and Aqua Wastewater Management (a subsidiary of Aqua Resources), for mailroom services provided in connection with the lease of office space in Aqua PA's Bryn Mawr office building (see Additional Follow-up Finding and Conclusion No. IV-4 for

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<sup>1</sup> Includes all Aqua America, Inc. subsidiaries.

<sup>2</sup> Aqua Florida was divested by Aqua America in 2013.

<sup>3</sup> Effective January 1, 2014, Little Washington Wastewater Company completed a name change to Aqua Pennsylvania Wastewater, Inc.

<sup>4</sup> The Aqua PA Controller is also responsible for the Controller duties of Aqua New Jersey.

additional information). The Public Utility Code at 66 Pa. C.S. § 2102 (a), (b) and (d), specifies that contracts between public utilities and their affiliates are to be filed and approved by the Commission, except in cases where total annual transactions between an affiliate is less than \$10,000. Although these services are not identified in the approved AIA agreement, due to the circumstances surrounding the charges as well as their immaterial nature, it does not appear that they necessitate the filing of a revised AIA at this time.

**Staff's Follow-up Recommendation – None.**

**Prior Recommendation** – Compare the internal cost of services provided between Aqua PA and their corporate affiliates to market rates on a periodic basis and document the savings realized from any resultant changes.

**Prior Situation** – Internal service costs should be compared to market rates on a periodic basis to ensure that costs are market competitive, identify opportunities to reduce service costs (through outsourcing or improving internal efficiency), and ensure the level of service received is comparable to that available in the market. However, Aqua PA was not conducting routine market studies for the services it regularly provides to, and receives from, affiliates. A market analysis had been conducted by Aqua Services during 2011 related to professional services provided to Aqua Virginia (VA) which indicated a cost benefit to utilizing Aqua Services; however, no market study had been performed specific to the services provided to, or by, Aqua PA.

**Follow-up Finding and Conclusion No. IV-3 – Aqua Services performed a market study analyzing key services provided to Aqua PA; however, the study did not include an analysis of services provided by Aqua PA to its affiliates.**

Aqua Services performed a market analysis, on services provided to Aqua PA by Aqua Services, during March of 2014. In addition, Aqua Services has indicated that it plans to continue performing market analyses on a three year cycle with the next market analysis planned for 2017. The 2014 market study followed the same general format as the 2011 analysis of services provided by Aqua Services to Aqua VA. The study included a review of accounting, engineering, legal, management, and customer services. A review of the market study revealed that it was prepared using various benchmarking reports, professional surveys, and actual invoices to Aqua PA for related contracted services. When the source data (i.e., benchmark studies and professional surveys) were not from, or available for, the current year, available rate information was adjusted for inflation. Exhibit IV-1 shows the results of the market study by service.

**Exhibit IV-1  
Aqua Pennsylvania, Inc.  
Market Study for Affiliate Services  
As of March 31, 2014**

Service	Market Rate per Hour	Aqua Services Rate per Hour	Difference	Percentage below Market
Accounting	\$122	\$65	\$(57)	-46.7%
Engineering	\$125	\$103	\$(22)	-17.6%
Legal	\$327	\$123	\$(204)	-62.4%
Management Services	\$223	\$153	\$(70)	-31.4%
Customer Service	\$47	\$21	\$(26)	-55.3%

Source: Data Request CA-7.5

As shown in Exhibit IV-1, Aqua PA, at the time of the market analysis, was receiving services from Aqua Services at costs that were 18% to 62% less than that available in the market. The services included in the market study (i.e., accounting, engineering, legal, management, and customer services) were identified by the Company as the primary services provided to Aqua PA. These services made up approximately 69% of all charges from Aqua Services to Aqua PA. The majority of the remaining charges relate to travel expenses, contracted services, and capital investment costs allocated to Aqua PA, which by form are already market based.

However, the study does not include services received from Aqua Resources, or services provided to other affiliates by Aqua PA. Aqua Services personnel acknowledged that the omission of these services was an oversight, and agreed that these services should have been included. Without including all services provided to, or received from affiliates in the analysis, Aqua PA has no assurance that the price points for services provided to affiliates are appropriately charged at the higher of cost or market value and services received from affiliates, other than Aqua Services, are priced at the lower of cost or market value.

Although no lease agreements are in place (see Additional Follow-up Finding and Conclusion No. IV-4 of this chapter for additional information), Aqua PA does review and, if necessary, update the rates charged to affiliates for the lease of office space annually. Market studies on commercial real estate leases are also conducted every five years with the last study conducted during 2011.

**Staff's Follow-up Recommendation – Expand the scope of the market analysis to include all services provided by Aqua PA to affiliates and services provided by affiliates (other than Aqua Services) to Aqua PA.**

**Additional Follow-up Finding and Conclusion No. IV-4 – Aqua PA does not have documented lease agreements in place with its affiliates.**

Aqua PA leases office space within its corporate office building in Bryn Mawr, Pennsylvania to two affiliate companies; Aqua Services and Aqua Wastewater Management (Aqua WM), a subsidiary of Aqua Resources. For accounting purposes, Aqua PA splits the total charge to Aqua Services into two separate invoices; one for Aqua Services Customer Operations Department<sup>5</sup> (ACO) and one for the remaining Aqua Services departments<sup>6</sup>. Each lessee (i.e., Aqua Services, ACO, and Aqua WM) is charged based on the actual square footage utilized by its employees and is also allocated a portion of the buildings total common area. Common area is allocated based on the percentage of each lessee's employees to the total employees utilizing the building. For 2015, each lessee was charged an annual rate of \$24 per square foot for the utilized office space and allocated common area. Additionally, each lessee is allocated a portion of phone, property tax, utility, and janitorial and maintenance expenses based on the percentage of office space utilized by its employees. In 2015, annual lease charges for each entity ranged from approximately \$38,000 to \$615,000.

Annually, Aqua Pa informally reviews the rental rates charged to affiliates. If necessary, rates are updated based on information from Aqua PA facilities managers and other outside parties who are knowledgeable on rental rates. To ensure the rental rate charged to lessees remains competitive, Aqua PA contracts with a third-party consultant to conduct a market study on commercial real estate lease rates every five years. The most recent market study was performed during 2011 with the next study planned sometime in the near future. Depending on the amenities included, the 2011 market study indicated that comparable lease rates for the area ranged from \$14 to \$36 with an average rate of \$24.88 per square foot/year. Aqua PA's lease rate of \$24 per square foot/year is in line with the average rate, and reasonable, taking into account amenities included.

Although Aqua PA has well developed lease arrangements in place with affiliates it has not documented the agreements or submitted them to the Commission for approval. The authority to approve contracts between public utilities and their affiliates is assigned by the PUC's general authority to regulate public utilities in the Commonwealth. 66 Pa. C.S. §2102(a) and §2102(b) states, in part, that:

(a) General rule - No contract or arrangement providing for the furnishing of . . . services, and no contract or arrangement for the purchase, sale, lease, or exchange of any property, right, or thing . . . between a public utility and any affiliated interest shall be valid or effective unless and until such a contract or arrangement has received the written approval of the commission . . .

(b) Filing and action on contract - It shall be the duty of every public utility to file with the commission a verified copy of any such contract or

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<sup>5</sup> ACO is responsible for Aqua Services Customer Service and Billing functions including call center, billing, collection, and meter operations services.

<sup>6</sup> Other Aqua Services functions include accounting and finance, administration, communications, engineering, fleet, human resources, information systems, legal, operations, purchasing, rates and regulatory, risk management, secretarial, and water quality related services

arrangement, or a verified summary as described in subsection (a) of any such written contract or arrangement . . . The commission shall approve such contract or arrangement made or entered into after the effective date of this section only if it shall clearly appear and be established upon investigation that it is reasonable and consistent with the public interest . . . No such contract or arrangement shall receive the commission's approval unless satisfactory proof is submitted to the commission of the cost to the affiliated interest of rendering the services or of furnishing the property or service described herein to the public utility.. . .

Without documented lease agreements in place, unexpected employee turnover, retirements, or other organizational changes could result in confusion over lease terms or how the lease agreements were intended to be carried out. Additionally, without Commission approval, agreements could be ruled unlawful and void, potentially affecting future rate cases<sup>7</sup>.

**Staff's Follow-up Recommendation – Document all lease agreements between Aqua PA and its affiliates, and submit them to the Commission for approval.**

**Additional Follow-up Finding and Conclusion No. IV-5 – Charges from Aqua Services to Aqua PA are predominately allocated or indirectly charged.**

During the review of the prior recommendations and prior situations presented in Follow-up Findings and Conclusions No. IV-1 through IV-3 above, the Audit Staff identified that a large portion of Aqua Service's costs (charged to Aqua PA) that were indirect in nature. Exhibit IV-2 presents a breakdown of direct vs. indirect charges from Aqua Services to Aqua PA for the years 2014 and 2015.

As shown in Exhibit IV-2, of the "Total Direct & Indirect" charges to Aqua PA, only 6.89% and 6.94% were directly charged during 2014 and 2015, respectively. In addition to direct and indirect charges attributable to specific service offerings, "Capital Information Technology (IT) Charges" are separately recorded but not tracked as either direct or indirect in nature. These charges are primarily related to IT projects affecting all Aqua America subsidiaries and include both direct and indirect charges, although the majority of the charges are presumably indirect.

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<sup>7</sup> 66 Pa. C.S. §2102, 2105, and 2106

**Exhibit IV-2**  
**Aqua Pennsylvania, Inc.**  
**Aqua Services Charges Allocated vs. Directly Charged to Aqua PA**  
**For the Years 2014 and 2015**

<b>Direct Charges</b>				
<b>Service</b>	<b>2014</b>	<b>%</b>	<b>2015</b>	<b>%</b>
Accounting & Financial	\$ 267,823	1.01%	\$ 283,455	1.03%
Administration	154,562	0.58%	351,031	1.27%
Balance Sheet	77,221	0.29%	208,151	0.75%
Communications	1,544	0.01%	106	0.00%
Corporate Secretarial	0	0.00%	0	0.00%
Customer Service	621,914	2.34%	477,601	1.73%
Engineering	203,122	0.77%	67,086	0.24%
Human Resources	465,401	1.75%	509,759	1.85%
Information Services	2,555	0.01%	3,365	0.01%
Legal	20	0.00%	203	0.00%
Officer Services	20,773	0.08%	0	0.00%
Purchasing	176	0.00%	180	0.00%
Water Quality	13,688	0.05%	15,703	0.06%
<b>Total Direct</b>	<b>\$ 1,828,799</b>	<b>6.89%</b>	<b>\$ 1,916,640</b>	<b>6.94%</b>

<b>Indirect Charges</b>				
<b>Service</b>	<b>2014</b>	<b>%</b>	<b>2015</b>	<b>%</b>
Accounting & Financial	\$ 3,215,621	12.11%	\$ 3,387,847	12.26%
Administration	7,961,264	29.99%	8,007,696	28.99%
Balance Sheet	432,615	1.63%	532,633	1.93%
Communications	354,326	1.33%	285,149	1.03%
Corporate Secretarial	1,315,074	4.95%	1,308,607	4.74%
Customer Service	4,811,292	18.13%	4,736,994	17.15%
Engineering	2,427	0.01%	790	0.00%
Human Resources	1,606,552	6.05%	1,745,014	6.32%
Information Services	3,874,726	14.60%	4,296,717	15.55%
Legal	593,156	2.23%	715,225	2.59%
Officer Services	3,433	0.01%	0	0.00%
Purchasing	271,124	1.02%	423,622	1.53%
Water Quality	274,500	1.03%	266,474	0.96%
<b>Total Indirect</b>	<b>\$ 24,716,110</b>	<b>93.11%</b>	<b>\$ 25,706,768</b>	<b>93.06%</b>
<b>Total Direct &amp; Indirect</b>	<b>\$ 26,544,909</b>	<b>100.00%</b>	<b>\$ 27,623,408</b>	<b>100.0%</b>
Capital IT Charges	\$ 6,126,068		\$ 5,090,084	
<b>Total Charges</b>	<b>\$ 32,670,977</b>		<b>\$ 32,713,492</b>	

Source: Data Request CA-16, CA-19, and Auditor Analysis

The time reporting system provides employees the capability to record hours worked for a particular affiliate for cost accounting purposes. Aqua Services employees utilize positive time reporting, tracking and recording all hours worked on their payroll timesheets by accounting unit and activity code. Specific accounting unit and activity codes are utilized by the accounting system to segregate and accumulate costs which are allocated to a specific affiliate or group of affiliates. Periodically, Aqua Services, together with Aqua PA, will review the accounting unit and activity codes for reasonableness.



However, in conjunction with very high levels of indirect charges, the Audit Staff questions whether general allocation codes are being routinely or customarily used to charge employee time instead of directly charging work hours, where appropriate. For example, the Aqua Services IA Department did not directly charge any work hours in 2014 or 2015. Although the IA Department is already internally tracking work hours based on the type of work performed (e.g., SOX testing, operational audit assignment, independent auditor assistance, training, etc.), all work hours are allocated as general Service Company cost, which is charged to affiliates based on the ratio of number of customers served. At a minimum, the costs related to state specific operational audits should be directly assigned.

Whenever practical, employees should closely track their time and expenses related to specific tasks and their efforts should be directly charged, as applicable. Direct charging of time and expenses more accurately transfers the cost of services to the entity receiving the benefit of the service, rather than using a common cost allocation methodology. Based on the evidence observed within the limited scope of the Audit, the Audit Staff believes opportunities exist to improve the accuracy of intercompany charges by direct charging appropriate work. One option would be to engage the Internal Audit Department to perform a review of the Aqua Services cost allocation process with a focus on identifying opportunities to increase the level of costs directly assigned. Other options could include additional education of employees and management, performing rotational spot checks of time reporting for select projects, etc.

**Staff's Follow-up Recommendation – Establish methods or techniques to improve cost assignment and where feasible increase the level of costs directly charged between affiliates.**

## V. FINANCIAL MANAGEMENT

**Background** – The Focused Management and Operations Audit of Aqua Pennsylvania, Inc. (Aqua PA or Company), conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits, released on May 23, 2013 at D-2012-2312432, contained three recommendations within the Financial Management functional area. The Audit Staff rated this functional area as needing minor improvement. In this chapter, the three prior recommendations and prior situations are reviewed and three follow-up findings and one follow-up recommendation are presented.

**Prior Recommendation** – Perform follow-up testing to verify that corrective action has been taken in a timely manner on prior Internal Audit findings and recommendations.

**Prior Situation** – The Internal Audit (IA) Department’s follow-up testing and verification of prior Operational Audit recommendations lacked the controls necessary to adequately track all recommendations and ensure corrective actions had been implemented. The IA Department performed this task manually. To follow-up on recommendations, the IA Department would contact the employees responsible for implementing the recommendations to ascertain what corrective action had been performed; however, the department did not perform any testing or verification to determine if the action taken sufficiently corrected the deficiency.

**Follow-up Finding and Conclusion No. V-1** – **The IA Department is actively tracking Operational Audit recommendations and performing necessary follow-up testing and verification to validate corrective actions.**

The IA Department implemented test basis verification as part of its follow-up process for recommended corrective actions starting with operational audits conducted in 2013. Recommendations implemented by December 31, 2013 and all subsequent audit recommendations require supporting documentation as necessary to validate that sufficient corrective action has been taken. In 2015, the Department’s Operational Audit process was documented in the Internal Audits Policies and Procedures Manual, which is covered in detail in Follow-Up Finding and Conclusion No. V-2 of this chapter. The manual includes an Action Plan and Follow-Up section regarding the process for following-up on corrective actions.

The IA Department uses a spreadsheet to track detailed information on each operational audit including: audited department, employee responsible for implementation, corrective action, implementation due date, follow-up performed and completion date. Implementations of the recommendations are scheduled to coincide with the end of a quarter. Therefore, in conducting the follow-up process, the IA Department will begin collecting supporting evidence two to four weeks from the end of the quarter. In addition, supporting documentation for any corrective actions will have been provided for IA review at this point. Eventually, the Department would like to implement a link or tool within its tracking spreadsheet that would allow IA to easily view

any supporting documentation of corrective actions. For now, the Company maintains supporting documentation on a separate secure shared drive.

**Staff's Follow-up Recommendation – None.**

**Prior Recommendation** – Develop and follow a more comprehensive set of operating policies and procedures for the IA Department.

**Prior Situation** – The IA Department had not established processes and procedures to govern its operational audits. Although, the IA Charter outlined the general roles and responsibilities of the Department, no detailed audit processes or manuals existed resulting in audit functions being performed informally or in a non-standardized manner. A sample of IA Department operational audit plans reviewed by the Audit Staff revealed the use of different formats and varying levels of detail outlined in the plans. Additionally, no documented process existed to budget for, or track, the overall audit project status or the hours used on specific components of the audit plan; the status of individual audits was only verbally communicated to the Manager of IA.

**Follow-up Finding and Conclusion No. V-2 – The Internal Audit Department has developed a set of operating policies and procedures, but additional enhancements can be made.**

During 2015, the Aqua Services IA Department developed an IA policies and procedures manual (Manual). The Manual was last updated in December 2015 and contains three sections: Infrastructure, Risk Assessment and Audit Plan, and Individual Audit Execution.

The Infrastructure section includes an overview of the IA function such as mission, authority, responsibilities, organization structure, professionalism and ethical standards, etc., as well as a copy of the IA Charter. Meanwhile, the Risk Assessment and Audit Plan section outlines the risk identification and risk prioritization processes and describes the steps used to develop the internal audit plan. Following the risk identification and prioritization processes, the internal audit plan is developed by following a set series of steps. These steps include: sharing risk assessment results and the proposed audit plan with Aqua America, Inc. (Aqua America) executive management; incorporating management feedback into the proposed plan; presentation of the proposed plan to the Audit Committee for approval; etc.

As outlined in the Manual's Individual Audit Execution Section, internal audits are structured into three main phases: Planning and Understanding the Business, Fieldwork, and Reporting and Follow-up. Planning and Understanding the Business begins by notifying the management team responsible for the process or function to be audited and conducting a kick-off meeting to discuss the scope, approach and timing of the audit. Additionally, IA staff will submit initial data requests and perform steps to gain an understanding of the business area and identify potential risks not foreseen during the audit planning risk assessment phase. During the Fieldwork phase, the specific

audit work plan steps are conducted, with audit findings and supporting documentation being documented. Risk ratings are then assigned to each finding and management action plans are developed to remediate the deficiencies identified. During the final phase (i.e., Reporting and Follow-up), the audit draft report is developed and submitted to the IA Director for review. The audit report is then released to the business area, executive management, and (after a review period) to the Aqua America Audit Committee. IA subsequently performs follow-up on audit recommendations to confirm management has implemented any necessary changes with the Director of IA reporting on IA's follow-up and completed remediation actions to the Audit Committee at its quarterly meetings.

The Audit Staff commends the IA Department for the improvements made to its internal policy and procedure documentation since the 2013 Focused Management and Operations Audit. As a result of the policies and procedures developed, the IA Department has clarified accountability and expectations, and established consistency for audit plans and reports.

A review of sample audit work plans, audit reports, and follow-up on audit findings revealed a standard format consistent with the general structure created through the policies and procedures manual. Additionally, the IA Department's first five year Institute of Internal Auditors (IIA) review, completed during November 2014, reportedly only identified minor deficiencies. These deficiencies resulted in small changes to IA's audit plans and the performance of interim internal IIA reviews.

However, the IA Manager is working on developing additional documented policies and procedures on budgeting, scheduling, and time tracking for internal department use (as opposed to time reporting for cost allocation purposes). IA staff currently track how their time is spent (i.e., SOX, Operational Audits, Direct Assistance, training, fraud investigations, etc.; including audit phase and progress) which is reported to the Director IA. The Director IA tracks this information to gain a better understanding of how time is utilized, and for future planning and budgeting purposes, but this process is informal and undocumented. Furthermore, the Audit Staff noted that the IA Charter did not include a date (although the Director of IA indicated it is reviewed annually) and was last updated in 2013. No version control was included for any of the policy and procedure documents reviewed.

Although the IA Department has developed policies and procedures that define and guide key Department and operational audit functions, additional refinements such as the anticipated documentation related to budgeting, scheduling, and time tracking for internal department use remain to be completed. As the department continues to become more established and experienced, additional refinements should be made to further develop and document Department practices.

**Staff's Follow-up Recommendation – Enhance Internal Audit Department operating policies and procedures.**

**Prior Recommendation** – Document Aqua PA’s internal dividend policy

**Prior Situation** – Although Aqua PA had a loosely developed approach for determining its dividend to Aqua America and the level of payment was within an acceptable range, no formal written dividend policy had been established.

**Follow-up Finding and Conclusion No. V-3** – Aqua PA created an internal dividend policy for Aqua PA dividend payments to Aqua America.

On December 31, 2013, Aqua America issued an Accounting Policy and Procedure Statement regarding dividend payments from Aqua PA to Aqua America. This policy documents the general process followed to determine if a dividend should be issued to its parent. It is consistent with Aqua America and Aqua PA’s historical dividend practice of declaring dividends based on availability of funds while ensuring compliance with all financial covenants and maintaining its desired capital structure and leverage ratios. From 2012 through 2015 Aqua Pa’s dividend payments to Aqua America ranged from 0% to 35% of net income.

**Staff’s Follow-up Recommendation** – None.

## VI. WATER OPERATIONS

**Background** – The Focused Management and Operations Audit (Management Audit) of Aqua Pennsylvania (Aqua or Company) conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits released on May 23, 2013 at D-2012-2312432, contained five recommendations within the Water Operations functional area. The Audit Staff rated this functional area as needing moderate improvement. In this chapter, five prior recommendations and prior situations are reviewed and three follow-up findings and recommendations are presented.

**Prior Recommendation** – Expand the Damage Prevention Manual to include all relevant policies and procedures, review and update as appropriate.

**Prior Situation** – Aqua PA had developed a Damage Prevention Manual; however, it was incomplete and did not include all of Aqua PA’s damage prevention procedures, standards, and best business practices. The Company’s Damage Prevention Manual had a template for reporting damages but did not include procedures for handling damages (i.e., tracking, investigation, reporting, etc.) to the Company’s facilities and had limited documentation regarding damages to other utilities’ facilities. Furthermore, aside from requiring a damage report to be filed, the manual did not provide any standards on the type of information that should be collected, how the damage report should be filled out, whether pictures need to be taken before/after excavation, etc.

**Follow-up Finding and Conclusion No. VI-1** – Aqua PA’s Damage Prevention Manual has been expanded to include all relevant policies and procedures.

A comprehensive damage prevention manual should incorporate all aspects of the program including items such as dig practices, locator training and education, tracking and investigation procedures, damage reporting, etc. Water utilities are not mandated to develop and/or maintain a Damage Prevention Manual similar to that required for gas utilities; nonetheless the Audit Staff has promoted creation and use of a comprehensive Damage Prevention Manual as a best business practice for any utility that has underground facilities. Moreover, Aqua PA management agreed with the Audit Staff’s recommendation from the 2013 Focused Management and Operations Audit that the Company’s Damage Prevention Manual needed to be more inclusive of all relevant operating practices and procedures as well as periodically updated.

The Damage Prevention and Control (DPC) Manual was updated by the Safety Department in November 2014. The DPC manual includes procedures to comply with the Pennsylvania One Call System such as receiving, processing and directing all locating activities, screening locate requests, documenting incident reports, etc. The DPC manual also includes information on locator training and education. Moreover, excavator operational procedures such as pre-excavation processes, tolerance zone practices, etc. are also included in the DPC manual. The manual includes a section on

reporting and evaluation of damages with supporting forms in the appendix such as the damage information reporting tool.

An all-inclusive damage prevention manual maintains all damage prevention policies and procedures in a single document that provides general consistency across the Company's service territory. It should improve compliance among all employees, operators, and contractors performing work around Aqua PA facilities. Furthermore, reviewing and updating the manual on a consistent basis will ensure that the damage prevention procedures are up-to-date and consistent with Company policy.

**Staff's Follow-up Recommendation – None.**

**Prior Recommendation** – Perform a cost benefit study to assess the net benefit of automating the damage prevention program.

**Prior Situation** – Administration of Aqua PA's damage prevention program was an overly manual process. The Company's manual system required its locators to manually analyze all Pennsylvania One Call System (POCS) locate tickets and compare them with system maps thereby increasing the time and effort needed for employees to respond to locate tickets that did not need to be marked and that could not be eliminated by the POCS mapping software. Moreover, although field personnel submitted damage reports to the Southeast Region service center for state-wide tracking, all related damage information such as pictures, repair costs, etc. was maintained at the local divisional office. Damages were tracked on an excel spreadsheet for operational and reporting requirements while divisional office personnel tracked, generated notices and billed for damages manually.

**Follow-up Finding and Conclusion No. VI-2 – Aqua PA has not documented the cost benefits of automating its damage prevention program.**

On average, Aqua PA receives approximately 100,000 locate requests annually. Roughly 50% to 60% of these locate requests are not marked; primarily due to a determination made that Aqua PA facilities are not in proximity to the work location, there is restricted or prohibited access to the work site, or insufficient information was provided with the request.

In addition, Aqua PA uses a spreadsheet to track third-party damages incurred not only to its own facilities but also damages to other facility owners inflicted by either the Company or its contractors. The POCS transmits locate tickets electronically to the Southeast Pennsylvania (SEPA) region and via fax for the Greater PA<sup>8</sup> region. By the end of 2016, Aqua PA has indicated that it plans to receive all tickets electronically including the Greater PA region. As of the February 2016, the SEPA and Greater PA regions locate tickets continue to be printed and distributed manually. Field personnel

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<sup>8</sup> Greater PA covers all Aqua PA service territory that is in the northeast and western parts of the state.

in both regions manually sort through each locate ticket filtering out those that do not have to be marked. Damage reports are manually completed and any pictures of the facilities as well as any supporting documentation are retained at the division offices.

Automated systems (e.g., Supervisory Control and Data Acquisition (SCADA) systems, automated meter reading, Geographical Information Systems (GIS), etc.) are becoming more prevalent in the utility industry. Automated systems such as SCADA, GIS, etc. are tailored to help reduce errors and improve consistency and accuracy. Based on other systems we've observed, the Audit Staff believes that the Company could improve its underground facility locating process by upgrading to an automated system. Moreover, an automated system would improve efficiency by eliminating manual sorting of locate tickets, minimize mapping errors, and reducing the time spent determining whether a facility is within proximity to Company facilities.

In August 2013, Aqua PA management met with a third-party vendor to review its damage prevention services such as mapping, tracking POCS tickets, etc. along with its associated costs. The Company concluded that most of the vendor services were already offered through POCS at minimal cost. However, Aqua PA did not document this review via a cost-benefit analysis making it problematic for the Audit Staff to substantiate the Company's claims.

Aqua PA management also indicated that the benefits of an automated damage prevention program are also contingent upon the passage of legislation transferring PA One Call enforcement from the Department of Labor & Industry (L&I) to the Pennsylvania Public Utility Commission. This change in oversight control could result in potential unforeseen reporting and recordkeeping requirements thus impacting any automated features Aqua PA would implement. The Audit Staff recognizes that automating the damage prevention program is a major undertaking but it is not contingent on the agency responsible for PA One Call enforcement. Instead, the primary goal of the automation would be to improve the efficiency and effectiveness of Aqua PA's damage prevention program primarily by reducing manual or time consuming processes.

**Staff's Follow-up Recommendation – Perform and document a cost-benefit analysis to assess the net benefit of automating the damage prevention program.**

**Prior Recommendation** – Update the Cross Connection Control Manual on a periodic basis.

**Prior Situation** – Aqua PA's Cross Connection Control Manual was dated 1994 and still identified the Company as the Philadelphia Suburban Water Company. The manual did not include the Company's Northeast or Western regions. Aqua PA management recognized the need to update the manual and had begun working on it before the Audit ended with a goal of completing it by early 2013.



**Follow-up Finding and Conclusion No. VI-3 – Aqua PA has updated its Cross Connection Control Manual.**

In accordance with 25 Pa. Code §109.709, public water suppliers, upon direction by the Pennsylvania Department of Environmental Protection, are required to develop and implement a cross connection control program including, among other things, a description of the methods and procedures to be used, a public education program for residential customers, a description of methods and devices which will be used, etc.

Aqua PA requires all its commercial, industrial and residential customers that have testable backflow prevention devices to test their devices annually. Moreover, Aqua mails a list of certified testers along with the installation/test notices to its customers.

Aqua PA updated its Cross Connection Control Manual in the third quarter of 2013. The Cross Connection Control Manual includes sections on the Company's general policy on cross connection control, types of backflow prevention protection required, types of acceptable cross connection assemblies, installation procedures, inspection and maintenance, violations, etc. Aqua PA management indicated that they plan to update the Cross Connection Control Manual on an annual basis.

**Staff's Follow-up Recommendation – None.**

**Prior Recommendation** – Establish a valve inspection program for critical valves.

**Prior Situation** – Aqua PA did not proactively operate or exercise its valves in SEPA as part of its preventative maintenance program and in 2010 had abandoned the valve inspection program used in the Western Region. Aqua PA operated its critical valves annually and the Roaring Creek Division operated non-critical valves on a three year schedule but had abandoned the practice starting in 2011. Company management indicated that a valve operation program was too labor intensive and cost prohibitive for use in its distribution system.

**Follow-up Finding and Conclusion No. VI-4 – Aqua PA has initiated efforts to develop a critical valve inspection program, and projects that it will become operational in the first quarter of 2016.**

The Company believes that a full scale valve inspection program to operate/exercise all valves in its service territory is not the best use of Company resources. However, Aqua PA agreed that more focus could be placed upon its critical valves. The Company further recognizes that critical valves are not only designated by size but also by other factors such as customer type, redundancy, location, etc. Hence, in March 2014, Aqua PA established a critical valve working group to examine the issue of critical valves including the related definition and to develop a critical valve inspection program. The defining criteria under consideration for critical valves include those valves that are:

- 16" and larger
- Located at hospitals, dialysis centers, nursing homes, etc.
- Located at certain water treatment plants
- At emergency interconnections with purveyors, and
- Regulator/relief control valves.

Aqua PA's population of all valves by diameter, as of October 31, 2015 is shown in Exhibit VI-1.

**Exhibit VI-1  
Aqua Pennsylvania, Inc.  
Number of Valves  
As of October 31, 2015**

Division	Total Number of Valves			Totals
	< 6"	6" - 15"	>=16"	
Eastern	434	17,427	748	18,609
Southern	451	13,596	526	14,573
Western	371	13,186	795	14,352
Great Valley	346	10,551	92	10,989
Honesdale	373	2,504	15	2,892
Whitehaven	276	2,373	1	2,650
Roaring Creek	568	2,824	109	3,501
Shenango	1,056	4,131	318	5,505
Susquehanna	227	957	18	1,202
Totals	4,102	67,549	2,622	74,273

Source: Data Request WO-6

Based on criticality, Aqua PA expects valves to be inspected/exercised on varying schedules. Starting in 2016, the Company expects to have a critical valve inspection program in place. Aqua PA plans to operate the critical valve exercising program into the shoulder months (i.e., May and October) when demand is lowest and crews are available to exercise valves. As of April 30, 2015, the initial pool of critical valves was over 2,500 with Aqua PA planning to finalize the list by the first quarter 2016.

Aqua PA management indicated that it does operate many of its valves through various ongoing activities such as main breaks (1,000 to 1,400 valves), construction shutdowns (6,000 to 8,000 valves), hydrant flushing, etc. The Audit Staff recognizes that valves are exercised during these activities but since the Company does not have an official valve database, no record is being maintained of the details such as valve identification number, number of turns, date operated, valve location, etc. Furthermore, Aqua PA does not have a valve inspection manual which typically includes standard operating procedures for inspecting/exercising valves.

American Water Works Association (AWWA) recommends that all water utilities initiate a Valve Exercise Program to ensure valves are inspected and operated on a regular basis. Moreover, according to the AWWA, in order to carry out a meaningful inspection and maintenance program, it is important that the location, make, type, size, turns, close direction, and installation date of each valve be recorded. Furthermore, a recordkeeping system should be adopted that provides a written record of valve location and dated condition, maintenance and inspection of the valve.

The Audit Staff generally agree with Aqua PA that a full scale valve exercise program may be labor intensive and cost prohibitive. However, the Audit Staff reasserts that an effective valve exercising program, particularly for critical valves, is necessary to ensure distribution system reliability, improve customer service, prepare for water emergencies, identification of valve or other distribution problems, etc. Additionally, an effective valve exercising program may help prevent damage to property, environment, and injury to the public and/or employees, particularly during emergency situations.

**Staff's Follow-up Recommendation** – Complete development of a valve inspection manual and implement the planned critical valve inspection program in a timely manner.

**Prior Recommendation** – Expand Aqua PA's Non-Revenue Water (NRW) program to include a review of apparent losses.

**Prior Situation** – Aqua PA's NRW program did not fully address apparent losses. As of January 2013, Aqua PA had adopted the AWWA's non-revenue water methodology for the systems in its Northern Region as well as for all systems in the Delaware River watershed while the Company's Western Region was still using unaccounted-for-water (UFW) methodology. Aqua PA reported UFW levels of 24% in its 2012 PUC Annual Report and did not exclude water usage for company use, main flushing, or other allowable exclusions. Aqua PA did not utilize any exceptions particularly in SEPA due to the difficult task of tracking/estimating water usage for allowable exclusions. The Company's increasing UFW trend of 20.5% in 2006 to approximately 24% in 2011 was primarily driven by the SEPA region since SEPA comprised approximately 90% of its throughput but based on its limited detailed information was unable to determine the cause for this increase. Aqua PA had achieved sizeable UFW and NRW reductions in its Northeast Region since 2009 while the Western Region incurred increases since 2009.

**Follow-up Finding and Conclusion No. VI-5** – Aqua PA performed a comprehensive UFW/NRW review of its Southeast Pennsylvania Region, but NRW trends for its Greater PA Region have been increasing.

Although Aqua PA tracks its overall system NRW using the AWWA Water Audit Software (Water Audit), the Audit Staff also observed that Aqua PA does not complete a Water Audit for any of its regions or divisions. Instead, the Company only submits

system-wide data in its NRW filing with the Commission. However, in late 2013, Aqua PA hired a consultant to perform a comprehensive study of its SEPA Region with a goal of investigating NRW trends and components while accounting for any discovered reporting errors. The Company wanted to develop business cases for prioritizing and implementing recommendations which would result in a proactive reduction of NRW, especially in its SEPA Region.

The report, completed in February 2014, provided a list of business cases (i.e. recommendations) and cost estimates associated with each. All business cases were reviewed and prioritized into three phases based on a number of factors such as cost, NRW savings-to-cost ratio, impact to NRW calculations, best practices, etc. Status updates on all the business cases were provided by Aqua PA and have been listed in Exhibit VI-2.

The SEPA NRW study reviewed each of the three major components of NRW; real losses, apparent losses and unbilled authorized consumption. In studying real losses, the study focused on reviewing main and service leakage and breakage. For the apparent loss component, the study focused on reviewing production and customer meters, water theft, billing and accounting. For unbilled authorized consumption, the study evaluated metered and unmetered consumption that is authorized but not billed (i.e., water treatment plant usage, hydrant flushing activities, etc.)

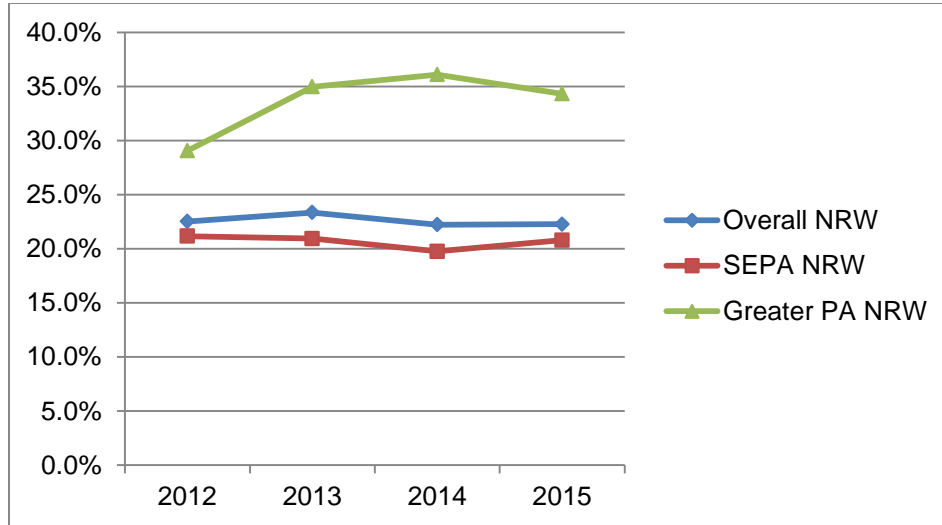
As a result of the NRW study and investigation efforts that have been put forth in the SEPA region, the SEPA NRW and UFW levels have been trending favorably over the last four years with NRW levels hovering around 20%. The NRW levels for Aqua PA and the SEPA and Greater PA regions are shown in Exhibit VI-3.

**Exhibit VI-2**  
**Aqua Pennsylvania, Inc.**  
**SEPA NRW Study Phase Costs and Implementation Status**  
**As of December 31, 2015**

Phase	Category	Status	Phase Cost: Expense	Phase Cost: Capital
1	Customer Meter Testing Standardization	90% Complete	\$180,000	\$870,000
	Leak Detection Form Standardization	Report Complete		
	Tap Card Form Standardization	Not cost beneficial		
	WTP Process Water Standardization	Not cost beneficial		
	Production Meter Calibration	Report Complete		
	AMRA to Banner Comparison	May start in Q4 2015		
2	NRW Calculation Standardization	Not cost beneficial	\$290,000	\$130,000
	Customers Meters at Curb Study	Not cost beneficial		
	Leak Detection Practices	Report Complete		
3	Theft Reduction Techniques	Report Complete	\$290,000	\$230,000
	District Metered Area	May start in Q4 2015		
	System wide Pressure Reduction Study	Not cost beneficial		
	Large Diameter Pipeline Condition Assessment & Leak Detection Pilot	Ongoing		
	AMI Study	May review in future		
Totals			\$760,000	\$1,230,000

Source: Data Request WO-8 and WO-9

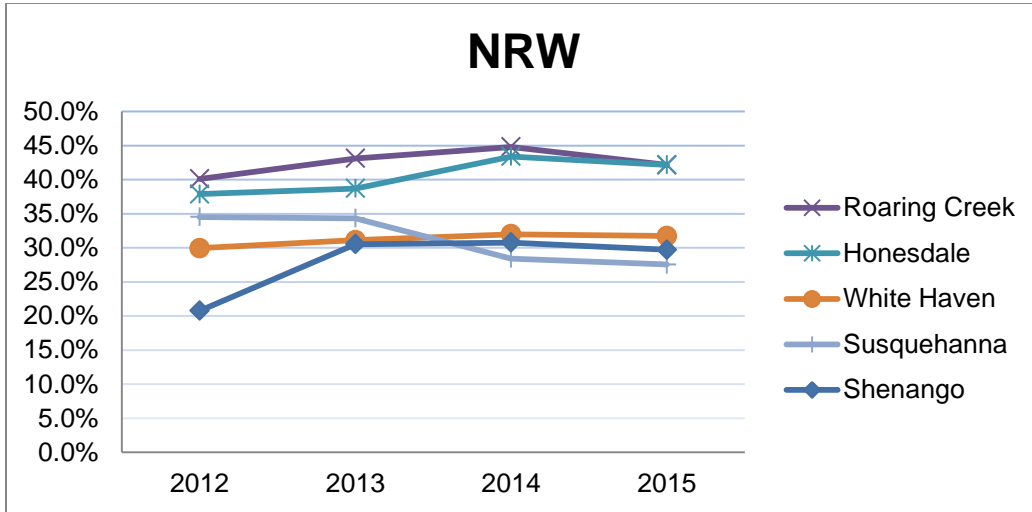
**Exhibit VI-3  
Aqua Pennsylvania, Inc.  
NRW Percent  
For the Years 2012 through 2015**



Source: Data Request WO-7

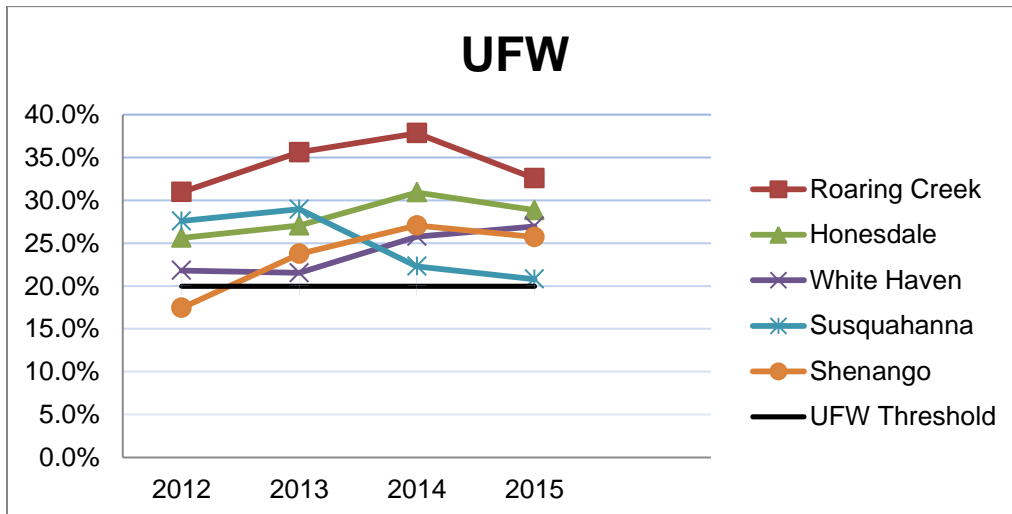
The non-revenue water percentage for the Greater PA region has decreased from 44% in 2008 to approximately 35% in 2015 but is still considerably higher than the overall or SEPA NRW percentages. The Greater PA region is comprised of five Divisions: Honesdale, Whitehaven, Susquehanna, Roaring Creek and Shenango. The NRW and UFW trends for each of the Greater PA Divisions from 2012 through 2015 are shown in Exhibits VI-4 and VI-5 respectively. Except Susquehanna which dropped to 27.5% in 2015, all the Divisions had NRW of over 30% in 2013, 2014 and 2015. The Roaring Creek and Honesdale Divisions had NRW levels of 42% in 2015 bringing the overall Greater PA NRW level to about 34%. Moreover, it can be seen from Exhibit VI-5 that UFW trends for all Greater PA Divisions have been above the 20% threshold in 2013, 2014 and 2015. The Public Utility Commission has not established guidelines for NRW, but UFW levels are considered to be excessive when they exceed 20% in accordance with 52 Pa. Code § 65.20(4).

**Exhibit VI-4  
Aqua Pennsylvania, Inc.  
NRW Levels (Percentage) for the Greater PA Region  
For the Years 2012 through 2015**



Source: Data Request WO-8

**Exhibit VI-5  
Aqua Pennsylvania, Inc.  
UFW Levels (Percentage) for the Greater PA Region  
For the Years 2012 through 2015**



Source: Data request WO-8

The Audit Staff recognizes that a number of systems within Divisions of the Greater PA Region were acquired by Aqua PA as small troubled water companies. Consequently, many of these systems inherently had significant infrastructure and operating issues which contribute to high levels of NRW/UFW. Subsequent to

acquisition, Aqua PA management indicated that these systems were incorporated into the Company's active leak detection and aggressive main replacement programs which require substantial time to yield meaningful results. In addition, the Audit Staff suggests that generating NRW water audits for smaller subsets of Aqua PA's service territory should help the company identify opportunities for improvement. While there is no requirement to perform more granular water audits, the strength of the NRW program is identifying economic opportunities to recover lost water. In many cases in the Delaware and Susquehanna River Basins, Aqua is generating water audits by system. Generating detailed information for each specific system may be burdensome but the information could be generalized by Division or Region. In turn, this information could be useful to the Commission, particularly in conjunction with its Advanced Notice of Proposed Rulemaking: Revision of the Commission's Regulation on Water Conservation measures 52 Pa. Code, Chapter 65 at Docket No. L-2012-2319361.

In 2015, NRW for the Greater PA Region accounted for approximately 2.7 billion gallons or 35% of the total water delivered to the region. Allowable exclusions at Aqua PA average about 5% of water produced; therefore the 20% UFW guideline recommended by the Commission approximately equates to an NRW of 25%. If Aqua PA's Greater PA region were to reduce its NRW to 25%, it would potentially avoid annual production costs of approximately \$465,000<sup>9</sup>.

**Staff's Follow-up Recommendation –Take corrective actions to reduce NRW levels to 25% or lower within the Greater PA region.**

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<sup>9</sup> Based on the 2015 variable production costs of \$630 per million gallons and a reduction of 738 million gallons of water produced.



## VII. EMERGENCY PREPAREDNESS

**Background** – The Focused Management and Operations Audit (Management Audit) of Aqua Pennsylvania, Inc. (Aqua PA or Company) conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits released on May 23, 2013, at D-2012-2312432, contained no recommendations within the Emergency Preparedness functional area. The Audit Staff rated this functional area as meeting expected performance level. However, the Audit Staff deemed it prudent to perform an updated review of the Company’s compliance with PUC regulations at 52 Pa. Code §101 regarding physical security, cyber security, emergency response and business continuity plans as part of this audit. In this chapter, five findings and recommendations are presented.

In order to protect infrastructure within the Commonwealth of Pennsylvania and ensure safe, continuous and reliable utility service, effective June 2005, PUC regulations at 52 Pa. Code §101 (Chapter 101) require all jurisdictional utilities to develop and maintain written physical security, cyber security, emergency response and business continuity plans. Furthermore, in accordance with 52 PA Code §101.1, all jurisdictional utilities are to annually submit a Self Certification Form to the Commission documenting compliance with Chapter 101. This form, available on the PUC website, is comprised of 13 questions as shown in Exhibit VII-1.

### Exhibit VII-1 Pennsylvania Public Utility Commission Public Utility Security Planning and Readiness Self Certification Form

Item No.	Classification	Response (Yes – No – N/A*)
1	Does your company have a physical security plan?	1.
2	Has your physical security plan been reviewed in the last year and updated as needed?	2.
3	Is your physical security plan tested annually?	3.
4	Does your company have a cyber security plan?	4.
5	Has your cyber security plan been reviewed in the last year and updated as needed?	5.
6	Is your cyber security plan tested annually?	6.
7	Does your company have an emergency response plan?	7.
8	Has your emergency response plan been reviewed in the last year and updated as needed?	8.
9	Is your emergency response plan tested annually?	9.
10	Does your company have a business continuity plan?	10.
11	Does your business continuity plan have a section or annex addressing pandemics?	11.
12	Has your business continuity plan been reviewed in the last year and updated as needed?	12.
13	Is your business continuity plan tested annually?	13.

\* Attach a sheet with a brief explanation if N/A is supplied as a response to a question.

Source: Public Utility Security Planning and Readiness Self-Certification Form, as available on the PUC website at [http://www.puc.state.pa.us/general/onlineforms/pdf/Physical\\_Cyber\\_Security\\_Form.pdf](http://www.puc.state.pa.us/general/onlineforms/pdf/Physical_Cyber_Security_Form.pdf)

While conducting our Management Efficiency Investigation, the Audit Staff reviewed the most recent Self Certification form submitted by Aqua PA to determine the status of its responses. Our examination of the Company's emergency preparedness included a review of the physical security plan, cyber security plan, emergency response plan, business continuity plan, and associated security measures. In addition, the Audit Staff performed inspections at a sampling of Aqua PA's facilities. Due to the sensitive nature of the information reviewed, specific information, findings, and recommendations are not revealed.

**Follow-up Finding and Conclusion No. VII-1 – Minor deficiencies or inconsistencies in physical security and policies were noted during inspections of Aqua PA's facilities.**

Physical security should be continuously reviewed and inspected and any deficiencies should be addressed as soon as possible. The Audit Staff randomly inspected several Aqua PA facilities. These facilities included office, storage, and operations facilities. The Audit Staff focused on each facility's compliance with the Physical Security Plan, as well as identification of any other vulnerabilities.

Through its security vendor, Aqua PA conducts tests of its security equipment throughout the year and specific issues are addressed as they arise. As inspections were conducted, the Audit Staff noted various minor vulnerabilities or deficiencies in physical security. Most of the deficiencies identified were due to facility age, oversight, weather, or general wear and tear and were highlighted during the inspection. As a result, Aqua PA's local facility managers made plans to address some of these deficiencies before the inspections were completed.

**Staff's Follow-Up Recommendation – Correct minor physical security deficiencies and continue to perform on-going physical security reviews of all facilities.**

**Follow-up Finding and Conclusion No. VII-2 – The Emergency Response Plans, Crisis Plans, and Integrated Contingency Plans had not been reviewed or revised within the last year.**

According to 52 Pa. Code §101.3(a), a jurisdictional utility shall develop and maintain written physical and cyber security, emergency response, and business continuity plans. Maintaining these plans requires at least annual review and revision as specified by 52 Pa. Code §101.3(b).

Aqua PA has extensive Emergency Response Plans, Crisis Plans, and Integrated Contingency Plans, which cover several possible scenarios with detailed appropriate responses. These plans are reviewed and revised on varying schedules, and some have been revised as recently as 2014, while others have not been reviewed since 2007. Therefore, key emergency contact information and other information related to contingency plans are not up-to-date. Without regular updates, much of the

critical contact information and logistical information is no longer relevant rendering parts of the plans useless or misleading during an emergency.

**Staff's Follow-Up Recommendation – Annually review and update the Emergency Response Plans, Crisis Plans, and Integrated Contingency Plans.**

**Follow-up Finding and Conclusion No. VII-3 – Aqua PA's Security Vulnerability Assessment is outdated.**

On June 12, 2002, the Public Health Security and Bioterrorism Preparedness Act of 2002 was signed into law. This Act added Section 1433 to the Safe Drinking Water Act, which requires community water systems serving more than 3,300 people to conduct vulnerability assessments (VA), certify to the Environmental Protection Agency (EPA) that the VAs were conducted, and submit a copy to the EPA. The Act also requires a water utility to submit a new or updated emergency response plan, tailored to account for the findings of the VA. VAs are a useful tool for understanding current weaknesses in a utility's security and emergency planning.

Aqua PA should be commended for designating projects to meet the requirements of its Physical Security Plan and Information Security Policy while incorporating changes as needed. However, Aqua PA's last state-wide vulnerability assessment was conducted 12 years ago. During the last 12 years, the nature of many of the threats facing utilities has changed due to evolving technology and the nature of current threats. Due to the changing threat environment, some of Aqua PA's security policies and standards may not be designed optimally. While the Safe Drinking Water Act does not require subsequent VAs, the Audit Staff suggests that it is a prudent practice to perform one at least once every ten years.

**Staff's Follow-Up Recommendation – Strive to perform a VA at least every ten years, and more often as appropriate due to circumstances, and revise the Physical Security Plan, Emergency Response Plan and Business Continuity Plan to address any new threats or vulnerabilities identified.**

**Follow-up Finding and Conclusion No. VII-4 – Aqua PA does not have a consistent cybersecurity training program for all employees.**

It is a best business practice to maintain up-to-date cybersecurity training for all employees. Aqua Pennsylvania's HR Department coordinates operations training, including outside vendor training and water and wastewater certifications. Aqua PA's operators go through a Pennsylvania Department of Environmental Protection (DEP) security training program. Personnel involved in cybersecurity control, implementation, and policies receive training related to each project or initiative as needed amounting to multiple courses per year, in addition to maintaining active certifications. Neither the DEP training for operators nor the specialized training for cybersecurity professionals is

designed for or offered to all employees. However, there is a need for companies in general to periodically offer some basic cybersecurity awareness training to every employee since virtually all employees have some access to company systems, computers, and/or the internet.

Consistent across-the-board cybersecurity training reduces a company's vulnerability to the most common types of cyber-attack, such as social engineering or phishing attempts. Aqua PA does distribute regular awareness bulletins about emerging threats and security tips to its employees, and specific at-risk groups are notified directly; but there is currently no fully developed training program for all Aqua PA employees covering cybersecurity basics. As of January 2016, Aqua PA was designing a New Hire Training program covering basic job functions and safety. During field work, this training regimen was incomplete and therefore was not yet implemented. However, this program will cover data classification and security awareness training, including cyber security topics.

**Staff's Follow-Up Recommendation – Develop and implement a company-wide cyber security awareness training regimen, including both first time and refresher training programs.**

**Follow-up Finding and Conclusion No. VII-5 – Aqua PA does not actively ensure cybersecurity standards compliance by its third-party vendors.**

Increasingly, companies are being compromised through their supply chains. In 2014, for instance, a group called "Energetic Bear" compromised vendors of industrial routers, remote access appliances, and virtual private network (VPN) software with a Trojan known as "HAVEX", or "Dragonfly".<sup>10</sup> These products were commonly used in Industrial Control Systems/SCADA systems. Thousands of companies who were already using these vendors' products were infected when they updated their software through the vendors' own websites.<sup>11</sup> It is plausible that this same type of attack could affect any company that fails to secure its supply chain.

Aqua PA has established criteria for vendor and device selection, but third-party vendors' employees are not screened in any way, although contractors are held responsible for the actions of their employees through their contract agreements. Aqua PA vets its vendors and equipment purchases using criteria that vary from project to project. Security issues are reviewed with the vendor prior to purchase of new equipment, but Aqua PA does not take an active role in supply chain security, preferring instead to rely on a combination of contract provisions and cyber security insurance.

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<sup>10</sup> Finkle, Jim. "U.S. Government Asks Firms to Check Networks after 'Energetic Bear' Attacks." *Reuters.com*. Reuters, 2 July 2014. Web. 26 May 2016. <<http://www.reuters.com/article/us-cybersecurity-energeticbear-idUSKBN0F722V20140702>>.

<sup>11</sup> Santillan, Maritza. "Energetic Bear Still Going Strong, More Than 2,800 Infected." *The State of Security*. Tripwire.com, 01 Aug. 2014. Web. 26 May 2016. <<http://www.tripwire.com/state-of-security/latest-security-news/energetic-bear-still-going-strong-more-than-2800-infected/>>.

According to a Cybersecurity data breach study, the cost for lost or stolen records for companies rose to an average of \$154 per record in 2015. Consequently, the potential financial damage from a data breach could be significant.<sup>12</sup> In the well-publicized Target hack in 2013, the cost to Target was \$252 million, only \$90 million of which was covered by their insurance; however, these figures do not include any expenses resulting from pending court cases, or loss of business due to damage to reputation.<sup>13</sup> With the increasing cost and frequency of supply chain vectored attacks, Aqua PA would benefit from taking a more active role in maintaining its supply chain integrity such as contracted required minimum security requirements, specific security checks on vendor's products, etc.

**Staff's Follow-Up Recommendation – Actively ensure third-party contractor compliance with company security standards.**

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<sup>12</sup> 2015 Cost of Data Breach Study: Global Analysis. Ponemon Institute LLC.: 2015. Pdf file: <<http://public.dhe.ibm.com/common/ssi/ecm/se/en/sew03053wwen/SEW03053WWEN.PDF>>

<sup>13</sup> Lunden, Ingrid. "Target Says Credit Card Data Breach Cost It \$162M In 2013-14." *TechCrunch*. TechCrunch, 25 Feb. 2015. Web. 31 May 2016. <<http://techcrunch.com/2015/02/25/target-says-credit-card-data-breach-cost-it-162m-in-2013-14/>>.

## VIII. MATERIALS MANAGEMENT

**Background** – The Focused Management and Operations Audit (Management Audit) of Aqua Pennsylvania (Aqua PA or Company) conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits released on May 23, 2013, at D-2012-2312432, contained four recommendations within the Materials Management functional area. The Audit Staff rated this functional area as needing moderate improvement. In this chapter, two prior recommendations and prior situations are reviewed and two follow-up findings and recommendations are presented.

**Prior Recommendation** – Establish emergency stock levels for Aqua PA.

**Prior Situation** – Aqua PA had materials reserved for emergency situations but it was not tracked within the Company’s materials management system (Lawson System). Aqua PA claimed that its Lawson System was unable to separately designate materials as emergency stock materials. The Company was instead relying on employee experience and institutional knowledge to decide on its emergency stock levels. Without tracking emergency stock levels separately within the Lawson System, the status of materials as emergency stock or non-emergency stock came into question, leading to higher levels of unneeded inventory being stored.

**Follow-up Finding and Conclusion No. VIII-1** – Aqua PA has established emergency stock levels and reduced its inactive inventory.

The Company began its efforts to identify and eliminate obsolete/inactive inventory at its Shenango warehouse. More specifically in September 2012, an evaluation of Shenango’s inventory was conducted resulting in the identification of \$526,000 of obsolete/inactive inventory. These materials were then used in projects and not replaced in order to reduce stock levels at Shenango. Similar reviews were performed at Roaring Creek and Susquehanna in 2015 with respective stock reductions occurring. Moreover, in September 2014, Aqua PA began to separately track emergency inventory within the Lawson System for the Springfield, Willow Grove, and Great Valley warehouses. To establish emergency stock levels, a committee comprised of management employees from the Materials Management and Division Operation Departments reviewed material lists with at least 18 months of no activity. Items on this list that were still needed were identified as emergency stock. Any remaining items were then reviewed by the warehouse managers and superintendents, who determined what inventory to retain. This review was last performed in the fall of 2015, using the 18 month no activity report from October, and management has indicated that it plans for this to occur annually thereafter. The process was performed separately for each warehouse, albeit simultaneously.

Since implementation of this process, overall inventory levels have generally been reduced; however, a few of Aqua PA’s warehouses actually incurred slight increases in total inventory levels. For instance, inventory levels at Pickering East,

Roaring Creek, Susquehanna, and Shenango were collectively reduced by approximately \$185,000, while Springfield, Willow Grove, and Great Valley saw a combined increase of approximately \$109,000. Overall, the net effect has allowed Aqua PA to reduce its inventory by \$77,000 with an associated annual carrying cost reduction of \$13,860 (based upon an 18% carrying cost). While inventory levels will fluctuate based upon need and activity, minimizing inactive or obsolete inventory is a sound business practice. Aqua PA has created a good process to identify obsolete/inactive inventory but additional time and focus is needed. In particular, as the committee continues to review materials that are inactive, additional effort should be spent on optimizing emergency stock levels.

**Staff's Follow-up Recommendation – Continue to periodically identify and eliminate obsolete/inactive inventory.**

**Prior Recommendation** – Strive to achieve average inventory turnovers of 4.0 turns at all warehouse locations.

**Prior Situation** – Aqua PA's average inventory turnover for 2011 was 5.6 turns, which was well above (i.e., better than) the Company's goal of 4.0 turns, but the satellite warehouses at Roaring Creek, Susquehanna, and Shenango were not performing as well, with turnover rates of 1.45, 0.94, and 1.97, respectively, and followed preceding years with similar values.

**Follow-up Finding and Conclusion No. VIII-2 – Aqua PA has improved its average inventory turnover rates company-wide and for many of its satellite warehouse locations.**

From 2011 to 2014, Aqua PA's average warehouse inventory turnover rate increased from 5.67 to 6.04 turns. During this period, the satellite warehouse locations at Willow Grove, Roaring Creek, and Shenango dramatically improved, while performance at the Great Valley and Susquehanna warehouses receded moderately. Inventory turnover performance in 2011 and 2014 is presented for each warehouse in Exhibit VIII-1.

**Exhibit VIII-1  
Aqua PA Turnover Rates  
For the Calendar Years 2011 and 2014**

District	Turns	
	2011	2014
Springfield	10.00	6.97
Willow Grove	6.64	12.08
Great Valley	3.59	2.92
Roaring Creek	1.45	3.13
Susquehanna	0.94	0.39
Shenango	1.97	2.91
Totals	5.67	6.04

Source: MM-1 and MM-2

As discussed in Follow-up Finding and Conclusion No. VIII-1, reductions in stored inventory have increased overall turnover rates at Aqua PA's warehouses which was especially significant at Willow Grove, Roaring Creek, and Shenango. It should be noted that the vast majority of Aqua PA's inventory is stored and issued from its main warehouse, Springfield, and the satellite warehouse locations at Willow Grove and Roaring Creek. Although, Aqua PA has not achieved their goal of active inventory turnover rates of 4.0 at all satellite locations, it has achieved commendable performance within the widely accepted industry range of 2.0 to 4.0 turns for all but one of its smallest satellite locations in its Susquehanna District.

**Staff's Follow-up Recommendation – None.**



## IX. CUSTOMER SERVICES

**Background** – The Focused Management and Operations Audit (Management Audit) of Aqua Pennsylvania (Aqua PA or Company) was conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission (PUC or Commission) Bureau of Audits released on May 23, 2013, at D-2012-2312432, contained four recommendations within the Customer Service functional area. The Audit Staff rated this functional area as needing moderate improvement. In this chapter, three prior recommendations and prior situations are reviewed and three follow-up findings and two recommendations are presented.

**Prior Recommendation** – Initiate a comprehensive theft of service program for all customers.

**Prior Situation** – Aqua Pennsylvania's theft of service program was focused on active customers who were recording zero consumption, and on inactive customers who were recording any consumption. Meters reporting zero consumption were investigated within 45 days and inactive customers showing consumption were investigated immediately. Anonymous tips were also relied on as a source of theft identification. No measures were performed to identify partial theft. Aqua had planned to initiate a comprehensive theft of service program utilizing an automated program to identify accounts that likely had theft associated with them.

**Follow-up Finding and Conclusion No. IX-1** – Aqua PA has initiated a pilot theft of service program for limited customer classes.

While review of the customers' billing and physical infrastructure can help identify some instances of theft or damage, automation provides greater efficiencies. Consequently, Aqua PA implemented a pilot theft of service program using algorithms to automate the process to identify customer accounts that exhibit characteristics associated with theft of service. These algorithms list properties in order of likelihood to have instances of theft. The lists produced are used to prioritize which properties to inspect and investigate. This new method is a more proactive approach and has the potential to identify more types of theft.

Phase One of the pilot project tested the algorithm for large meters. Of the 30 meters investigated, four were malfunctioning, bypassed, or partially bypassed. This equates to a success rate of 13.3% corresponding to a recovery of approximately \$30,000 in lost water revenues. Phase Two was the testing an algorithm designed to identify damaged or bypassed small meters. The results of this phase were not available at the end of our audit field work. The projected savings resulting from the properties identified in the test cases by the new theft of service program algorithms will be verified after the Company has analyzed Phase Two results.

The estimated cost to develop both algorithms was approximately \$58,000, half of which was recovered in the savings identified in Phase One of the pilot project. The

cost effectiveness of this program is expected to rise once lost revenues from Phase Two are recovered. The costs to expand the program to all customer classes are incremental, therefore Aqua PA should proceed in fully implementing the program. Another key feature of an active theft program is that it actually discourages theft since potential thieves are made aware of an increased likelihood of being caught.

As highlighted in the Phase One pilot, lost water revenue can be attributed to factors other than theft of service such as defective meters. Defective meters can in fact result in notable losses in revenue posing as much financial harm to the Company as customer theft. Based upon preliminary results of Phase One and barring unexpected results from the Phase Two analysis, Aqua PA should expect the savings trend to continue as they expand the theft of service algorithms to other customers and customer classes. The Audit Staff agrees that full deployment may be dependent upon the results of Phase Two; however, Phase One highlights the tremendous benefit of this program.

**Staff's Follow-up Recommendation – Complete deployment of the theft of service program.**

**Prior Recommendation** – Customize the Lawson System to track meter inventory effectively and eliminate redundant computerized tracking systems.

**Prior Situation** – The Company utilized the Lawson System as its inventory management and accounting software; however, the Meter Operations Department required meter inventory detail beyond the capabilities of the Lawson System. Consequently, duplicate entry of information into separate computer programs occurred to account for and track meter inventory.

Due to the inability of the Lawson System to record a higher level of meter inventory detail, the Meter Operations Department used an Excel spreadsheet to track inventory levels, usage, and to facilitate the ordering of meters. This dual tracking of similar information resulted in the Meter Operations Department entering data into the Lawson System in batch-type processes while also updating the Excel spreadsheet.

**Follow-up Finding and Conclusion No. IX-2 – Aqua PA is now using a single system to track its meter inventory.**

During the first quarter of 2014, the Lawson System Master List was updated to include the additional detailed meter inventory data required by the Meter Operations Department. This step allowed the Lawson System to become the primary tool to track, order, and maintain meter inventories.

It is a good business practice to eliminate redundancies where possible in order to operate in the most cost effective and efficient manner. By enhancing the meter inventory tracking capabilities of the Lawson System, the Company has optimized its resources to attain a higher level of operating efficiency.

**Staff's Follow-up Recommendation – None.**

**Prior Recommendation** – Automate the creation of shut-off collection order notices in the Company's Northeast and Western Regions.

**Prior Situation** – Aqua PA's manual shut-off collection order process in the Northeast and Western Regions was inefficient. The ten day shut-off notices were automated, but three day and 48 hour shut-off notices were completed manually. Customer Service Coordinators (CSCs) had to retrieve information from Aqua PA's customer information system and manually enter the information into standard notices. During peak times, each CSC had to potentially enter hundreds of collection notices each day, taking a large portion of their time from other duties.

**Follow-up Finding and Conclusion No. IX-3** – Aqua PA has increased automation of its shut-off collection order notices, but there is no policy for when a district should utilize automation or manual procedures.

By the end of 2015, the ten day shut-off notices had been automated for all Regions and the three day and 48 hour shut-off notices had been automated through a mail merge procedure throughout most, but not all, of the districts within the Regions. The mail merge procedure automatically dispatches operators to deliver the notices by hand, in accordance with 66 PA C.S. Chapter 14 and 52 PA Code Chapter 56 guidelines. For example, satellite districts within the Shenango District do not use the mail merge procedure. In these districts the operators normally self-dispatch from their home and submit collection orders from their tablets as they dispatch themselves. Therefore, it only becomes efficient to turn on the mail merge procedure once a certain volume of notices are required; due to the fact that the mail merge procedure can only be activated from the office, which is not normally manned by operators. Currently, the operators' judgement is relied upon to determine whether it is more onerous to travel to the office and turn on the mail merge system or to self-dispatch. There is no policy on when the mail merge procedure should be used to send shut-off notices; either on a district by district basis, or on a daily basis, as in the case of Shenango's satellite districts.

Most of Aqua PA's districts have implemented an automated dispatch process for its shut-off notices while the primarily small, satellite locations still rely on the manual process. Automation of intensively manual processes can improve the productivity of employees and the efficiency of processes. However, automation should be weighed against other business efficiencies to determine the most cost effective and efficient business practices. At the moment, basing the use of the mail merger system on field conditions is prudent; however, the lack of guidance or documentation when the system will become effective for these satellite districts could cause the underuse or misuse of this newly developed tool. Ideally, a policy should be established defining more precisely when a district should switch to using the mail merge procedure.

**Staff's Follow-up Recommendation – Establish a policy governing the automated dispatch process for all districts including the satellite districts.**

## X. HUMAN RESOURCES AND SAFETY PROGRAMS

**Background** – The Focused Management and Operations Audit (Management Audit) of Aqua Pennsylvania (Aqua PA or Company) conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits released on May 23, 2013, at D-2012-2312432, contained three recommendations within the Human Resources and Safety Programs functional area. The Audit Staff rated this functional area as needing moderate improvement. In this chapter, three prior recommendations and prior situations are reviewed and three follow-up findings and recommendations are presented.

**Prior Recommendation** – Expand the current emergency succession plan into a formal company-wide succession plan which includes not only executive, but middle level management, and is periodically reviewed and updated by the Board of Directors Executive Committee.

**Prior Situation** – Aqua PA did not have a formal management succession plan. Instead the Company maintained a succession plan as part of the overall Aqua America corporate succession plan, which covered 12 executive level management positions and specified first, second and third successors for each position. Historically, Aqua PA has utilized a mixture of recruitment and promotions from within to fill vacancies in management positions. Management indicated that it had been able to fill vacancies without operational interruptions based on the depth and experience within the Company. Therefore, management believed it would not be cost-effective to incur the internal and external costs associated with developing a company-wide management succession plan.

**Follow-up Finding and Conclusion No. X-1** – Aqua PA has not taken steps toward developing a formal management succession plan.

Under guidance of Aqua Service, Inc.’s (Aqua Services) General Counsel, Aqua America, Inc. (Aqua America) reviews and updates the emergency management succession sequence (emergency succession plan or plan) during executive management meetings. The plan functions and serves the same role in the organization as it did previously; however, management did make the decision to limit each position to two replacement candidates. The Company indicated that, through experience, management discovered limited benefit in identifying a third alternative for many positions. Instead, its purpose is to temporarily fill unexpected vacancies at Aqua Services and Aqua PA on an interim basis and is not intended to identify long-term candidates or successors for high-level positions. Any position filled as a result of this plan would be subject to the same internal and external recruitment processes as a position filled following a planned retirement or departure. As of April 2016, first and second successors were identified for 14 executive management positions.

Historically, Management has expressed reservations about having a management succession plan in a formal written document as the Company believes it

to be too prescribed and restrictive. However, Aqua America's new Chief Executive Officer (appointed June 1, 2015) has shown interest in evaluating the benefits of a formalized succession plan. In the interim, the organization does not have a documented or formal management succession plan and its emergency succession plan should not be viewed as a complete succession plan.

A thorough management succession plan helps to identify, develop and train replacements for key management positions and can provide career development paths that aid in employee growth and retention. Cultivating talent within the organization protects against multiple issues, including:

- Becoming overly reliant on institutional knowledge,
- Increased retirements due to an aging workforce,
- High growth periods, and
- Unexpected departure of mid-level managers.

Although Aqua America and Aqua PA have historically been able to successfully fill management positions, it remains vulnerable to unexpected vacancies and talent developmental constraints. An adequate management succession plan should identify key management positions, skills and experience necessary for those positions. In addition, a good succession plan will identify prospective employees for each position but more importantly what training, experience, or opportunities each employee needs to move up in the organization. This employee development program is not a guaranteed succession plan but enables the company to focus on developing the qualifications, skills, and experience necessary to ensure business continuity and adherence to the Company's long term vision.

**Staff's Follow-up Recommendation** – Create a more comprehensive company-wide succession plan.

**Prior Recommendation** – Clarify all ongoing reporting relationships throughout the Company and strive to make a basic, easy to follow, Organizational Chart that fully depicts the organization available to all employees.

**Prior Situation** – Aqua PA's organizational chart did not clearly identify the Company's complex reporting relationships and was not readily available to all employees. Aqua Services Human Resources (HR) Department utilized the Human Resource Information System (HRIS) to maintain organizational charts for Aqua America and its subsidiaries. A limited portion of the Company's organizational chart was available to all employees via the Company's website. However, in order to obtain complete organizational charts, employees had to request copies from HR. Moreover, the overall Aqua America organizational chart provided to the Audit Staff was difficult to follow and understand since Aqua PA had several employees with cross company reporting relationships.

**Follow-up Finding and Conclusion No. X-2 – Aqua PA has not made changes to its organizational charts but plans to transition to a new HRIS with enhanced organizational charting features.**

Human Resource Information Systems (HRIS) often provide the organization charting tools needed to effectively clarify reporting relationships which is vital for an organization the size and complexity of Aqua PA with its Service Company cross-company reporting structure.

Organizational charts are an essential part of an organization because they can present a clear representation of reporting structures, helping employees and management quickly identify individuals responsible for a specific function or department. Moreover, maintaining accurate organizational charts enable management to identify positions that are missing or that need to be filled and to identify inefficiencies and make timely personnel changes (see Follow-up Finding and Conclusion No. III-1). Organizational charts have other useful benefits in that they enable newer employees to connect with his/her co-workers, helps to manage workload and makes planning easier. Company management indicated that it is working to restructure the intertwined reporting relationships within Aqua America especially Aqua PA, Aqua Services and Aqua Resources which would help reduce the number of cross-company reporting relationships displayed on the organizational charts. A more streamlined organization would also help with optimizing employee staffing levels, spans of control, and workloads.

The HR Department uses a HRIS to perform various functions, including creating organizational charts but plans to migrate to a new system called Infor Human Capital Management (HCM). HCM will have several enhanced organizational charting capabilities over the existing HRIS. The Company expects the project to begin in early 2016 with a go-live date of January 1, 2017. The HR Department currently maintains and operates several HR systems that aid the HRIS in creation of organizational charts. However, the new HCM system is intended to replace all of these different systems and combine them into one central HRIS. The HR Department expects this transition to increase efficiency, eliminate duplication of efforts, streamline its processes and have better overall functionality than the current system.

According to Company management, the new HCM will be able to display dual reporting relationships. Additionally, employees and managers will be able to view complete organizational charts via the self-service portal in HCM. The organizational charts will be generated by the new system and will be maintained automatically as HR makes any organizational change.

**Staff's Follow-up Recommendation – Complete efforts to create easy to follow organizational charts that are available to all employees and continue to streamline the cross-company reporting structure.**

**Prior Recommendation** – Restructure the HR Department to include the Safety Administrator and ensure all training, including safety related training, is administered and tracked through the HR Department.

**Prior Situation** - Aqua PA's training efforts were not sufficiently maintained and tracked by the HR Department. Specifically, responsibility for training administered by the Safety Administrator (i.e., operational safety and operational task related safety training such as backhoe operator training, electrical safety, confined workspaces, trench safety, etc.) was divided across departments without adequate oversight. The Safety Administrator developed and provided all training necessary for the Operations Department. Department supervisors were responsible for ensuring all employees registered and attended required training by tracking attendance. Attendance records were tracked by sign-in sheets and not maintained electronically or logged. HR did track the training when made aware, or when the Safety Administrator or the department supervisor provided a copy of the sign-in sheet. However, outside of training relating to individual licenses (i.e., CDL, water operators certification, professional engineer license, etc.) the HR Department was often not informed of these training efforts, making it difficult to maintain records in the HRIS system.

**Follow-up Finding and Conclusion No. X-3** – Aqua PA developed a yet undocumented process to help ensure all training records are forwarded to Human Resources but did not restructure the Human Resources Department to include the Safety Administrator.

In early 2014, the Human Resources Department and Manager, National Safety (Safety Manager) implemented a process to ensure that all safety training is entered into the Company's HRIS and included in employee personnel files. Following any training coordinated by the Safety Administrator, the Safety Manager instructed all employees to forward all training registrations to HR following the training. In support of this process, HR sends a quarterly email to the Safety Administrator reminding the Safety Department staff to forward all safety related training to HR. The HR Department is responsible for incorporating these records into the employee personnel files in the HRIS.

Aqua PA made significant strides to ensure that all employee training is captured; however, several concerns remain. Aqua PA's practice is not yet documented and the fractured nature of all training records raises accountability concerns. In particular, the documentation process involves separate departments within the organization and appears informal. While documenting the process does not eliminate all accountability issues (i.e., failing to record training), documentation would help protect against attrition and inexperience. With respect to training records, there does not appear to be an efficient way for HR to reconcile its HRIS records with those of the Safety Department. The supervisors within the various operations departments are responsible for tracking the training offered to their direct reports through the Safety Administrator offering little opportunity to create a system of checks and balances. However, one such way to create this system of checks and balances is to require the HR Department to sign off on any training requests.



The HR Department should be capable of tracking and maintaining all developmental programs and training records of employees within its organization. This ensures that all employees receive the training opportunities management has deemed essential to maintain safety awareness, operational proficiency, improve job efficiency, learn new skills, and remain in regulatory compliance. A centralized department also can ensure compliance with a single point of contact; however, Aqua PA's structure can work provided proper documentation is maintained and sufficient checks and balances are created to help ensure success.

**Staff's Follow-up Recommendation – Document the training process and develop a procedure to review training administered outside the HR Department and annually reconcile Safety Administrator and HR Department training records for accuracy and completeness.**

## XI. DIVERSITY

**Background** – The Focused Management and Operations Audit (Management Audit) of Aqua Pennsylvania, Inc. (Aqua PA or Company), conducted by the Management Audit Division (Audit Staff) of the Pennsylvania Public Utility Commission’s (PUC or Commission) Bureau of Audits released on May 23, 2013, at D-2012-2312432, contained two recommendations within the Diversity functional area. The Audit Staff rated this functional area as needing minor improvement. In this chapter, the two prior recommendations and prior situations are reviewed and two follow-up findings and follow-up recommendations are presented.

**Prior Recommendation** – Strive to increase the utilization of minorities and females in underutilized job categories through hiring and promotion.

**Prior Situation** – Although the Company had appropriate programs in place and appeared to make a sincere effort to improve diversity in its workforce, underutilization of minorities and females was still occurring in Aqua PA’s Southeastern Region. Underutilization analysis using the “whole person” rule (i.e., placement goals to address underutilization are set when minority and/or female employment are less than their respective availability by at least one employee) determined that there was minority underrepresentation in eight job groups and female underrepresentation in four job groups in 2011.

**Follow-up Finding and Conclusion No. XI-1** – Aqua PA appears to have achieved some improvement in female and minority utilization but has fallen short of its goals.

Aqua PA made multiple changes to the structure of its Affirmative Action Plan (AAP) and the method in which it analyzes and reports workforce utilization since the 2011 Management Audit. These changes made direct comparisons of 2014 and 2015 AAP data to the data from the Management Audit’s most recent AAP (2011) very difficult, and as discussed below.

In 2013, the Company had three AAPs and presented underutilization analysis using the whole person rule. The Company reported only two of these AAPs to the Commission, as the third was the Corporate AAP and consisted entirely of non-regulated employees. Data from 2013 was consistent with information presented in the Management Audit and the 2011 AAP, making a fair comparison possible. The 2013 underutilization analysis determined minority underrepresentation occurred in 10 job categories, two more than 2011, and female underrepresentation in six job groups, three more than 2011. Overall, the differences between 2011 and 2013 are attributable to the low number of positions in each job group, where hiring or terminating a single employee can have significant impact on utilization.

The Company increased the number of AAPs in 2014 to better align with Affirmative Action Plan regulations. These regulations instruct contractors to maintain an AAP for establishments/locations of more than 50 employees. For establishments/locations with less than 50 employees, a Company can choose to create an AAP for that establishment, roll the data into an AAP supporting that establishment's personnel function, or roll it into an AAP that covers the work location of the employee's supervisor. In total, the Company created six AAPs for the following: Corporate, Great Valley, Northeastern, Springfield, Western, and Willow Grove Divisions. Unlike pre-2014 AAPs, the Corporate AAP now includes employees from PUC regulated and non-PUC regulated operations. Consequently, the change meant that employees were being separated into approximately three times as many job groups and also included employees outside the PUC's jurisdiction. The change is immediately noticeable in the utilization analysis. Reviewing the six AAPs from 2014 showed 21 underutilized job groups for minority employees and 10 underutilized job groups for female employees. In contrast, had the change to a different AAP structure not been made, the Company would have reported nine underutilized job groups for minority employees and five for female employees.

Finally, in 2015 the Company changed from the whole person method to the two standard deviation method. The difference between the two is that unlike the whole person rule, where the gap between the availability of minority or female candidates exceeds utilization by more than one employee, the two standard deviation method requires the difference between availability and utilization to reach two standard deviations of statistical significance. An important consideration is that incumbency versus utilization analysis is far less likely to result in underutilization using the two standard deviation method. In fact, the Company reported only one underutilized job group using this method in 2015, but would have reported 25 under the whole person rule, many in low employee count categories. This does not mean the two standard deviation method is fallible as it is a common method and allowed method under Office of Federal Contract Compliance Program (OFCCP) guidelines. However, it is important to remember that the two standard deviation rule tends to identify severe examples of underutilization in job groups but is useful to eliminate underutilization results where only one or two employees are in a category. Ideally, using both methods can create a clearer picture of success or where additional efforts may be needed.

**Staff's Follow-up Recommendation – Strive to increase representation in deficient or underutilized job categories to meet Company goals.**

**Prior Recommendation** – Initiate additional efforts to increase purchases from minority owned business enterprise vendors.

**Prior Situation** - Aqua PA made an effort to promote procurement from minority-owned, women-owned, disability-owned business enterprise (MWDBE) vendors; however, purchases from minority-owned business enterprise (MBE) vendors from 2008

to 2011 accounted for a very small percentage of overall purchases. MBE spending represented only 0.06% of overall procurement in 2011.

**Follow-up Finding and Conclusion No. XI-2 – Aqua PA increased MBE spending compared to the lower levels experienced in 2010-2011, but additional work is needed.**

A summary of Aqua PA's purchases made from MWDBE vendors during the years 2011 through 2014 are shown in Exhibit XI-1. From 2011 to 2014, Aqua PA's total purchases increased by only 2.2%. In comparison, total MWDBE purchases increased by over 10% during the same period and MBE specific purchasing increased by over 58% for this period; on the other hand, MBE purchases remain an extremely small percentage (0.09%) of total purchases. As indicated in Exhibit XI-1, purchases from MBE vendors did spike sharply in 2013. This was due in large part to a one-time contractor supplied services agreement. While unable to replicate this spending level in the subsequent year, it does show the Company's willingness to consider and select diverse vendors in the procurement process.

The Commission's Policy Statement on Diversity at 52 Pa. Code §69.801-69.809, encourages major jurisdictional utilities to identify MWDBE vendors and afford them the opportunity to bid on the purchase of goods and services. Aqua PA uses an annual vendor questionnaire to ensure that their MWDBE vendor information is up-to-date. Aqua PA also continues to sponsor and attend procurement related networking events in Philadelphia and surrounding areas. While Aqua PA's efforts are noteworthy and increased diverse spending is commendable, there is still room for improvement as diverse spending only accounted for 3.25% of total spending in 2014.

**Exhibit XI-1  
Aqua Pennsylvania, Inc.  
Diverse Spending Levels  
For the Years 2011 through 2014**

		Minority-Owned Business Enterprises		Women-Owned Business Enterprises		Persons with Disabilities-Owned Business Enterprises		Total MWDBE	
Years	Total Purchases <sup>1</sup>	Annual Purchases	% of Total Purchases	Annual Purchases	% of Total Purchases	Annual Purchases	% of Total Purchases	Annual Purchases	% of Total Purchases
2011	\$ 217,920,227	\$ 122,048	0.06%	\$ 6,403,064	2.94%	\$ 48,634	0.02%	\$ 6,573,746	3.02%
2012	\$ 228,399,526	\$ 143,751	0.06%	\$ 7,058,775	3.09%	\$ 209,572	0.09%	\$ 7,412,098	3.25%
2013	\$ 213,971,185	\$ 1,187,989	0.56%	\$ 5,437,931	2.54%	\$ 509	0.00%	\$ 6,626,429	3.10%
2014	\$ 222,681,236	\$ 193,012	0.09%	\$ 6,982,673	3.14%	\$ 66,660	0.03%	\$ 7,242,345	3.25%
Net Increase/ (Decrease)	\$ 4,761,009	\$ 70,964		\$ 579,609		\$ 18,026		\$ 668,599	
<sup>1</sup> Excludes bank transactions, utility costs, intercompany charges, taxes, and employee reimbursements									

Source: Data Request DV-7.5

**Staff's Follow-up Recommendation – Continue efforts to identify new MWDBE vendors and strive to increase MWDBE spend levels.**

## **XII. ACKNOWLEDGEMENTS**

We wish to express our appreciation for the cooperation and assistance given to us during the course of this Management Efficiency Investigation by the officers and staff of Aqua Pennsylvania, Inc.

This audit was conducted by Porus Irani, Deron Henry, Barry Keener and Michael Flynn of the Management Audit Staff of the PUC's Bureau of Audits.

