

Philadelphia Gas Works

MANAGEMENT EFFICIENCY INVESTIGATION EVALUATING THE IMPLEMENTATION OF SELECTED RECOMMENDATIONS FROM THE 2015 STRATIFIED MANAGEMENT AND OPERATIONS AUDIT REPORT

Prepared by the
Pennsylvania Public Utility Commission
Bureau of Audits
Management Audit Division
Issued August 2018

Docket No. D-2017-2627521



PHILADELPHIA GAS WORKS

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I. INTRODUCTION

A. Background

At its July 24, 2014 Public Meeting, the Pennsylvania Public Utility Commission (PUC or Commission) accepted the Schumaker & Company (Schumaker) proposal to perform a Stratified Management and Operations Audit of Philadelphia Gas Works (PGW or company). Schumaker subsequently completed its work, and in August 2015, issued a final report containing 76 recommendations for improvement. PGW submitted its implementation plan on October 2, 2015 indicating that 62 were accepted, 13 were partially accepted and 1 recommendation was rejected. On October 22, 2015, at D-2015-2468141, the Commission made the audit report and Implementation Plan public and directed PGW to:

- Proceed with its October 2015 Implementation Plan; and,
- Submit progress reports on the implementation annually, by October 2nd, for the next three years.

Since October 2015, PGW submitted two implementation plan updates as requested by the Commission to ascertain the company's progress in implementing the recommendations contained in the previous Stratified Management and Operations Audit report. Based on a review of these updates, the PUC's audit staff elected to conduct a Management Efficiency Investigation (MEI) of PGW's progress implementing 65 of the original 76 recommendations that were deemed the most significant. Specific items of management effectiveness and operational efficiency 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 PGW's efforts to implement certain recommendations contained in the Stratified Management and Operations Audit report released in October 2015. The scope of this evaluation was limited to PGW's efforts in implementing 65 prior Management Audit Report recommendations in the functional areas of:

- Executive Management
- Corporate Governance
- Financial Management
- Gas Operations
- Emergency Preparedness
- Supply Chain
- Fleet and Facilities Management
- Information Technology
- Customer Service
- Human Resources and Diversity

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Additionally, the PUC's audit staff deemed it prudent to review PGW's compliance with PUC regulations at 52 Pa. Code Chapter 101 regarding physical security, cyber security, emergency response and business continuity plans.

C. Approach

The Management Audit Staff of the PUC's Bureau of Audits (audit staff or auditors) began fieldwork on November 13, 2017 and continued through March 13, 2018. The fact gathering process included:

- Interviews with PGW personnel;
- Analysis of selected PGW records, documents, reports, and other information focused on the period 2015 through 2017; and,
- Visits to selected company facilities.

II. SUMMARY OF MANAGEMENT EFFECTIVENESS AND OPERATING EFFICIENCY

The PUC auditors found that PGW effectively or substantially implemented 28 of the 65 prior Management Audit recommendations reviewed and has taken some action on the remaining 37 recommendations. Among the more notable improvements achieved by the management of PGW are:

- The implementation of measures to address anticipated retirements and adopted elements of a comprehensive workforce planning process.
- Completion of a management compensation study and realignment of compensation levels for most positions.
- Implementation of a document management software to maintain all policies and procedures.
- Revision of the Internal Audit reporting structure resulting in the Director of Internal Audits reporting directly to the PFMC Audit Committee and administratively to the CEO.
- Reduction of expenses related to the internal auditing function by adding staff and reducing reliance on an external auditing firm which related in an annual savings of approximately \$215,000.
- Creation of a new DIMP in 2015.
- Reduction in cast iron main breaks and leaks by incorporating additional factors into its MRP modeling.
- Reduction of gas supply assets by maximizing gas purchases from Marcellus Basin, which resulted in an estimated savings of \$47 million from August 2015 through October 2017.
- Development of a comprehensive business plan for the Supply Chain department.
- Establishment of an Enterprise Program Management Office.
- Improvement of customer service satisfaction scores.
- Incorporation of diversity into its business strategy, corporate initiatives, employee engagement, training, and development.

Although these accomplishments are commendable, the PUC auditors have identified opportunities for further improvement. Specifically, PGW should:

- Continue development of its Corporate Planning Department and refine the strategic planning process.
- Periodically conduct a comprehensive organizational review.
- Make additional efforts to prepare for upcoming retirements within the Gas Control Center.
- Encourage the PFMC, PGC, and City Council to streamline PGW's corporate governance structure to avoid approximately \$600,000 annually of expenses for PGW.
- Explore ways to mitigate or eliminate PGW employment residency requirements.

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- Conduct daily bank account reconciliations and resolve reconciliation items in a timely manner.
- Strive to reduce usage of the unclassified utility plant in-service account by reviewing and documenting processes related to the unitization of unclassified utility plant in-service assets.
- Ensure LNG revenue covers all costs associated with LNG sales.
- Continue implementation of GIS data migration.
- Aggressively replace cast iron main and all risky pipe.
- Reduce the number of open or backlogged leaks.
- Implement a standardized change over approval process with appropriate segregation of duties for approval levels and provide unit and cost variance explanations on Final Inspection and Review reports.
- Perform disaster recovery tests semi-annually.
- Update all emergency plans annually and consider testing scenarios on a rotating basis.
- Incorporate live drills into the Business Continuity testing schedule.
- Address security and safety issues based on priority level.
- Develop and implement a policy promoting cyber safe usage of electronic communications devices.
- Expedite system integration within Supply Chain to improve automation.
- Reduce preventable motor vehicle accidents.
- Continue developing effective facilities management policies with a focus on guiding principles, best practices, and general procedures easily incorporated in a future comprehensive facilities plan.
- Reduce long-term accounts receivable balances through risk-based collections practices.
- Focus efforts toward preventing or quickly identifying undetected gas use.
- Improve call center employee turnover levels.
- Continue to increase diversity in underutilized job categories.

Exhibit II-1 summarizes the 65 prior recommendations reviewed and the PUC audit staff's follow-up findings, conclusions, and recommendations.

**PHILADELPHIA GAS WORKS MANAGEMENT EFFICIENCY INVESTIGATION
SUMMARY OF OCTOBER 2015 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
III. EXECUTIVE MANAGEMENT (Page 16)		
Develop an organizational review and development process.	III-1 – PGW does not have a comprehensive organizational review process.	Periodically conduct a comprehensive organizational review.
Reinstitute the Strategic Focused Organization or similar strategic planning process.	III-2 – PGW has taken steps to implement a new strategic planning process but more work is needed.	Continue developing the Corporate Planning Department and refine the strategic planning process.
Expand the capacity of the Human Resources staffing function.	III-3 – PGW's Human Resources staffing function has implemented measures to address anticipated retirements.	None
Develop a comprehensive workforce plan.	III-4 – PGW has not developed a formal workforce plan but adopted elements of a comprehensive workforce planning process.	None
Perform a management compensation study (including incentive compensation) to assess compensation levels as compared to market and realign as deemed appropriate.	III-5 – PGW conducted a management compensation study and took steps to realign compensation levels for most positions.	None
Enhance PGW's ERM program.	III-6 – PGW's ERM program remains incomplete.	Design and implement a formalized ERM program and related processes.
Enhance PGW's risk management training programs.	III-7 – PGW has not developed a more comprehensive ERM training program.	Develop a more comprehensive risk management training program.
Take steps to plan for the retirements that could have a major impact on the ability to staff the Gas Control Center.	III-8 – PGW has taken some steps to prepare for upcoming retirements in its Gas Control Department but additional efforts are needed.	Make additional effort to plan, and prepare for, upcoming retirements in the Gas Control Center.

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SUMMARY OF OCTOBER 2015 MANAGEMENT AUDIT RECOMMENDATIONS AND
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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
III. EXECUTIVE MANAGEMENT (Continued)		
Coordinate the procedures review process.	III-9 – PGW implemented document management software to maintain all department policies and procedures.	None
Develop a plan for making organizational changes and for enhancing reporting capabilities.	III-10 – Enhanced reporting capabilities and organizational changes were accomplished within Risk Management.	None
IV. CORPORATE GOVERNANCE (Page 36)		
Improve the structure and processes of Board Governance.	IV-1 – PGW’s corporate governance structure and processes have not been streamlined.	Encourage the PFMC, PGC, and City Council to make the changes necessary to streamline PGW’s corporate governance structure.
Revise the Internal Auditing Department reporting structure so that the Manger of Internal Audit reports directly to the PFMC Board’s Audit Committee and no longer administratively to the CFO.	IV-2 – The Director of Internal Audits reports directly to the PFMC Audit Committee and administratively to the CEO.	None
None	IV-3 – Requiring city residency as a condition of employment is hindering PGW’s ability to attract and retain employees for management level positions.	Explore ways to mitigate or eliminate PGW employment residency requirements.
V. FINANCIAL MANAGEMENT (Page 43)		
Adjust the bank reconciliation process so that reconciling items are cleared in a timely manner.	V-1 – Unresolved reconciliation items continue to remain outstanding for extensive periods.	Explore the use of automated daily bank account reconciliation and establish parameters to ensure the timely clearing of unresolved reconciliation items.

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SUMMARY OF OCTOBER 2015 MANAGEMENT AUDIT RECOMMENDATIONS AND
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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
V. FINANCIAL MANAGEMENT (Continued)		
Develop a systemic plan and process to review fixed assets across PGW and determine which recorded assets are no longer in service and need to be removed from the records.	V-2 – PGW has implemented reasonable measures to ensure accurate recording of retired assets.	None
Develop a systematic plan and process to review unclassified assets with the end goal of classifying those assets to the proper account.	V-3 – PGW has implemented processes aimed at unitizing unclassified utility plant in-service assets; however, unclassified utility plant in-service balances continue to increase.	Review and document processes related to the unitization of unclassified utility plant in-service assets and strive to reduce usage of the unclassified utility plant in-service account.
Explore alternatives for fulfilling internal audit requirements.	V-4 – PGW has added staff to its Internal Audit Department and significantly reduced its costs for outsourced internal auditing services.	None
Develop a mechanism for accounting for the carrying charges in the LNG sales pricing.	V-5 – PGW is developing a mechanism, including carrying costs, for the potential introduction of firm LNG sales pricing.	Ensure LNG revenue covers all costs associated with LNG sales.
VI. GAS OPERATIONS (Page 54)		
Migrate all asset data into a single geospatial database.	VI-1 – PGW hired a contractor to perform GIS data migration with a project completion date of April 2018.	Continue the GIS data migration and create a visual representation of key assets and data.
Take corrective action to timely address the noted deficiencies in the portions of the DIMP that were deemed unsatisfactory.	VI-2 – PGW created a new DIMP in 2015.	None
Aggressively accelerate the replacement of high risk mains, specifically cast iron mains.	VI-3 – PGW has accelerated its cast iron main replacement.	Continue to aggressively replace cast iron main and all risky pipe.

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SUMMARY OF OCTOBER 2015 MANAGEMENT AUDIT RECOMMENDATIONS AND
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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
VI. GAS OPERATIONS (Continued)		
Reduce the number of open leaks by outsourcing the excavation work and using PGW crews to make repairs.	VI-4 – PGW has made reductions to its leak backlog but still carries a high number of open or backlogged leaks.	Continue to emphasize the methodical reduction in open leaks through cast iron replacement and a “repair first” practice and reduce the number of open or backlogged leaks.
Reconcile the output from the Main Replacement Program (MRP) with the actual leak experience to validate its predicted outcomes.	VI-5 – PGW has reduced its cast iron main breaks and leaks by incorporating additional factors into its MRP modeling.	None
Develop a set of goals and reports for Field Operations and Planning and cascade them down through the organization to drive efficiency and operational and individual performance improvements.	VI-6 – PGW tracks individual employee productivity levels for coaching purposes but has not established formal goals tied to individual performance measures.	Develop a set of individual productivity goals for the Field Operations and Planning department and compare with actual performance to drive productivity improvement.
Update the system model design criteria.	VI-7 – The Winter Load Committee validated the existing design hour criteria, but the link between the <i>Billing Collection Customer Service System (BCCS)</i> and <i>Network Model</i> has yet to be reestablished.	Reestablish the link between the <i>BCCS</i> and the <i>Network Model</i> to enable the input of actual customer loads into the model.
Increase the number of qualified contractors to perform gas main installation work.	VI-8 – PGW has solicited and qualified three new contractors to perform gas main installation work.	None
Implement financial controls on work performed by contractors.	VI-9 – PGW has not implemented a standardized change order approval and variance explanation process.	Implement a standardized change order approval process with appropriate segregation of duties for approval levels and provide unit and cost variance explanations on the Final Inspection and Review reports.

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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
VI. GAS OPERATIONS (Continued)		
Continue to take steps to reduce PGW gas supply assets.	VI-10 – PGW has reduced gas supply assets.	None
Integrate the corrosion work order database into AIMS.	VI-11 – PGW has not integrated the corrosion work order database into AIMS.	Complete the project to integrate the corrosion work order database into AIMS.
VII. EMERGENCY PREPAREDNESS (Page 77)		
Perform disaster recovery tests semi-annually to adhere to established goals and objectives.	VII-1 – PGW is performing disaster recovery tests, but not always according to its frequency goal.	Perform disaster recovery tests semi-annually, making sure that all backup and restoration methods used by PGW are regularly tested.
Perform annual penetration testing and vulnerability assessments.	VII-2 – PGW has been conducting annual penetration testing and vulnerability assessments since 2015.	None
Improve emergency response capability by conducting periodic drills, simulating potential emergency situations, and updating area segregation plans.	VII-3 – PGW conducts annual emergency response drills but has not updated its emergency plans.	Review all emergency plans annually, update as needed, and consider testing scenarios on a rotating basis.
Develop and implement an expanded BCP schedule that includes tabletop drills and live drills annually.	VII-4 – PGW has conducted tabletop exercises, but live drills have not been scheduled or performed on a regular basis.	Incorporate live drills into the Business Continuity testing schedule.
Develop and implement a sample plan framework for PGW departments to use when developing their BCPs.	VII-5 – PGW has not developed a sample plan framework for departments to develop their BCPs.	Consolidate department BCPs into centrally developed BCPs.
None	VII-6 – Security, safety issues, and areas for improvement were discovered during facility tours.	Address security and safety issues based on priority level.

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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
VII. EMERGENCY PREPAREDNESS (Continued)		
None	VII-7 – The Gas Control Rooms’ security could be improved.	Consider upgrading security features at PGW’s Gas Control Rooms.
None	VII-8 – PGW lacks or does not communicate its plan to evacuate handicapped workers or guests from upper floors in an emergency evacuation.	Design, implement, and educate necessary employees on a plan to evacuate handicapped workers or guests in an emergency.
None	VII-9 – PGW’s facilities use multiple camera management software systems that do not communicate with each other, and there are areas where additional cameras would improve security.	Consider upgrading to a single consolidated camera management system and install additional cameras where needed.
None	VII-10 – Safety Data Sheets (SDS) have been reviewed but not regularly updated.	Update and make available SDSs for all chemicals.
None	VII-11 – The Emergency Response Plan (ERP) needs minor improvements.	Update the ERP to address noted deficiencies.
None	VII-12 – PGW does not have a policy promoting cyber-safe usage of electronic communications devices.	Develop and implement a policy promoting cyber-safe usage of electronic communications devices.
VIII. SUPPLY CHAIN (Page 90)		
Develop a Supply Chain business plan that fully integrates into a PGW strategic plan.	VIII-1 – The Supply Chain department created a comprehensive business plan.	None
Develop written procedures for all Supply Chain processes.	VIII-2 – Supply Chain expanded written policies and procedures for department processes.	Maintain up-to-date written procedures for all Supply Chain processes.

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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
VIII. SUPPLY CHAIN (continued)		
Perform an analysis on the value of outsourcing Supply Chain function(s).	VIII-3 – Supply Chain evaluated and outsourced certain functions.	None
Integrate all systems used by Supply Chain.	VIII-4 – Supply Chain is evaluating the integration of its systems.	Expedite system integration within Supply Chain to improve automation.
Improve cycle count accuracy levels to at least 90% and increase analysis on inventory turn rates.	VIII-5 – Cycle count accuracy levels exceed 90% and inventory turn rates have begun to improve.	None
Pursue additional vendor partnering opportunities.	VIII-6 – Supply Chain developed, but did not implement, the necessary tools to pursue additional vendor partnering opportunities.	Implement the integrated supply strategy, update procurement rules, and balance productivity, effectiveness, and cost savings of vendor partnership agreements.
Develop and implement a Vendor Evaluation Program.	VIII-7 – PGW's vendor evaluation program deals with poor performance and corrective action, but it is not used in the bid process.	Expand the vendor scorecard to include contracted service providers.
IX. FLEET AND FACILITIES MANAGEMENT (Page 99)		
Periodically analyze outsourcing the Fleet function(s) to an outside contractor	IX-1 – Preliminary analysis revealed potential cost savings from outsourcing fleet maintenance activities.	Develop a detailed business case for outsourcing fleet maintenance activities.
Conduct a post implementation audit of the new M5 system	IX-2 – PGW has not conducted a post implementation audit of the new M5 system.	Conduct a post implementation audit of the new M5 system.
Fully implement the DriveCam initiative and increase the number of loss controls to address PMVAs.	IX-3 – PGW fully implemented DriveCam and actively uses it to promote safe driving behaviors and reduce preventable motor vehicle accidents.	Continue loss prevention and positive driver behavior initiatives to reduce preventable motor vehicle accidents.

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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
IX. FLEET AND FACILITIES MANAGEMENT (Continued)		
Develop a comprehensive facilities plan	IX-4 – PGW has not developed a comprehensive facilities plan.	Continue developing effective facilities management policies with a focus on guiding principles, best practices, and general procedures easily incorporated in a future comprehensive facilities plan.
X. INFORMATION TECHNOLOGY (Page 104)		
Conduct a formal assessment study for adding a formal PMO to the IS organization as soon as possible.	X-1 – PGW established an Enterprise Program Management Office.	None
Expand IS project management methodology documentation and review at least annually, and revise as appropriate.	X-2 – Project management methodology documentation has been revised and is reviewed annually.	None
Develop comprehensive project plans and schedules by incorporating additional detailed information and data.	X-3 – PGW's IS projects have comprehensive project plans and schedules.	None
Configure the Accounts Payable system to allow electronic workflow, including approval of vendor invoices, and eliminate the need for sending paper invoices to the Accounts Payable group for payment processing.	X-4 – PGW now uses an electronic workflow for approving IS invoices.	None
Implement use of systematic employee development plans for IS employees.	X-5 – Employee development plans are utilized for IS employees.	None

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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
X. INFORMATION TECHNOLOGY (Continued)		
Take actions to improve Help Desk performance to meet targets.	X-6 – PGW has acted to improve help desk performance but has not consistently achieved its targets.	Improve medium security-level help desk ticket performance.
Develop detailed policies and procedures involving IS chargebacks, not only during the budget cycle but also involving any changes in actual charges during the fiscal year.	X-7 – The IS department developed procedures for budgeting and allocating IS chargebacks; actual charges reflect changes to the number of devices used by each department.	None
XI. CUSTOMER SERVICE (Page 112)		
Continue to institutionalize recent efforts to strengthen call center operations.	XI-1 – PGW's overall customer service satisfaction scores have significantly improved.	None
None	XI-2 – PGW's call center experiences high turnover.	Improve call center employee turnover levels closer to industry averages.
Budget and track costs separately for each District Office.	XI-3 – PGW tracks charges related to the operations of its District Offices.	None
Evaluate and implement alternative in-person customer service options.	XI-4 – PGW plans to implement an alternative in-person payment option at its District Office locations in 2018.	None
Develop a plan for enhancing customer systems, including use of mobile applications for making customer payments.	XI-5 – Although PGW plans to begin installing kiosks in early 2018; mobile applications and electronic alerts remain in the planning phase.	Expand and improve customer engagement through mobile applications.

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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
XI. CUSTOMER SERVICE (Continued)		
Further incorporate commercial/industrial accounts into PGW's risk-based collections process, including sending more accounts to collection agencies.	XI-6 – PGW is in the process of implementing risk-based collections for its commercial and industrial accounts.	Complete the implementation of risk-based collections processes for commercial and industrial accounts.
Place greater emphasis on decreasing the number and amount of over-90-day-old accounts.	XI-7 – PGW has reduced its levels of residential accounts receivable balances; however, the over 90-day accounts receivable aging balances remain high.	Continue to reduce long term accounts receivable balances through risk-based collections practices.
Identify and address why the number of customers being refunded their credit balances following closing has decreased from roughly 62% to 27%.	XI-8 – PGW's investigation into credit balance refunds is ongoing.	Complete the root cause analysis and adjust processes as needed to resolve completion of refunds to customers with credit balances.
Determine the number and location of residential meters that may have the incorrect ERT protocol and implement corrective measures.	XI-9 – PGW identified and replaced all incorrectly installed ERTs by 2017.	None
Formalize communication protocols between PGW groups to readily identify and remediate under billings for gas service.	XI-10 – PGW should investigate solutions to prevent undetected service to eliminate issuance of large make-up bills.	Focus efforts toward preventing or quickly identifying undetected gas use.

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Prior MA Recommendations	MEI Follow-up Findings and Conclusions	MEI Follow-up Recommendations
XII. HUMAN RESOURCES AND DIVERSITY (Page 130)		
Create a safety committee scorecard.	XII-1 – PGW developed and implement a scorecard in the 2nd Quarter of 2016 to support and evaluate safety committee effectiveness and performance.	None
Measure and report safety performance using standard industry benchmarks.	XII-2 – PGW records and tracks safety performance data; however, a goal has only been established for the incidence rate of total recordable cases.	Develop additional safety goals and compare to standard industry benchmarks.
Leverage opportunities to increase diversity through retirements, workforce planning, and succession planning.	XII-3 – PGW’s workforce and succession planning efforts are supported by long-term initiatives to increase diversity.	Continue to increase diversity in underutilized job categories.
Integrate diversity as an overall business objective.	XII-4 – PGW incorporates diversity on an ongoing basis into its business strategy, corporate initiatives, employee engagement, training, and development.	None
Develop specific procedures to improve Minority, Women, and Disabled Business Enterprise (MWDBE) subcontractor participation for the next five years and include revised internal, external, and subcontracting efforts in the next Annual Diversity Report.	XII-5 – PGW developed and began implementing its comprehensive supplier diversity plan.	Complete implementation of the comprehensive supplier diversity plan.
None	XII-6 – PGW did not file an annual Report on Diversity with the PUC in 2015 or 2016.	Document the process and procedures used for filing annual PUC Diversity Reports to the Commission.

III. EXECUTIVE MANAGEMENT

Background – As detailed in the Schumaker report, Philadelphia Gas Works is owned by the City of Philadelphia. The Management Agreement Act (1972) created the Philadelphia Facilities Management Corporation (PFMC), a non-profit established to manage and operate PGW. The Philadelphia Gas Commission (PGC) is also governed by the Management Agreement Act. The Management Agreement Act gives the PGC responsibility for approving PGW’s annual operating budget, reviewing the capital budget before forwarding to the City Council, receiving semi-annual reports (on salaries, fringe benefits, expenses, and costs of PFMC), and approving senior management and other employees of PGW selected by the PFMC. The PFMC oversees PGW senior management including the President and CEO. Reporting to the CEO are five direct reports including the COO, the CFO, the Senior VP of Human Resources, the Senior VP of Strategic Planning and Information Services, and the VP of Regulatory and Legislative Affairs.

In this chapter, ten prior recommendations and prior situations are reviewed, and ten follow-up findings and five recommendations are presented. The findings primarily relate to the organization’s reporting structure, strategic planning, workforce planning, management compensation, enterprise risk management, and document management. In addition, four executive management recommendations were not investigated due to their minor nature and overall impact to the company.

Finding No. III-1

Prior Situation – PGW abandoned its Strategic Focused Organization (SFO) planning process in 2010. Under the SFO planning process, an organizational review was conducted as part of the overall strategic planning process. In the absence of the SFO process, the Cabinet Committee reviewed and approved organizational changes without a strategic company-wide organizational evaluation. As a result, several abnormal organizational relationships developed:

- The HR Department reported directly to the General Counsel.
- Labor Relations reported to the Chief of Staff.
- Internal Audit did not directly report to the PFMC Audit Committee.
- The strategic planning function was part of the Finance Organization.
- There were many one-to-one or one-to-two reporting relationships.
- External Relations was separate from Public Affairs and Corporate Communications.

Prior Recommendation II-1 – Develop an organizational review and development process.

Follow-up Finding and Conclusion – PGW does not have a comprehensive organizational review process.

Current Review – PGW contracted with a consultant to perform a formal organizational assessment in early 2018. The assessment was not complete as of March 2018 and an in-depth organizational review component was not incorporated into the newly developed strategic planning process. However, many of the abnormal reporting relationships present during the 2015 Management Audit have been addressed:

- The Human Resources department reports directly to the CEO and no longer to the General Counsel;
- The Internal Audit department functionally reports directly to the PFMC and administratively to the CEO as opposed to the CFO; and,
- Strategic Planning no longer resides in Finance, but is a stand-alone department reporting to the CEO.

A comprehensive strategic planning process should set high level corporate goals, initiatives, and strategies and link departmental resources toward achieving those goals. Succession planning and periodic organizational reviews help to ensure the organization is structured in the most effective manner and employee resources are adequate, properly trained, and in the right place to achieve strategic objectives. Most organizational change proposals originate in the business units in connection with periodic succession planning meetings conducted by the Human Resources (HR) department. HR succession planning meetings include a review of each department's structure and commonly identify areas where restructuring may be needed. Once identified, the PGW Cabinet Committee¹ reviews proposed organizational changes and approves or disapproves them accordingly.

Reviewing staffing, departmental structure, etc. during succession planning meetings and the cabinet's review of any proposed organizational changes provides a solid basis for maintaining the desired corporate organization. However, a more comprehensive review should be completed every three years to evaluate recent changes to structure and consistency to company vision. This review may be conducted using internal resources or a consultant if the necessary internal resources are not available. The review should incorporate analysis on spans of control, commonality of functions, support and interactions between functions, reporting structure, strategic direction, etc. to determine if organizational structure is optimal. Without periodically performing a comprehensive organizational review, inefficient, malfunctioning or competing organizational relationships and conditions may develop. PGW contracted with a consultant for help design and implement a new Corporate Planning Department and strategic planning process, which was established in September 2017. It is anticipated that the new process will address some elements of a comprehensive organizational review.

Follow-up Recommendation – Periodically conduct a comprehensive organizational review.

¹ The Cabinet Committee reviews and discusses any major issues confronting PGW. The Committee is composed of the CEO, CFO, COO, SVP of Strategic Planning and IS, SVP of Gas Management, SVP of Human Resources, Labor, Corporate Communications, VP & General Counsel, VP of Regulatory & Legislative Affairs.

Finding No. III-2

Prior Situation – PGW abandoned its SFO strategic planning process in 2010. That process included a comprehensive organization-wide strategic planning review linking corporate strategies to departmental plans and goals. The new planning process focused on budgeting for capital and operating expenditures and developing five-year financial forecasts. Although the new process utilized some metrics to monitor general performance, these were not comprehensive or linked to other aspects of the strategic plan. Additionally, the planning process across departments was inconsistent, with some departments developing detailed plans while others only developed financial budgets.

Prior Recommendation II-3 – Reinstigate the Strategic Focused Organization or similar strategic planning process.

Follow-up Finding and Conclusion – PGW has taken steps to implement a new strategic planning process but more work is needed.

Current Review – PGW contracted with a consultant to help create a new Corporate Planning Department, which was established in September 2017. PGW performed preliminary work for the engagement by self-assessing its project management capabilities and reviewing existing project related templates, methodologies, etc. The consultant subsequently assisted PGW in designing and implementing a new strategic planning function that included program management capabilities.

Corporate Planning is comprised of three areas reporting to the SVP of Strategic Planning and Information Systems: Strategic Planning Organization (SPO), Enterprise Program Management Organization (EPMO)², and Business Process Optimization (BPO)³. The SPO is responsible for:

- Managing the strategic development process;
- Maintaining PGW's mission, vision, and values;
- Defining and articulating PGW's strategic plan to achieve its objectives;
- Prioritizing proposed initiatives against corporate objectives; and,
- Identifying internal and external risks specific to initiatives and to the entire strategic plan, etc.

PGW's Corporate Planning department is still developing many details of the SPO, EPMO, and the overall strategic planning process. Corporate Planning will include five individuals: the Director of SPO and an SPO Specialist, the Director of EPMO and an EPMO Specialist, and the Director of BPO. The three director positions have been filled but the SPO and EPMO Specialists had not been hired as of March 2018, although PGW had begun the search to fill these positions.

² See Finding No. X-1 for more information about the EPMO.

³ See Finding No. III-9 for more information about the BPO.

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A strategic plan should set high level corporate goals, initiatives, and strategies and link departmental resources toward achieving those goals. It should also include, or pair with, a robust set of performance measures which assess accomplishment of these goals. The fiscal year (FY) 2018 strategic plan was the first created by the SPO, but some processes were unfinished or still being developed.

The FY 2018 strategic plan included five goals, seven objectives and ten projects. However, PGW did not have metric-based key performance indicators (KPI) that tracked corporate progress toward achieving the goals and objectives. As of March 2018, the SPO was in the process of developing a new set of key performance metrics.

In the FY 2018 strategic plan, corporate goals and objectives were connected to the individual departments through the project evaluation process where one of the evaluation criteria was strategic alignment. While connecting individual projects to the strategic goals and objectives is an important part of connecting department strategy and strategic direction, non-project initiatives should also align with the direction of the company through support of all or most company-wide goals. In the past, PGW accomplished this through the creation of departmental business plans but they were not completed for 2018. The SPO is considering reintroducing a refined departmental business planning process in 2021 to capture some of the non-project initiatives.

Some important organization level concerns (e.g., staffing, training, succession planning, etc.) are not included in the strategic planning process unless they are elevated as a serious concern. Such items are considered business as usual and are to be managed by the respective departments until departmental resources are linked to the strategic plan, which is currently planned for FY 2021.

Another aspect of the strategic planning process that still needs developed is adequately linking the strategic planning process with the budgeting and risk management processes. The strategic planning process should be completed before the budgeting process begins to allow strategic initiatives to be funded in the budget and long-range plan. PGW expects the FY 2020 strategic plan to be finalized ahead of the start of the budgeting process. In addition, the Director of Risk Management noted that more work was needed to formalize the inclusion of risk components within the strategic planning process.

PGW has made commendable progress toward implementing its new strategic planning function but more work is needed to fully develop and refine the process. Specifically, PGW should:

- Finalize a set of metric-based KPIs;
- Reintroduce departmental business plans or an alternative, to align non-project initiatives and organizational concerns to PGW's strategic direction;
- Establish a link between the strategic planning and budgeting processes; and
- Refine and formalize a process for evaluating risk in the strategic planning process.

Follow-up Recommendation – Continue developing the Corporate Planning Department and refine the strategic planning process.

Finding No. III-3

Prior Situation – As of 2014, PGW’s HR staffing function had a small staff consisting of a director, three full-time staff, and three interns responsible for all planning, recruitment, selection, and onboarding functions. On average, the staffing group processed 150 to 175 hires a year, usually for entry-level positions which historically had been easy to fill, with most positions filled within 60 to 65 days. However, anticipated retirements were becoming an issue with 25% of PGW’s employees, eligible to retire, and an additional 35% becoming eligible to retire within the next five years. Sufficient internal talent was not available to fill mid and senior level management positions requiring PGW to look externally for these historically hard to fill positions. Given the high rate of retirement eligibility and potential wave of retirements, the HR department’s compliment may not be able to timely fill all open positions.

Prior Recommendation II-6 – Expand the capacity of the Human Resources staffing function.

Follow-up Finding and Conclusion – PGW’s Human Resources staffing function has implemented measures to address anticipated retirements.

Current Review – PGW’s HR Staffing Department consists of the Director of Staffing, Wellness, and Special Projects who oversees four full-time employees, three interns, and a contractor. In June 2017 PGW increased the size of its staffing function, creating a new position focused on the PGW employee wellness programs. The four full-time employees include two focused on staffing, one focused on wellness and one administrative employee. The contractor and three interns also focus most of their time on PGW’s staffing. Furthermore, PGW has contracted with three staffing firms to obtain additional staffing support and resources, if needed.

HR monitors retirement trends and has found that the annual number of retirements is relatively stable with increases corresponding with the expiration of the union contract. Exhibit III-1 shows retirements from 2013 through 2017.

**Exhibit III-1
Philadelphia Gas Works
Employee Retirements
September 1, 2012 through August 31, 2017**

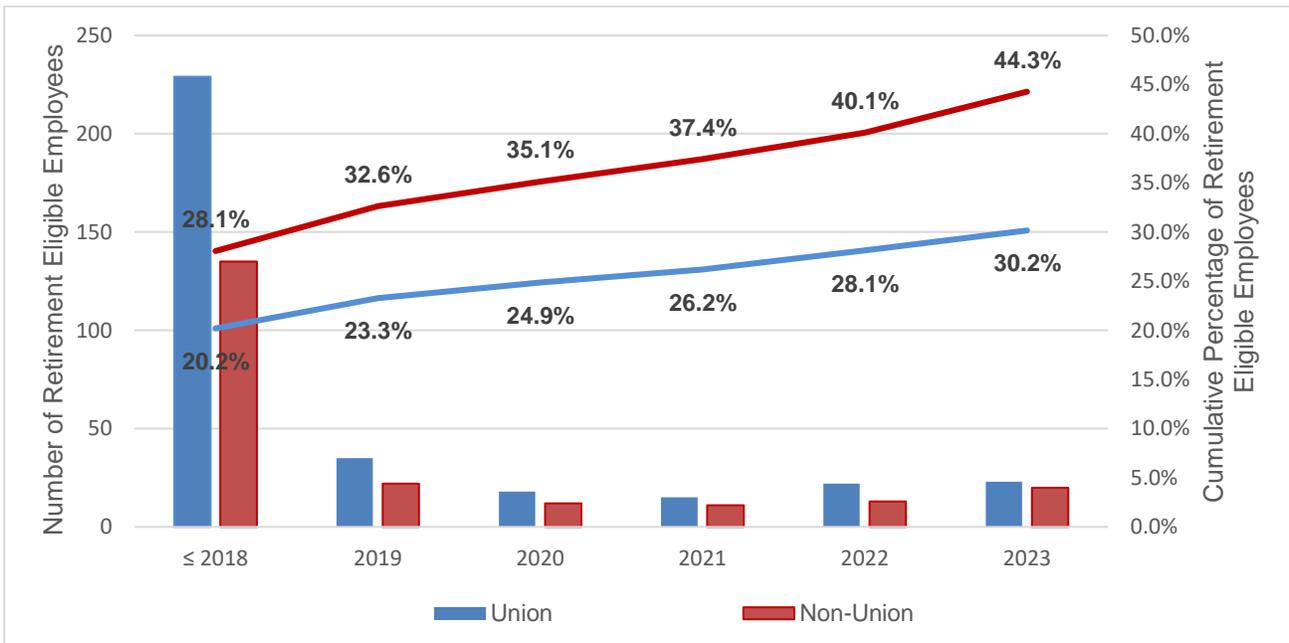
Fiscal Year	2013		2014		2015		2016		2017		5-Year Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Union	40	2.4	56	3.4	137	8.6	23	1.4	27	1.6	283	17.3
Non-Union	26	1.6	21	1.3	47	3.0	13	0.8	17	1.0	124	7.6
Total	66	4.0	77	4.6	184	11.6	36	2.2	44	2.7	407	24.9

Note: Retirement percentages are based on the average number of employees for each year.
Source: Data Requests EM-5 and EM-16

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As shown in Exhibit III-1, PGW experienced a large increase in the number of retirements in 2015 when its previous union contract expired. The current collective bargaining agreement expires in May 2020 and HR anticipates approximately 200 or 12% of employees to retire, including a significant number from management positions. Exhibit III-2 presents the number of employees who are eligible to retire or will become eligible to retire over the next five years. Overall, 28% of PGW’s employees will be eligible to retire by 2020, with a slightly higher concentration in non-union positions. In 2020, 35% of non-union employees will be eligible to retire including a majority of management positions.

**Exhibit III-2
Philadelphia Gas Works
Retirement Eligibility
September 1, 2017 through August 31, 2023**



Note: Percentages are based on the 5-year average number of union and non-union employees, respectively.
 *Includes employees who will be eligible to retire during 2018 and those already eligible to retire from prior years.
 Source: Data Requests EM-6 and EM-23.

The PUC auditors recognize that increasing staffing levels to address a variable issue like retirements is not sound long-term business practice. Instead, PGW has developed a workforce planning process and took other steps to effectively handle spikes in retirements. For instance, HR holds succession planning meetings and staffing planning meetings to identify potential upcoming retirements, employee development needs, vacancies, hiring and talent needs, etc. (see Finding No. III-4). Also, PGW will expand its hours for pre-employment testing, applicant screening, and onboarding interviews to expedite the hiring process, particularly for classifications expecting high turnover. In addition, senior staff from other HR functions may be assigned to assist in the staffing process by screening candidates and conducting

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interviews. On average, from 2015 through 2017, PGW filled 91.2% of positions within its “time to fill” goals⁴; this was just short of meeting its overall goal of 92%.

Historically, PGW has struggled to fill and retain mid/senior level employees due to a variety of factors, including low compensation relative to the industry and the City’s residency requirement. The City of Philadelphia, based upon a 2015 compensation study, adjusted salary levels at PGW during 2016. Management has also indicated that city’s residency requirement can be a factor when attracting and retaining management level talent (See Finding No. III-5 and Finding No. IV-3 for more information). Overall, attracting highly specialized talent, such as utility management, can be challenging and may require additional work by the HR staffing department. Nonetheless, the HR staffing department has the necessary resources and mechanisms to address the upcoming retirements at PGW.

Follow-up Recommendation – None

⁴ Time to fill goals: internal union – 87 days; external union – 53 days; internal non-union – 67 days; external non-union – 127 days.

Finding No. III-4

Prior Situation – The last Management Audit noted that PGW had an aging workforce where 25% of employees were eligible to retire in 2014 and an additional 35% were eligible to retire within five years. In response, PGW implemented a management succession planning process to identify and develop internal candidates. However, this workforce planning effort was not comprehensive, failing to address the needs of the non-exempt workforce or consider potential changes in required work competencies or knowledge transfer.

Prior Recommendation II-7 – Develop a comprehensive workforce plan.

Follow-up Finding and Conclusion – PGW has not developed a formal workforce plan but adopted elements of a comprehensive workforce planning process.

Current Review – PGW still faces an aging workforce. Overall, 23% of employees are currently eligible to retire and an additional 12% will become eligible to retire over the next five years. Looking specifically at non-union employees as outlined in Finding No. III-3 above, 28% are currently eligible to retire and an additional 16% will become eligible for retirement over the next five years, or 44% by 2023.

PGW's HR Department is primarily responsible for workforce planning efforts. The VP of HR holds succession planning meetings with each business area either quarterly or semiannually depending on the individual department's needs. The meetings involve the CEO, CFO, COO, Senior VP of HR, VP of HR, Director of Organizational Development, and the VP and Director from the respective department. These meetings focus on training and developing employees to prepare them to step into more senior positions. These meetings also include other important elements such as the organizational review, review of open positions, etc. During the meetings an organizational chart of the department is reviewed focusing on all non-union positions⁵. Any vacancies, the need to fill any vacancies, and the timeline for filling open positions are reviewed. Each employee, their date of hire and their earliest retirement date are also shown on the organizational chart to facilitate a discussion on potential upcoming retirements. As part of the succession planning process, PGW utilizes a nine-box grid to assess each employee based on potential and performance. Each employee's developmental needs are discussed highlighting their strengths, weaknesses, and opportunities for improvement. In addition, the overall structure of the department is reviewed and evaluated to determine if it is operating effectively and as intended, or if restructuring it would improve the organization.

The Director of Staffing also holds planning meetings with each department director on a monthly, bi-weekly, or weekly basis depending on the size of department and level of employee turnover. These meetings are focused on filling positions, working with departments to identify their hiring and talent needs, and developing the talent pipeline/recruitment channels for both union and non-union positions.

⁵ Union positions are required to follow a standard progression of seniority as outlined in the union contract.

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The Organizational Development Department also meets annually with all PGW directors to discuss their respective organization training needs and an annual needs assessment is created for each department. Information gathered during the needs assessment as well as HR's succession and staffing planning meetings helps Organizational Development craft the training programs for each department and the overall company. Standard or customized training can be requested by the departments throughout the year if additional needs arise.

The goal of workforce planning is to proactively assess future turnover and competency requirements, develop strategies to attract and retain employees with needed competencies, develop the current workforce, and ensure a process is in place to address the transfer of institutional knowledge. PGW has developed a workforce planning process which considers aspects from expected retirement and turnover, needed job skills, employee development, recruitment and retention, etc. As a result, PGW has the tools necessary to effectively plan for future workforce needs and attract qualified and skilled candidates.

Follow-up Recommendation – None

Finding No. III-5

Prior Situation – PGW historically had trouble attracting and retaining talent for management level positions. A compensation study conducted during 2010 showed compensation levels for exempt employees were significantly below market; at around the 15th percentile for lower level management and even lower for upper level management. Additionally, PGW did not have an incentive compensation plan. PGW was unable to implement an incentive compensation plan and had fallen farther below market compensation rates by 2014. PGW’s management compensation structure was last adjusted during 2005.

Prior Recommendation II-8 – Perform a management compensation study (including incentive compensation) to assess compensation levels as compared to market and realign as deemed appropriate.

Follow-up Finding and Conclusion – PGW conducted a management compensation study and took steps to realign compensation levels for most positions.

Current Review – During 2015, PGW worked with a consultant to conduct a compensation study to update and realign PGW’s non-union salary ranges with current market pay levels. The consultant utilized market data from a proprietary list of utility market participants adjusting data for aging and geographic factors. The study considered all forms of direct compensation such as salary, incentives, and bonuses but did not include employee benefits. Employee benefits are negotiated as part of the union contract and applied to all union and non-union employees. Compensation levels for exempt employees had fallen to around the 5th percentile, and PGW was experiencing problems attracting and retaining talent for many management level positions.

PGW presented the results of the compensation survey and the business impact to the PFMC and PGC. As a result, the PFMC and PGC approved wage increases for non-union employees. Compensation levels for non-union employees’ director level or below were adjusted to the 50th percentile and those above director level (VPs and SVPs) were adjusted to the 37.5th percentile. Compensation levels for the CEO, CFO, and COO were not adjusted for strategic considerations. Since adjusting the salary levels of non-union employees, the company has made improvements in attracting and retaining talent, particularly in management positions. The City’s residency requirement, which applies to PGW is now purportedly the company’s biggest obstacle to attracting and retaining non-union talent (see Finding No. IV-3). PGW should continue to monitor exempt employee salary ranges and periodically (every 3-5 years) conduct compensation studies to ensure employee salaries remain competitive with the market and industry levels.

Follow-up Recommendation – None

Finding No. III-6

Prior Situation – PGW began developing an enterprise risk management (ERM) program during 2007 and 2008. As part of the first phase of the project, the Director of Risk Management compiled a risk inventory and ranked risks based on input from the PGW president, SVPs and VPs. The second phase entailed setting goals, formalizing action plans and combining the existing risk inventory into PGW’s SFO structure by ranking risks in the SFO’s 13 major risk categories. The second phase was to be completed by mid-2008 but progress stopped and as of 2015 the ERM program was not completed. PGW made some progress including contracting with a consultant to evaluate PGW’s ERM program and risks; embedding the risk register into the business planning process so risk mitigation was included in the budgeting process; and, creating a risk-based auditing model to develop Internal Audit’s annual audit plan. As of the date of the last report, PGW expected to continue work on its formal ERM program in early 2015.

Prior Recommendation III-20 – Enhance PGW’s ERM program.

Follow-up Finding and Conclusion – PGW’s ERM program remains incomplete.

Current Review – PGW planned to continue developing its ERM program during 2015 by filling a vacancy in the Risk Management Department with a candidate that possessed a risk management background. However, PGW was unable to find a candidate with the desired ERM experience and instead reassigned the position to meet other needs. A recent retirement within Risk Management has created another opportunity for the Director of Risk Management to hire someone with the ERM experience needed. The Director of Risk Management expects to begin work on PGW’s ERM program after filling a Risk Management Specialist position that was posted but unfilled as of March 2018. A contract has been secured with a consulting firm to help PGW identify its risk profile, provide training to management, and assist with developing its ERM program.

According to the Director of Risk Management, the ERM program will need to be reconstituted because previous work was more than a decade old. PGW faces a new risk universe and will need to develop an updated risk register. A top priority is solidifying the company’s risk profile as this is a key aspect of a successful ERM program, and something PGW struggled to establish in its previous ERM program work. Developing a successful ERM program requires management level employees to be sufficiently trained and be aware of the risks facing the organization, its risk framework and philosophy, and how to use this information to effectively make decisions relative to risk. Currently, only basic risk management training is provided to employees, but additional training is needed for management on risk recognition and mitigation (see Finding No. III-7 for additional information).

PGW evaluates and considers general risks in various business processes and has included risk management aspects when designing formalized processes for its new Corporate Planning Department. The Director of Risk Management attends audit committee meetings, budget meetings, and is on the competitive contract committee

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(which evaluates all PGW contracts). Nonetheless, PGW has struggled to fully implement a successful ERM program. An effective ERM program strategically evaluates the enterprise at all levels to identify risks which could affect the company's ability to meet its goals and objectives and takes steps to manage risks at an acceptable level. The needed program framework and processes are not in place to effectively evaluate risks at all levels of the organization and make decisions to mitigate risks in accordance with the company's risk strategy.

Follow-up Recommendation – Design and implement a formalized ERM program and related processes.

Finding No. III-7

Prior Situation – Basic risk management training was provided to PGW management as part of HR’s mandatory training curriculum. The training provided was customized based on the training group, but only provided a basic overview of risk principles, defined risk management processes and techniques, and identified typical risks.

Prior Recommendation III-21 – Enhance PGW’s risk management training programs.

Follow-up Finding and Conclusion – PGW has not developed a more comprehensive ERM training program.

Current Review – As presented in Finding No. III-6, efforts to develop PGW’s formal ERM program were suspended and remain unchanged. Likewise, efforts to provide more comprehensive levels of risk management training have not materialized. Additionally, almost all the directors on the board when ERM training was last provided have been replaced.

The Risk Management Department is responsible for developing, maintaining, and providing risk management training with assistance from human resources. Five main risk management training courses are provided to various employee groups as highlighted below:

- *Risk Management 101* is provided to all management level employees on a three-year cycle. The training provides a background on risk management processes and risk mitigation tools. Participants then engage in exercises where they must use the tools learned to address risks in a mock business environment.
- *Supervisory Boot Camp* and *Management Academy* are training programs based on leadership topics designed to help develop new supervisory and management employees, respectively. Risk management is one of the components covered in the programs’ curriculum. *Supervisory Boot Camp* introduces the basics of handling employee injuries and motor vehicle accident claims. *Management Academy* builds on the *Supervisory Boot Camp* concepts and includes training on handling third party claims and conducting incident investigations.
- New employee orientation includes a half hour introductory training where employees learn the connection between their new jobs and potential risks to PGW, and how to mitigate those risks.
- Incident investigation training was designed to help field operations employees learn how to investigate accidents from a risk management perspective through roleplaying in a variety of injury, accident, and claim scenarios. The training is provided as requested by field operations.
- *Fusion School* is an annual training event for distribution foremen and supervisors. The school includes an hour training session where participants

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learn about the connection between their work, injuries, claims, and lawsuits. Participants discuss risks and real-life strategies to mitigate those risks.

Implementing a successful ERM program requires employees at all levels of the organization, especially management, to be sufficiently trained and aware of the risks facing the organization, its risk framework and philosophy, and how to use this information to effectively make decisions while managing risk. A good ERM training program should provide a foundation on risk management theory but focus on the application of ERM concepts in real-world scenarios. It should also be interactive and personal, highlighting the value ERM can have for individual employees and demonstrate how an ERM program might work within specific business units⁶. Although some basic risk management training has been provided to the majority of PGW's management and employees, they have not received the level of training necessary to effectively and efficiently implement PGW's ERM program.

Follow-up Recommendation – Develop a more comprehensive risk management training program.

⁶ Shinkman, M., & Herd, D. (May 1, 2015). Three Keys to ERM Training. *Risk Management Magazine*. Retrieved from <http://www.rmmagazine.com/2014/05/01/three-keys-to-erm-training/>

Finding No. III-8

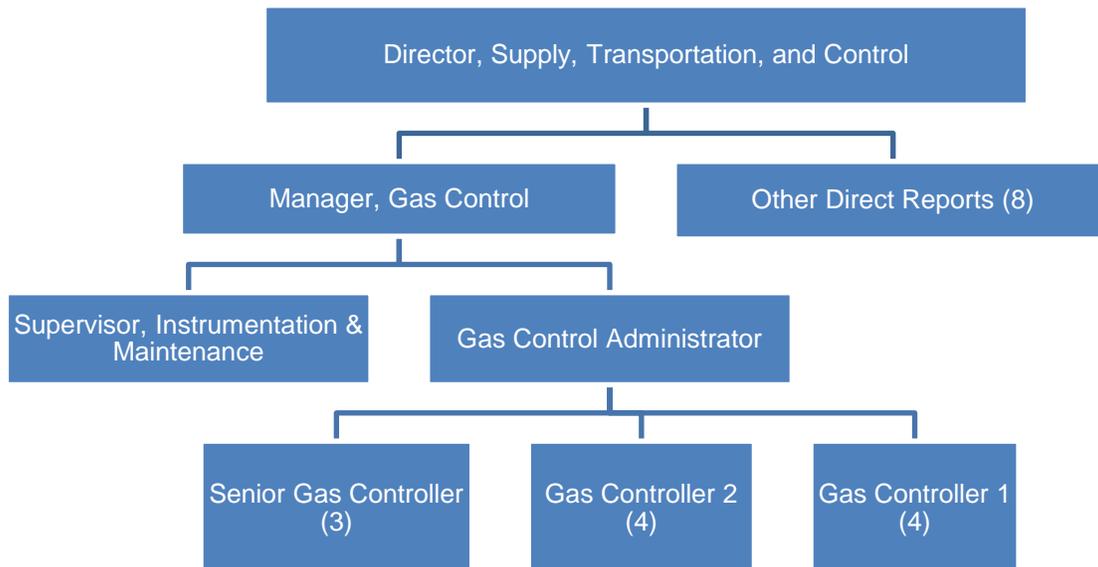
Prior Situation – PGW’s Gas Control Center is responsible for the physical control and electronic monitoring of gas as it enters and moves through the distribution system to reach PGW’s customers. During 2014, PGW had eleven gas controllers consisting of five senior gas controllers and six regular gas controllers. The gas control function required 24-hour coverage with two or three controllers on duty at a time depending on the forecasted load. From 2012 through 2014, the level of overtime for the gas control function increased from 12.2% to 20.2% suggesting staffing levels were just adequate to provide the needed coverage. Additionally, at least three of the senior gas controllers were eligible to retire and more gas controllers would be eligible to retire within three years. Eligible employees could elect to take retirement with a notice period of between two weeks and two months; however, a new gas controller takes about two years to train which could leave gas control with a serious staffing problem.

Prior Recommendation VII-1 – Take steps to plan for the retirements that could have a major impact on the ability to staff the Gas Control Center.

Follow-up Finding and Conclusion – PGW has taken some steps to prepare for upcoming retirements in its Gas Control Department but additional efforts are needed.

Current Review – PGW’s gas control function is staffed by eleven gas controllers reporting to the Gas Control Administrator as presented in Exhibit III-3.

**Exhibit III-3
Philadelphia Gas Works
Gas Control Organization Structure
As of December 31, 2017**



Source: Interview Request EM-3 and Data Request EM-26

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The gas controllers are primarily responsible for maintaining the integrity of PGW’s distribution system; monitoring and controlling gas as it enters PGW’s distribution system and distribution to customers. Gas control is a 24/7 operation requiring three gas controllers to staff each shift during the winter months and two for each shift for the remainder of the year. Operationally, there are key differences between the different levels of gas controllers. Gas Controller 1s are considered entry level employees and are not qualified to work alone during a shift without oversight from a Senior Gas Controller or a Gas Controller 2. Gas Controller 2s have demonstrated an advanced understanding of PGW’s system and are knowledgeable on how to handle certain situations, allowing them to oversee shifts during summer months when demand is low. Senior Gas Controllers have the best understanding of PGW’s system and are required to oversee all shifts during the winter months when system operations are most complex, and demand is high. Given the importance of the gas control function and the department’s staffing requirements it is essential to plan for retirements to avoid shift coverage problems, excessive and costly overtime, operational problems caused by inexperienced staff, loss of institutional knowledge, etc.

The Gas Control Department experienced a significant number of retirements from 2013 through 2017 and even more Gas Control employees will be eligible to retire within five years. Exhibit III-4 illustrates the number of retirements, and eligible retirees in Gas Control over the period 2013 through 2022.

**Exhibit III-4
Philadelphia Gas Works
Gas Control Retirements and Eligible Retirees
September 1, 2012 through August 31, 2022**

Fiscal Year	Number of retirements
2013	3
2014	0
2015	3
2016	0
2017	2
Total	8
Fiscal Year	Eligible Retirees
2018	4
2019	4
2020	4
2021	4
2022	6

Source: Data Request EM-26

The upcoming eligible retirees shown in Exhibit III-4 include the entire Gas Control management structure. The four employees shown as eligible to retire for years

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2018 through 2021 are the Director of Supply, Transportation, and Control; the Manager of Gas Control; the Supervisor of Instrumentation and Maintenance; and the Gas Control Administrator. Additionally, due to the level of retirements from 2013 through 2017, as of March 2018, five of the eleven current Gas Controllers have less than two years of experience and the most senior Gas Controller has only five years of experience.

As discussed in depth within Finding No. III-4, PGW has a thorough workforce planning process. This includes periodic succession and planning meetings focused on development of current employees and workforce planning including pending retirements. Prior to a retirement in 2015, the Gas Control Department was permitted with special approval from the PGC to hire the replacement gas controller. However, after that hire, the Gas Control Department has not been permitted to hire additional personnel until a retirement created a vacancy. Therefore, in preparation for the upcoming retirements in the Gas Control management structure, an engineer from Gas Processing is shadowing the Director and Manager of Gas Control with the intention of learning these positions and stepping in as the incumbents retire. Moreover, because it requires approximately two to three years to sufficiently train a new Gas Controller to become proficient and most retirements are only given with a six-month notice, the Gas Control Department may be vulnerable to a critical manpower shortage.

The actions taken by Gas Control to prepare for upcoming retirements is commendable. However, the level of retirements experienced over the last several years and the length of time needed to train new employees has reduced the department's ability to effectively plan for upcoming management retirements. PGW should continue to monitor employees' retirement eligibility as part of its workforce planning process, but increase efforts to plan for upcoming retirements, fill positions, and train new Gas Control employees to avoid operational disruptions. Because of the long lead time to train new gas controllers, PGW should consider requesting expanded staffing levels in the department.

Follow-up Recommendation – Make additional effort to plan, and prepare for, upcoming retirements in the Gas Control Center.

Finding No. III-9

Prior Situation – During the 2007 Management Audit, PGW’s Policies and Compliance Department had a manager tasked with coordinating all company-wide procedures to ensure that all new procedures followed the same protocol, and all procedures were periodically reviewed and updated. The Policies and Compliance department was eliminated in 2011 and the process was no longer in place. Instead each department was responsible for maintaining its own procedures.

Prior Recommendation II-2 – Coordinate the procedures review process.

Follow-up Finding and Conclusion – PGW implemented document management software to maintain all department policies and procedures.

Current Review – In November 2016, PGW implemented *PolicyTech*, an online document management software to facilitate collaboration and simplify the creation, approval, and distribution of documents to employees. Oversight of *PolicyTech* resides within PGW’s Business Process Optimization function. *PolicyTech* facilitates regular revision of policies and procedures through automated workflows that prompt document owners to certify review or approval of a document within a set timeline. If notifications appear to be overlooked by document owners, the system administrators, who receive the same notifications, will make personal contact to ensure that the document review occurs.

A benefit of *PolicyTech* is PGW management’s ability to see which employees have or have not reviewed specific documents, how long each document was viewed, and how often a document is reviewed. PGW employees are given access to the corporate and department level documents relevant to their position. Another benefit is that old versions of an updated document are automatically archived. By centralizing PGW’s policies and procedures within *PolicyTech*, PGW has created an automated process to ensure employees actively review them and they remain up-to-date.

Follow-up Recommendation – None

Finding No. III-10

Prior Situation – The Director of Risk Management wanted to implement specific changes within the Risk Management function: additional personnel to help research liability claims, cross-training of employees within Risk Management and enhanced report writing and data analytics via upgrade of *RiskMaster* software.

Prior Recommendation III-22 – Develop a plan for making organizational changes and for enhancing reporting capabilities.

Follow-up Finding and Conclusion – **Enhanced reporting capabilities and organizational changes were accomplished within Risk Management.**

Current Review – While no formal planning document was created, the Director of Risk Management has implemented the prescribed changes within the Risk Management function. Since 2015, the *RiskMaster* upgrade and accompanying training have been completed, which led to a more robust, streamlined reporting capability. Recent hires within the department have been cross-trained in liability claims and Workers' Compensation. Additional cross-training has occurred between Safety and Workers' Compensation personnel.

Follow-up Recommendation – **None**

IV. CORPORATE GOVERNANCE

Background – PGW is wholly owned by the City of Philadelphia and primarily governed by the PFMC and the PGC. The Mayor, City Council, and other City offices, such as the City Solicitor and the City’s Director of Finance, also have some oversight responsibility for PGW. The PFMC is a non-profit created to operate and manage PGW as outlined in the Management Agreement Act of 1972, as amended. The PFMC consists of seven members appointed by the Mayor of Philadelphia to two-year terms and can be reappointed. The PFMC utilizes three committees to help conduct its business: Audit Committee, Finance Committee, and the Workforce Development Committee. The Philadelphia Gas Commission (PGC) is also governed by the Management Agreement Act and consists of five members: City Controller, two members appointed by the City Council, and two members appointed by the Mayor. The PGC has responsibility for approving PGW’s annual operating budget, reviewing the capital budget before forwarding to the City Council for approval, receiving semi-annual reports (on salaries, fringe benefits, expenses, and costs of PFMC), and approving senior management and other employees of PGW selected by the PFMC.

In this chapter, two prior recommendations and prior situations are reviewed and two follow-up findings, one additional finding, and three recommendations are presented. The findings primarily relate to PGW’s corporate governance structure and processes, Internal Audit’s reporting structure, and the organizations ability to attract and retain management level employees under the City of Philadelphia’s residency requirement. In addition, one corporate governance recommendation was not investigated due to its minor nature and overall low impact to the company.

Finding No. IV-1

Prior Situation – PGW has been governed by the Philadelphia Facilities Management Corp (PFMC) and the Philadelphia Gas Commission (PGC) since the creation of the Management Agreement Act in 1972. These two entities had overlapping and unclear roles and responsibilities in the governance of PGW. When the governance structure was developed, the PFMC’s chartered responsibilities included the management of PGW while the PGC was to be responsible for rate-making and handling customer complaints. However, many of the PGC’s functions were transferred to the PUC. Consequently, the PGC’s role evolved to focus on approving budgets, gas contracts, and real estate acquisitions although these were already approved by the PFMC. Furthermore, neither the PFMC nor the PGC operated in the spirit of governance best practices developed out of the Sarbanes-Oxley Act of 2002. More specifically they did not have: clearly defined responsibilities and committee structures; staggered board terms; provisions to ensure directors have relevant technical and business experience; and reasonable director compensation.

Prior Recommendation IV-1 – Improve the structure and processes of Board Governance.

Follow-up Finding and Conclusion – PGW’s corporate governance structure and processes have not been streamlined.

Current Review – Changes to PGW’s governance structure would require an amendment to the City of Philadelphia’s (City) ordinances which must be passed by City Council. Consequently, PGW rejected the 2015 Management Audit recommendation citing it was beyond the capacity of PGW management to address, and no action has been taken by the PFMC or PGC to initiate change. Without the necessary changes to PGW’s governance structure, the company continues to be constrained by a duplicative and unclear governance structure that falls short of meeting standard governance practices. Some examples include:

- Overlapping and unclear responsibilities remain between the PFMC and PGC with both entities responsible for budget approval, financial oversight, real estate/lease transactions, gas purchase contracts, etc.
- Directors’ backgrounds and experiences appear to be narrow with a concentration in finance, real estate, law, and community relations with no, or limited experience in gas operations, utility management, auditing, customer service, etc.
- The PFMC does not have a requirement for staggered board terms with six of the seven current directors appointed during 2016; one has served since 2012.
- The Philadelphia mayor appoints PFMC directors to serve two-year terms; the PGC is comprised of five commissioners appointed to four-year terms with two appointed by the mayor, two appointed by City Council, and the remaining position filled by the City Controller. None are compensated for their time and service.
- Several PFMC and PGC directors have ties to City government, limiting the independence of the board.
- An incomplete board committee structure where only one committee, the PFMC Audit and Finance Committee, is active and guided by a documented committee charter; the PGC has no committees.

The corporate governance function of publicly held entities is governed by various regulations including SOX and NYSE Corporate Governance Rules. Although these rules only apply to publicly held entities all regulated PA utilities should follow the spirit and intent of these best practices. As such, PGW should streamline its corporate governance structure by:

- Developing a single controlling board of directors: The PFMC and PGC should be combined into a single board with comprehensive clearly defined roles and responsibilities.

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- Appointing a diverse group of directors with relevant technical and business experience.
- Implementing staggered director term length to ensure board continuity and knowledge retention as incumbent directors leave the board.
- Establishing a director compensation policy to reasonably compensate directors for their time and commitment to the board and its committees.
- Appointing a board with a majority of members that are independent from City government and PGW management.
- Creating a board committee structure that includes, at a minimum, Audit, Finance, Governance/Nominating; and Compensation committees each composed of at least three independent directors.

Although changes to PGW's governance structure cannot be directly changed by PGW management, efforts should be made to open discussions between the PFMC, PGC and other necessary city representatives to initiate change. The current corporate governance structure is duplicative, does not follow standard governance practices, and has been highlighted in numerous PUC audit reports as inefficient. Further, budgeted PGC operating expenses averaged \$954,000 for the 2016 and 2017 fiscal years. Eliminating the PGC and establishing a director compensation policy would result in an estimated annual cost savings of approximately \$600,000⁷ for PGW.

Follow-up Recommendation – Encourage the PFMC, PGC, and City Council to make the changes necessary to streamline PGW's corporate governance structure.

⁷ Average budgeted PGC operating expenses from 2016 and 2017 of \$954,000 less director compensation of roughly \$350,000 would result in an annual cost savings of \$604,000.

Finding No. IV-2

Prior Situation – During the 2015 Management Audit the reporting structure of the Internal Audit (IA) Department was unclear and did not ensure audit independence. IA procedure documents and interviewed personnel indicated that the Manager of IA reported to the CFO who then reported to the PFMC Audit Committee. Conversely, the IA charter and PGW management stated that the Manager of IA reported directly to the PFMC Audit Committee with only administrative reporting to the CFO. The Manager of IA attended and provided status updates directly to the PFMC Audit Committee, but executive management from the finance organization were also in attendance and executive sessions between the Audit Committee and the Manager of IA were infrequent.

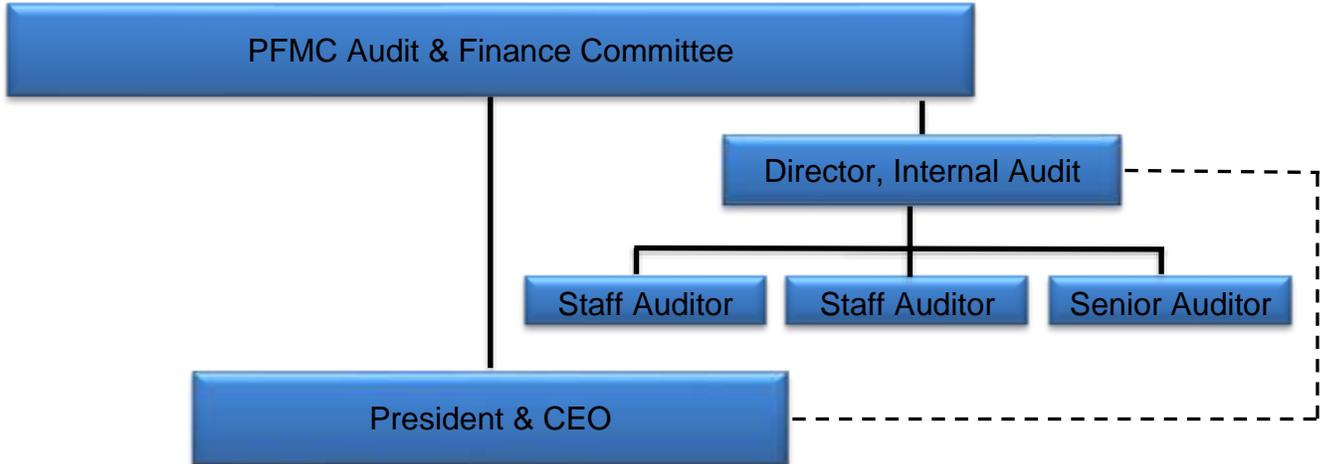
Prior Recommendation IV-3 – Revise the Internal Auditing Department reporting structure so that the Manager of Internal Audit reports directly to the PFMC Board's Audit Committee and no longer administratively to the CFO.

Follow-up Finding and Conclusion – **The Director of Internal Audits reports directly to the PFMC Audit Committee and administratively to the CEO.**

Current Review – During 2016 PGW reorganized IA's reporting structure, as presented in Exhibit IV-1, by moving administrative reporting for the Director of IA⁸ to the CEO. The revised reporting structure is reflected in the IA charter and was confirmed by PGW management and the Director of IA. See Finding No. V-4 for additional information related to PGW's IA function. As a best practice, the head of IA should report functionally to the Audit Committee and administratively to the CEO or a member of senior management not directly responsible for activities reviewed by IA. By revising the reporting structure for the Director of IA, the independence and objectivity of PGW's IA function has been strengthened.

⁸ Previously this position was titled, Manager, Internal Audit as referenced in the Prior Situation and Prior Recommendation.

**Exhibit IV-1
Philadelphia Gas Works
Internal Audit Department Reporting Structure
As of December 2017**



Source: Data Request CG-5 and Interview Request FM-3

Follow-up Recommendation – None

Finding No. IV-3

Additional Finding and Conclusion – Requiring city residency as a condition of employment is hindering PGW’s ability to attract and retain employees for management level positions.

Current Review – As highlighted in the 2015 Management Audit and discussed in Finding No. III-3, PGW has an aging workforce with a high number of employees who are currently, or soon eligible to retire. From 2013 through 2017, about 25% of PGW’s workforce retired and an additional 22.5% are eligible, or will be eligible, to retire by 2018. From 2019 through 2023, an additional 11.8% will become eligible to retire. Focusing specifically on PGW’s non-union workforce, which would include management employees, reveals that 28.1% are eligible to retire and an additional 16.2% will become eligible to retire from 2019 through 2023.

PGW’s Human Resources Department indicated that PGW struggles to attract and retain qualified candidates in mid- and senior-level management positions. While steps taken by PGW to increase and realign non-union compensation levels with market levels has helped, the City of Philadelphia’s residency requirement is purportedly an obstacle in attracting, hiring, and retaining management level candidates. The residency requirement mandates all PGW employees to live within the City of Philadelphia as a condition of employment. New employees have 12 months from date of hire to relocate within the city if they do not already reside there.

Although it is common for cities to impose residency requirements as a condition of employment, many cities have eliminated or relaxed their residency requirements for high level or specialized positions. For instance, Philadelphia eliminated the residency requirement for policemen and firemen with five or more years of experience in 2010 and 2015, respectively. Unlike most municipal services, PGW, as a natural gas utility, operates in the competitive, investor owned and highly specialized environment. As a result, PGW faces competition for qualified candidates from entities not bound by a residency requirement. There are several other investor owned utilities, pipeline, and construction companies within the Philadelphia region that compete for the same talent. This competition can mean PGW may lose its employees to one of these competitors that it spent valuable resources hiring and training. While residency requirements may not be the only cause for talent loss, it is an extra condition not found within similar positions in the market.

Having the ability to quickly attract, hire, and retain top talent is essential to avoid operational disruptions and remain competitive within the natural gas industry. Providing a diverse candidate pool is essential to fill key or high-level management positions. In addition, given the number of potential retirements, PGW will likely need new and experienced talent to maintain its operations. An inability to attract or retain experienced employees could lead to safety or operational risks particularly when responding to emergencies and dealing with a product like natural gas. Although the residency requirement for PGW employees is a requirement of the City and outside of PGW’s direct control, PGW management should work with the PFMC, the PGC, and City representatives to eliminate or relax the residency requirement to allow talent to be

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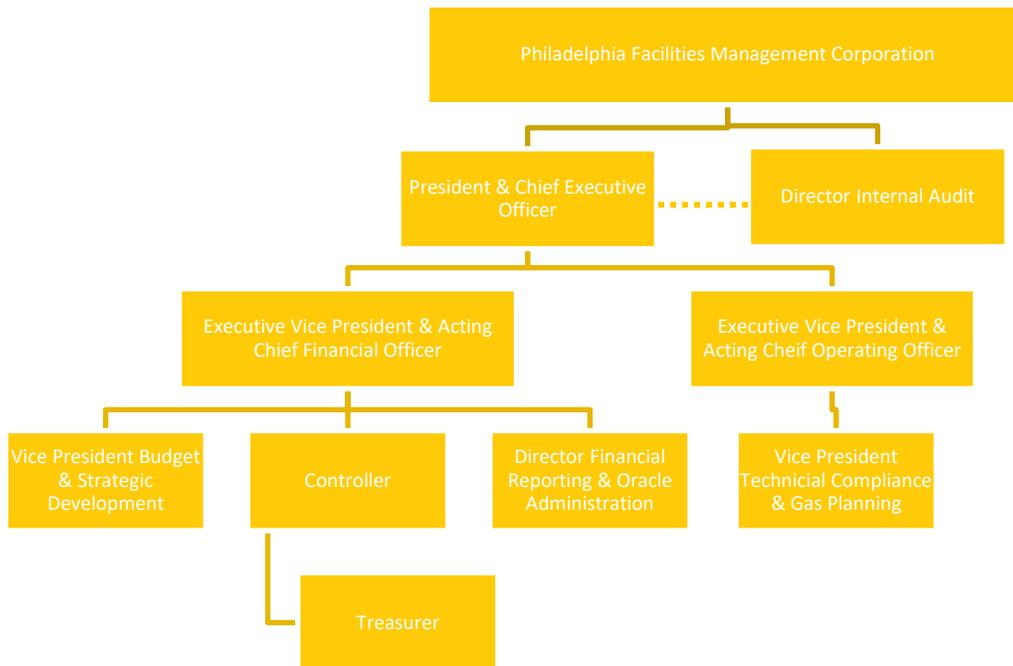
pulled from a wider area. In the interim, PGW should work to mitigate the adverse effect the residency requirement is having on the company by focusing on factors it controls. Such items may include relocation assistance programs; tracking employee data from exit interviews and retention interviews, including items related to their attitude toward the residency requirement/social and economic conditions related to residency; and an increased focus on staffing planning, hiring in advance of upcoming retirements, etc.

Additional Recommendation – Explore ways to mitigate or eliminate PGW employment residency requirements.

V. FINANCIAL MANAGEMENT

Background – PGW’s financial management organization is responsible for budgeting and strategic development, financial reporting, accounting, and treasury functions. The financial management organization is led by PGW’s executive vice president and CFO. As shown in Exhibit V-1, the CFO’s direct reports include the vice president of budget and strategic development, the controller, and the director of financial reporting and Oracle administration. Generally, the issues identified in the 2015 management audit were tied to PGW’s accounting department, which is managed by PGW’s director of financial reporting and Oracle administration. However, two of the prior issues relate to departments outside of the CFO’s reporting structure, including PGW’s internal audit department and technical compliance and gas planning department. To maintain independence, the director of internal audit reports directly to the audit committee of the Philadelphia Facilities Management Corporation and reports indirectly to PGW’s president and chief operating officer. Whereas, the technical compliance and gas planning department reports to PGW’s executive vice president and acting chief operating officer.

**Exhibit V-1
Philadelphia Gas Works
Financial Management Organization[^]
As of January 18, 2018**



The dotted line represents the indirect reporting relationship from internal audit to the president and CEO
[^] The above exhibit also includes a portion of the acting chief operating officers’ reporting structure which is related to the financial management-based issue identified in the 2015 management audit
 Source: Data Request EM-1

In this chapter, five prior recommendations and prior situations are reviewed, and five follow-up findings and three recommendations are presented. The findings primarily relate to PGW's accounting department's unresolved bank account reconciliation items, recording process for retired assets, and unitizing previously unclassified assets. This chapter's findings also include review of PGW's internal audit department expenditures and obligations, as well as a review of PGW's technical compliance and gas planning department's assignment of carrying costs associated with interruptible LNG sales and development of a pricing mechanism for potential firm LNG sales. In addition, two financial management recommendations were not investigated due to their minor nature and overall low impact to the company.

Finding No. V-1

Prior Situation – At the time of the 2015 management audit, PGW's bank reconciliations were prepared by the Financial Reporting and Reconciliation section (FRR) of the accounting department. PGW maintained 14 active bank accounts which were due to be reconciled within 45 days of month end. Any issues discovered through the bank account reconciliation process were to be documented, however, such issues were not required to be resolved on an ongoing and timely basis. As of August 31, 2014, one PGW bank account had not been fully reconciled since September 2012. Further review revealed this bank account was handled by several areas and personnel at PGW, and included transactions generated from District Office activities (e.g., the collection of customer payments).

Prior Recommendation V-1 – Adjust the bank reconciliation process so that reconciling items are cleared in a timely manner.

Follow-up Finding and Conclusion – **Unresolved reconciliation items continue to remain outstanding for extensive periods.**

Current Review – In 2015, PGW conducted a Six Sigma Project reviewing its reconciliation processes. PGW determined that separation of its Mail Receipts, District Office, and Treasury bank account would streamline the reconciliation and research process. The original account was separated by removing all District Office bank transactions into separate bank accounts for each of the six District Offices. The change resulted in fewer unreconciled items for each of the seven accounts, removing one phase of the research process. However, PGW has not changed or streamlined its practices for addressing unresolved reconciliation items since the 2015 Management Audit.

Consistent with the practices in place during the prior audit, PGW continues to conduct bi-weekly meetings between Treasury and FRR to investigate unresolved reconciliations. Additionally, any write-offs must be approved by PGW's Chief Financial Officer (CFO), where the CFO may suspend the proposed write-off for additional investigation into the unresolved items. PGW requires extensive research and explanations prior to approval of any write-offs for its unresolved bank reconciliation items because of the impact to its cash account.

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Meanwhile, PGW's reconciliation procedures have not been updated to reflect the changes to the reconciliation process for the separate District Office bank accounts. Further, the procedures do not detail the ongoing research process for PGW's unresolved reconciliation items, nor establish a timeline to ensure the timely resolution of outstanding items. Most unresolved reconciliation items result from suspended items (unapplied funds), errors and unrecorded fees or payments, and are comprised of numerous transactions. The totals of these unresolved items which may result in an overall excess or negative balance for PGW are presented in Exhibit V-2 in aggregate for Fiscal Years 2014 through 2017.

Exhibit V-2
Philadelphia Gas Works
Unresolved Reconciliation Items
September 1, 2013 through August 31, 2017

Fiscal Year	Total Value
2014	\$19,483
2015	(\$8,176)
2016	\$52,871
2017	(\$159,613)

Source: Data Request FM-2

As demonstrated by Exhibit V-2, PGW has not established an effective process requiring the timely clearance of unresolved reconciliation items. The Association for Financial Professionals' report on best practices for bank account reconciliation⁹ highlights the importance of immediately researching any discrepancies; aligning of bank account structures, enhancing controls, employing automated resources, and establishing daily account reconciliations so exceptions can be immediately redressed. Fundamentally, best practices for bank account reconciliations stress resolving discrepancies in a timely manner because the longer the account remains out of balance, the less likely it can be resolved. Nevertheless, PGW's unresolved reconciliation items can remain outstanding for periods greater than five fiscal years¹⁰. While the cumulative value of unresolved items is immaterial¹¹, discrepancies should not be permitted to remain outstanding for such an extended timeframe.

Follow-up Recommendation – Explore the use of automated daily bank account reconciliation and establish parameters to ensure the timely clearing of unresolved reconciliation items.

⁹ "Bank Account Reconciliation Best Practices" was published in August 2014 by the Association for Financial Professionals, <https://www.afponline.org/publications-data-tools/reports/guides/treasury-in-practice/Detail/reconciliation/>

¹⁰ PGW's fiscal year begins September 1 of the preceding year and ends August 31st of the year (e.g., fiscal year 2017 began September 1, 2016 and ended August 31, 2017).

¹¹ The five-year cumulative total differences comprise 0.69% of the value of PGW's August 2017 bank balances.

Finding No. V-2

Prior Situation – At the time of the 2015 Management Audit, PGW did not have a sound process in place for matching new capital replacement assets with the corresponding retired asset. The forms used by PGW to record new asset additions did not include a place to identify the retiring asset. Without that information, PGW’s Accounting department could not identify and remove PGW’s retired assets from its records. Thus, PGW’s total capital asset account balance was overstated. PGW planned to conduct a study in 2015 to identify retired assets that were still recorded.

Prior Recommendation V-3 – Develop a systematic plan and process to review fixed assets across PGW and determine which recorded assets are no longer in service and need to be removed from the records.

Follow-up Finding and Conclusion – PGW has implemented reasonable measures to ensure accurate recording of retired assets.

Current Review – A utility’s total capital asset account balances should accurately reflect the utility’s true capital assets. In 2014, PGW began reviewing its accounting records to identify retired assets that were still recorded as being in service. PGW’s Accounting department has continued to conduct these reviews on an ongoing, periodic basis. Other PGW departments (i.e., Fleet, Field Operations, etc.) are contacted by Accounting to review asset lists to identify any unrecorded retired assets. As such, Accounting maintains a log capturing total retired assets identified and appropriately recorded. Exhibit V-3 reflects the retirement activity captured between fiscal years 2015 and 2017.

Exhibit V-3
Philadelphia Gas Works
Total Retired Capitalized Assets
September 1, 2014 through August 31, 2017

Fiscal Year	Capitalized Total
2015	\$4,040,383
2016	\$5,903,157
2017	\$5,480,428

Source: Data Request FM-8

PGW’s capital asset retirement procedures include a step-by-step walkthrough of the retirement process and directives for asset retirements. Typically, retirements are identified via PGW’s Capital Work Order form where the project work description indicates the replacement of assets (i.e., number of feet of pipe to be replaced). In cases where the work description is unclear, Accounting contacts the submitting department for clarification to ensure the proper recording and/or retirement of the assets. Thus, PGW has established the required procedures and necessary

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communication related to retirement of its capital assets to reduce the risk of overstatement of capital asset account balances.

Follow-up Recommendation – None

Finding No. V-3

Prior Situation – PGW’s total unclassified in-service plant assets increased from 14% to 18% between 2010 and 2014. A review of the unclassified in-service plant asset account reflected that the unclassified projects were the same projects, year after year, with differences attributed to the addition of new unclassified projects. In January 2015, PGW planned to conduct an analysis of its unclassified fixed assets account and implement additional procedures to reduce the balance of its unclassified fixed asset account.

Prior Recommendation V-4 – Develop a systematic plan and process to review unclassified assets with the end goal of classifying those assets to the proper account.

Follow-up Finding and Conclusion – PGW has implemented processes aimed at unitizing unclassified utility plant in-service assets; however, unclassified utility plant in-service balances continue to increase.

Current Review – In 2014, PGW established an ongoing process aimed at classifying older plant assets and ensuring proper classification of newly completed projects. PGW’s Accounting department periodically reviews older plant assets that are not properly classified and maintains this information within a data log. The log includes assets placed into service as early as October 1987 and as recently as August 31, 2017 that were reclassified from unclassified to their proper category. Approximately half the total current cost of the reclassified assets was attributed to the in-service mains category.

In addition, Accounting is responsible for following up with the originating department on new projects to determine the proper classification of the plant assets if classification is unknown. Further, upon completion of a capital project, unitized plant assets are assigned the specific PUC category for proper classification. Best practices for utilities include the proper classification of plant fixed assets. FERC Account 106 “Completed construction not classified – Gas” is defined by the Code of Federal Regulations Title 18 chapter I, Part 201, Uniform System of Accounts Prescribed for Natural Gas Companies Subject to the Provisions of the Natural Gas Act, as including:

... the total of the balances of work orders for gas plant which have been completed and placed in service, but which work orders have not been classified for transfer to the detailed gas plant accounts.

Thus, PGW’s Account 106 is used to capture unclassified plant assets. As demonstrated in Exhibit V-4, PGW’s unclassified plant assets have continued to increase.

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**Exhibit V-4
Philadelphia Gas Works
FERC Account 106 Balances
For the years ended December 31, 2011 through 2016**

Year	Ending Balance	Increase	Percentage over prior year ending balance
2011	\$301,251,672	\$38,034,755	14%
2012	\$318,333,321	\$17,081,649	6%
2013	\$358,935,117	\$40,601,796	13%
2014	\$373,075,623	\$14,140,506	4%
2015	\$407,933,560	\$34,857,937	9%
2016	\$437,109,752	\$29,176,192	7%

Source: PGW's 2011-2016 PUC Annual Reports

In addition to the total unclassified balance growing, the ratio of unclassified to classified plant assets grew from 19% to 25% from 2011 to 2016. While PGW has taken measures to ensure the proper classification of plant assets, its actions have not resulted in a reduction in its unclassified plant asset balances.

PGW's asset classification policies and procedures focused on procedural directives for asset reclassification within the accounting information system. However, those procedures did not include any narrative governing the process for reviewing assets for unitization from unclassified to classified. Moreover, PGW's procedures did not address the periodic review of its existing unclassified in-service plant assets. While it is notable that PGW reviews older unclassified or incorrectly classified assets, the PUC audit staff suggests PGW's focus should be on ensuring new assets are classified correctly before addressing older assets. Therefore, a review of completed work order approval forms showed most of the costs assigned to Account 106 resulted from main replacement projects. Thus, PGW should conduct a review of its classification processes specific to main replacement to reduce utilization of the unclassified utility plant in-service account moving forward. Once PGW reduces new assets placed into Account 106, it can then focus on older unclassified assets.

Follow-up Recommendation – Review and document processes related to the unitization of unclassified utility plant in-service assets and strive to reduce usage of the unclassified utility plant in-service account.

Finding No. V-4

Prior Situation – In 2014, PGW’s internal audit department consisted of one FTE which was insufficient to meet the company’s internal audit needs, as such, PGW relied on an outside contractor for a significant level of support. However, the costs related to use of the outside contractor were high, the cost of 2,000 audit hours with the outside contractor was \$400,000. PGW stated that its reliance on the outside contractor was a short-term solution to meet its internal audit obligations and intended to reduce its reliance on the firm by increasing its internal staff.

Prior Recommendation V-5 – Explore alternatives for fulfilling internal audit requirements.

Follow-up Finding and Conclusion – PGW has added staff to its Internal Audit Department and significantly reduced its costs for outsourced internal auditing services.

Current Review – PGW’s IA department is currently comprised of the Director IA¹², one senior auditor, and two staff auditors. In addition, for a variety of reasons, PGW sought to replace its external auditor in mid-2016. After issuing an RFP, PGW successfully engaged an external auditing firm to augment internal resources by providing audit planning, quality assurance, and reporting services with the majority of audit fieldwork performed by PGW’s IA department.

Exhibit V-5 illustrates the impact of the staffing changes in PGW’s IA department expenditures during fiscal years 2015, 2016, and 2017. PGW’s overall spending for the IA department has decreased by 40%, with costs for outsourced services decreasing from \$670,933 to \$98,914. Therefore, the PUC auditors estimate that PGW has achieved annual savings of approximately \$570,000 for outside services. A portion of the outsource services costs were reduced as PGW’s IA department staff transitioned from temporary to full-time status.¹³ PGW plans to continue utilizing its current mix of internal staff and leveraging the external auditor moving forward. The PUC auditors calculated the overall annual savings at approximately \$215,000, based upon PGW’s fully loaded labor costs.¹⁴ However, due to additional supporting information provided by PGW, the PUC auditors note that the calculated annual savings is potentially understated.¹⁵

¹² See Finding No. IV-2 for additional details related to the reporting structure of the Director of Internal Audit in Chapter IV – Corporate Governance.

¹³ PGW’s costs for temporary staff is captured as purchased services. Once hired as full-time employees, the costs associated with the employees became reflected as labor.

¹⁴ Fully loaded labor costs include benefits, insurance, and payroll taxes. These costs were projected at a rate of 90.88% of total employee salary for PGW’s 2017 fiscal year and applied to both FY 2015 and FY 2017 to derive the projected annual savings.

¹⁵ PGW’s IA Department’s salary expense totals were reported between 7% to 12% lower than the labor expenditure totals reflected in Exhibit V-4.

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**Exhibit V-5
Philadelphia Gas Works
Internal Audit Department Expenditures
Fiscal Years 2015 to 2017**



Note: Labor costs and Total Costs include salary only and do not include fully loaded employee costs.
Source: Data Request FM-5

Follow-up Recommendation – None

Finding No. V-5

Prior Situation – At the time of the 2015 management audit, the carrying costs for PGW’s Liquefied Natural Gas (LNG) inventory were not being assigned to PGW’s LNG sales. PGW’s LNG supplies were held in advance of sale to customers; however, the carrying costs associated with the advance outlay of funds were not flowing through to LNG sales. PGW’s LNG sales include Weighted Average Cost of Gas (WACOG) or the Sales Service Charges, but neither charge included the carrying costs associated with the LNG inventory.

Prior Recommendation VII-2 – Develop a mechanism for accounting for the carrying charges in the LNG sales pricing.

Follow-up Finding and Conclusion – PGW is developing a mechanism, including carrying costs, for the potential introduction of firm LNG sales pricing.

Current Review – PGW’s LNG sales pricing includes three components: the LNG weighted average cost of gas, a sales service charge, and an individually negotiated profit margin. The WACOG and sales service charge components of PGW’s LNG sales are credited to PGW’s default generation supply customers through its Gas Cost Rate filing. The profit margin generated from the LNG sales is reported on PGW’s Income Statement as “Other Revenue”. Carrying costs for LNG storage and production are captured within the LNG WACOG component of LNG sales pricing. However, as LNG sales are interruptible, certain carrying costs (i.e., cost of capital) are excluded from the current price structure for LNG sales. PGW applies the cost of capital and other related carrying costs only to firm customers. PGW maintains that due to the nature of interruptible sales, LNG sale activities are limited to amounts in excess of firm customer demand. Thus, regardless of the level of potential LNG sales, the outlay of capital is required to safeguard firm customer supply and is therefore borne by firm customers.

Certain events (i.e., weather, pricing, availability, etc.) and system constraints (i.e., limited capacity, ability to liquify and vaporize gas, etc.) impact the availability of PGW’s LNG sales. For example, in early 2015, PGW’s LNG sales were interrupted due to the increased demands created by the “Polar Vortex”. Due to the interruption in services and other factors, PGW’s LNG sales volume¹⁶ decreased from 498,551 to 6,673 Mcf from 2015 to 2017. As such, PGW is exploring the feasibility of expanding its LNG facilities to accommodate firm LNG customers through a resultant increase in LNG output. As part of that initiative, the company is developing an appropriate pricing mechanism for potential new firm LNG rate customers.

PGW’s LNG sales volume is low, rendering the default service customers’ outlay for capital costs immaterial in 2016 and 2017. In addition, PGW utilizes a cash-based budget indicating that revenue earned from LNG sales through the negotiated profit margin may benefit the base rate customer¹⁷. However, in the future, should PGW’s interruptible LNG sales volume increase or expand to firm customers, PGW could risk

¹⁶ Natural gas sales volume is measured per thousand cubic feet (Mcf).

¹⁷ It is important to note that the base rate customer and default service customer are not always the same and differences can occur due to natural gas shopping.

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material cross-subsidization of LNG sales if not priced correctly. Moreover, the nature of LNG requires gas to be purchased and stored before it is used, at times for months. Therefore, it is imperative that pricing account for all applicable costs for both interruptible and firm LNG customers. PGW should implement measures to safeguard against the potential risk of subsidization of LNG sales by analyzing all excluded carrying costs of the potential LNG sales with the total value of each individually priced profit margin. As stated earlier, the company has already started to explore this pricing mechanism for potential firm LNG customers. If this analysis indicates the cost of capital for LNG is material, PGW should adjust its profit margin or sales service charge for interruptible LNG customers.

Follow-up Recommendation – Ensure LNG revenue covers all costs associated with LNG sales.

VI. GAS OPERATIONS

Background – The Field Operations organization is responsible for the operation and maintenance of PGW’s gas distribution system. As of the conclusion of field work in March 2018, the Field Operations organization consisted of two departments: Field Services & Maintenance and Engineering Design, Construction & Planning. The Field Services & Maintenance department is responsible for field operations, maintenance, leak response and repair, pressure control, meter shop, and other related functions. The Engineering Design, Construction & Planning group consisting of engineers, drafters, technicians, and plotters is responsible for preparing drawings, updating maps, maintaining the network model, and other related functions. This group also consists of the construction organization which is responsible for main and service replacement, contractor management, etc.

In this chapter, eleven prior recommendations and prior situations are reviewed, and eleven follow-up findings and seven recommendations are presented. The findings primarily relate to GIS data migration, DIMP, main replacement, open leak reduction, Main Replacement Program validation, system model design criteria, financial controls for qualified contractors, gas supply assets, and corrosion work order database integration. In addition, one gas operations recommendation was not investigated due to its minor nature and overall low impact to the company.

Finding No. VI-1

Prior Situation – PGW maintained asset records (i.e., mains, services, valves, meters, etc.) in multiple databases which required reconciling multiple systems, causing potential inaccuracies in data and reporting. PGW recognized the need for a geospatial database and in 2015, had initiated the transfer of its asset data into an Environmental Systems Research Institute (ESRI) GIS (geographic information system) database. The company also had plans to move leak data and main drawings into the ESRI GIS database. However, work orders generated in AIMS (Automated Information Management System) were not linked to the GIS database.

Prior Recommendation VII-5 – Migrate all asset data into a single geospatial database.

Follow-up Finding and Conclusion – PGW hired a contractor to perform GIS data migration with a project completion date of April 2018.

Current Review – PGW hired a contractor in April 2017 for a yearlong project to migrate all asset data into ESRI GIS including mains, services, meters, cathodic protection, pressure force, regulator stations, valves, etc. The contractor worked on five delivery areas within PGW’s service territory with two areas completed in December 2017 and the remaining three expected to be completed in early 2018. The expected completion date for the overall project is anticipated in April 2018. The project includes migrating the following:

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- Importing all main data;
- Importing all network point features, annotation, and dimensions from AutoCAD drawings;
- Capturing pressure force system data from detailed main maps (DMM);
- Capturing cathodic protection system data and information from general main maps (GMM); and
- Geocoding meter data from the Oracle database and capturing services with references to house or curb lines.

As part of the project, PGW plans to update its *Utility and Pipeline Data Model (UPDM)*, which is a pre-configured geodatabase for GIS. It is a data model template that represents each physical component of the gas infrastructure network in a single database table. The *UPDM* data model enhancement will include an update to several asset classes such as: pipes (mains and services), cathodic protection systems, fittings, gas devices and facilities, gas structures, regulator stations, etc.

Leak data will continue to be maintained in AIMS, although PGW indicated plans to create a link between AIMS and GIS to view leak information geospatially. Although most of the data will exist in AIMS, spatial representations of these features will be displayed in GIS. Using relationship classes in an enterprise geodatabase, PGW will be able to link each unique asset to its corresponding record in AIMS and display the information via pop-up windows in web maps and applications. After the project is complete in April 2018, PGW expects its assets to be maintained in the primary/secondary databases shown in Exhibit VI-1.

Exhibit VI-1 Philadelphia Gas Works Asset Databases April 2018

Assets	Primary Database	Secondary Database
Mains	ESRI GIS	ArcGIS for AutoCAD
Services	ESRI GIS	AIMS
Pressure Force Structures	ESRI GIS	AIMS
Corrosion Structures	ESRI GIS	Will be migrated to AIMS
Drawings	Spatially in ESRI GIS	Backend Info in AIMS
Work Orders	AIMS	Spatially in ESRI GIS
Schedules	AIMS	-
Repair Records	AIMS	Spatially in ESRI GIS
Leak Data	AIMS	Spatially in ESRI GIS

Source: Data Request GO-34

The link between AIMS and GIS will be completed after the *UPDM* model enhancement is performed and the assets have been successfully migrated into GIS. Having assets and related data in a single GIS database would enhance PGW's ability to efficiently plan and schedule work. Furthermore, linking work orders generated in

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AIMS to the GIS database would effectuate automation and eliminate the manual work needed to maintain multiple databases.

Follow-up Recommendation – Continue the GIS data migration and create a visual representation of key assets and data.

Finding No. VI-2

Prior Situation – A Distribution Integrity Management Program (DIMP) audit conducted by the PUC’s Gas Safety Division in December 2012 found several unsatisfactory aspects of the plan which were not addressed by PGW’s DIMP review committee until 17 months later. The results showed that six of the 42 questions received an unsatisfactory rating from the Pipeline and Hazardous Materials Safety Administration (PHMSA) certified inspector. All unsatisfactory elements of the DIMP were assigned to specified employees for completion; however, implementation timelines were not established. It was also determined that reviews would be conducted annually not to exceed 15 months, and that a full plan review would be conducted every three years, but no follow-up meeting had been scheduled.

Prior Recommendation VII-6 – Take corrective action to timely address the noted deficiencies in the portions of the DIMP that were deemed unsatisfactory.

Follow-up Finding and Conclusion – PGW created a new DIMP in 2015.

Current Review – PGW’s DIMP review committee meets annually and last convened in March 2017. The DIMP review committee consists of seven members including four subject matter experts. The agenda for the March 2017 meeting reviewed several items including the threat identification table, current relative risk ranking model being utilized, top ten ranked risks, etc.

PHMSA integrity management regulations require natural gas distribution companies to develop, write, and implement an integrity management program with the following elements:

- Knowledge – an operator must demonstrate an understanding of its system;
- Identify threats – an operator must consider several categories of threats;
- Evaluate and rank risk – an operator must evaluate and rank the risks associated with its distribution pipeline;
- Identify and implement measures designed to reduce the risks from failure of its gas pipeline;
- Measure performance, monitor results, and evaluate effectiveness – develop and monitor performance measures from an established baseline to evaluate the effectiveness of its integrity management program;
- Periodic evaluation and improvement – an operator must re-evaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas; and
- Report results – report, on an annual basis, performance results to PHMSA and, where applicable, also to state regulators.

PGW created a new plan in late 2015. The new DIMP was audited by PUC’s Gas Safety Division in February 2016 and again in June 2017. The DIMP included all elements required by the integrity management regulations. Although the PUC’s Gas Safety Division made a few recommendations to improve PGW’s DIMP, no compliance issues were identified. By creating and maintaining a DIMP, PGW is complying with the

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federal regulations at 49 CFR Part 192, Subpart P – Gas Distribution Pipeline Integrity Management, specifically § 192.1007 which identify the requirements of a DIMP plan.

Follow-up Recommendation – None

Finding No. VI-3

Prior Situation – Despite replacing nearly 80 miles of cast iron main from 2010 to 2013, the number of cast iron main leaks and leaks per mile for cast iron had increased. PGW had a higher leak per mile rate for cast iron pipe than its peers. Its aging cast iron infrastructure was the primary source of main leaks.

None of the benchmarking studies conducted by PGW or its consultants recommended establishing goals for system improvement in leaks per mile. A goal for system improvement needed to be established in terms of reducing the number of leaks per mile. Service leaks trended downward over the 2009-2014 timeframe. Bare steel services accounted for about 80% of the service leaks. PGW replaced approximately 12,500 bare steel services from 2010 to 2014. PGW was replacing bare steel services whenever they were encountered during main replacement, leak repair or excavation which was having a positive impact on reducing leaks and eliminating bare steel services.

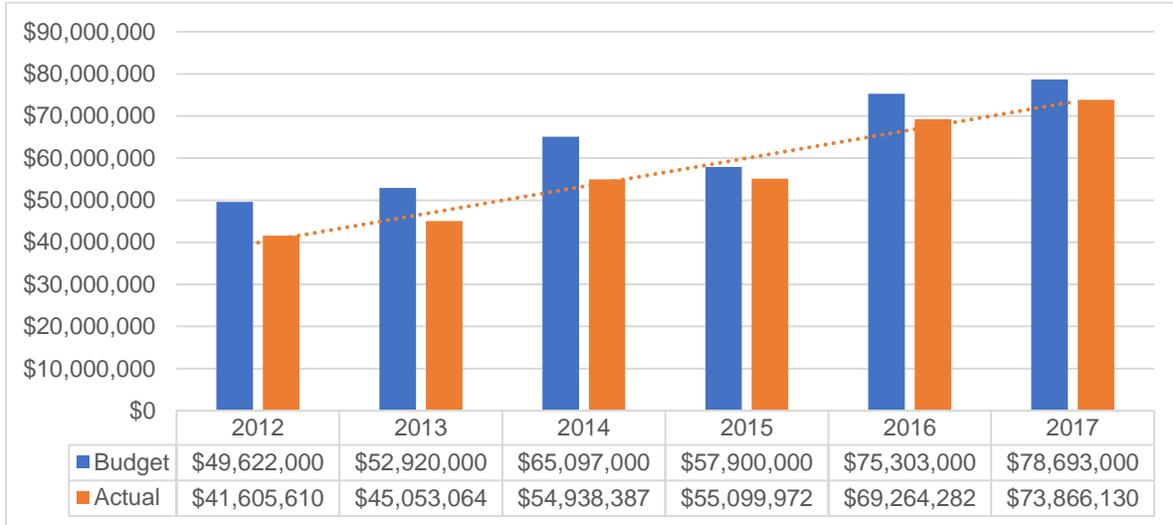
Prior Recommendation VII-7 – Aggressively accelerate the replacement of high risk mains, specifically cast iron mains.

Follow-up Finding and Conclusion – PGW has accelerated its cast iron main replacement.

Current Review – In its Long-Term Infrastructure Improvement Plan (LTIIP) filed in 2012 for fiscal years 2013-2017, PGW planned to eliminate all cast iron pipe in 88 years. In 2017, the company filed its second LTIIP for fiscal years 2018-2022 whereby it indicated plans to retire all cast iron mains within 45 years. PGW started replacing its cast iron mains more aggressively and is on pace to replace all its cast iron main in approximately 43 years - a significant improvement from the initial 88-year replacement rate. Dollars projected and spent on main and service replacement has increased since 2012 as illustrated in Exhibit VI-2.

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**Exhibit VI-2
Philadelphia Gas Works
Main & Service Replacement Expenditures
September 1, 2011 through August 31, 2017**



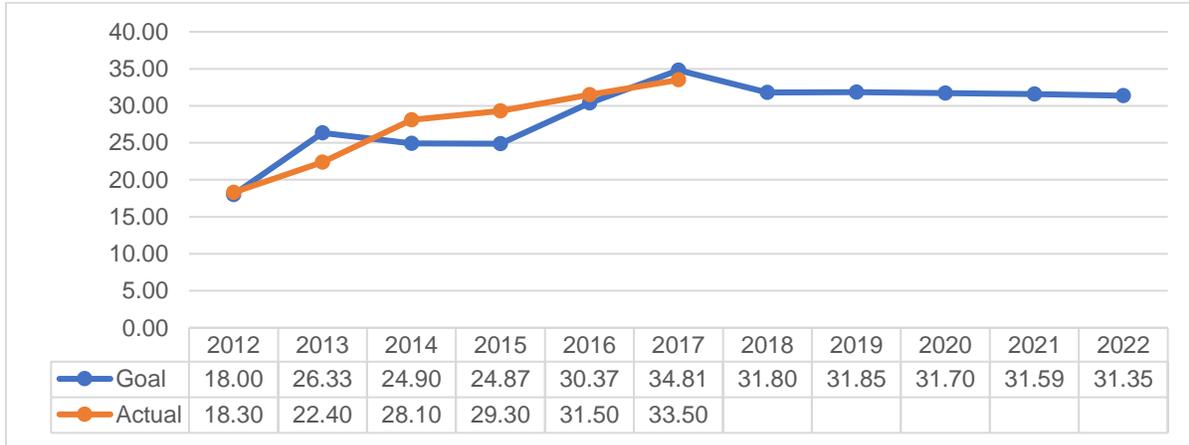
Source: Data Request GO-5

Exhibit VI-3 shows the miles of cast iron main projected to be replaced from 2012 through 2022, and the actual miles of main replaced for fiscal years 2012 through 2017. As evident from the exhibit, PGW increased its cast iron main replacement by about 50% from 2013 to 2017. The expanded main replacement is, at least, partially attributed to the company’s increased Distribution System Improvement Charge (DSIC) cap approved by the Commission in January 2016. The increased cap that represents 7.5% (up from 5%) of its annual distribution revenues and equates to about \$33 million annually.¹⁸ PGW plans to continue to use its DSIC mechanism to recover costs in excess of its baseline program.

¹⁸ On September 1, 2015, PGW filed a petition to increase the DSIC cap from 5.0% to 7.5%. On January 28, 2016, at Docket P-2015-2501500, the Commission authorized PGW to increase its DSIC cap to 7.5% of distribution revenues.

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**Exhibit VI-3
Philadelphia Gas Works
Miles of Main Replaced (Projected and Actual)
September 1, 2011 through August 31, 2022**



Source: Data Request GO-8 and GO-9

Exhibit VI-4 demonstrates PGW’s cast iron main replacement expenditure goals for fiscal years 2018 through 2022. With an additional \$33 million in revenue available through the DSIC mechanism, PGW can accelerate its baseline cast iron main replacement from 18 miles annually to about 32 miles. In addition to the 8” and smaller low and intermediate pressure cast iron mains replaced through the baseline program, the accelerated program places priority on low and high pressure 12” and larger cast iron mains. The company also plans to replace the unprotected bare and unprotected coated steel services and meter sets associated with these cast iron mains.

**Exhibit VI-4
Philadelphia Gas Works
Main Replacement Expenditures (Projected)
September 1, 2017 through August 31, 2022**

Mains	2018	2019	2020	2021	2022
Current Baseline Program					
8" and smaller LP/IP	\$21,003,840	\$21,384,000	\$21,859,200	\$22,239,360	\$22,714,560
Accelerated Program - DSIC					
8" and smaller LP/IP	\$8,168,160	\$8,316,000	\$8,500,800	\$8,648,640	\$8,833,440
12" and larger LP	\$4,456,320	\$4,760,870	\$5,188,681	\$5,026,051	\$4,657,922
12" and larger HP	\$20,446,800	\$20,249,856	\$19,575,227	\$19,653,148	\$20,289,108
Abandonment	\$0	\$0	\$0	\$0	\$0
Accelerated Totals	\$33,071,280	\$33,326,726	\$33,264,708	\$33,327,839	\$33,780,470
Yearly Totals	\$54,075,120	\$54,710,726	\$55,123,908	\$55,567,199	\$56,495,030

Source: Data Request GO-6

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Exhibit VI-5 displays leak information for the years 2012 through 2017. The number of cast iron main breaks, service leaks and hazardous leaks on mains and services have decreased significantly since 2014. Since 2014, PGW has reduced its cast iron main breaks by almost 50% and its hazardous leaks on mains and services by 55% and 37% respectively. The company indicated that the increase in main leaks from 2,948 in 2016 to 3,136 in 2017 was primarily due to repairing its backlogged leak inventory (refer to Finding No. VI-4). A reduction in leaks can validate the efficacy of the company’s main replacement efforts although other conditions that can impact the number of leaks on a system including weather, system usage, etc.

**Exhibit VI-5
Philadelphia Gas Works
Number of Leaks
January 1, 2012 through December 31, 2017**

	2012	2013	2014	2015	2016	2017	% Change since 2014
Cast Iron Main Breaks	164	298	533	512	232	269	-49.5%
Hazardous Leaks on Mains	1,186	1,072	1,542	1,169	749	694	-55.0%
Total Main Leaks	2,294	2,703	3,460	3,077	2,948	3,136	-9.4%
Hazardous Leaks on Services	2,427	2,050	1,906	1,531	1,371	1,206	-36.7%
Total Service Leaks	3,170	3,713	3,682	3,267	3,022	2,838	-22.9%

Note: Hazardous Leaks and Cast Iron Breaks are subsets of Total Leaks.
Source: Data Request GO-7 and GO-22

In its November 2011 Order (Docket No. M-2011-2271982), the Commission encouraged the industry as a whole to accelerate main replacement efforts, particularly cast iron and bare steel. By reducing cast iron mains more aggressively, PGW is reducing the likelihood of catastrophic failure due to the presence of old, “risky” pipe in its distribution system. The current reduction in leaks can be, at least partially, attributed to this acceleration. Nonetheless, PGW still has approximately 1,375 miles of cast iron and 481 miles of unprotected steel pipe to replace. This pipe will need to be replaced to maintain a safe and reliable system. Therefore, PGW must continue to aggressively replace “risky” pipe.

Follow-up Recommendation – Continue to aggressively replace cast iron main and all risky pipe.

Finding No. VI-4

Prior Situation – In 2014, PGW maintained a high number of open leaks that led to excessive field review for duplication. The company carried between 2,800 and 3,200 open or backlogged leaks at any time and did not appear to have the resources to reduce that number. PGW had more open leaks per mile than most similar gas utilities. Furthermore, taking frequency of inspection into consideration, the open leaks on a recheck schedule annualized to over 9,500 rechecks per year or over 40 per day in a five-day work week. Schumaker recommended PGW reduce its average number of leaks to a maximum of 1,500. To achieve this, PGW needed to increase the resources applied to leak repair by working overtime, using contractors or temporary employees, or a combination of both.

Prior Recommendation VII-9 – Reduce the number of open leaks by outsourcing the excavation work and using PGW crews to make repairs.

Follow-up Finding and Conclusion – PGW has made reductions to its leak backlog but still carries a high number of open or backlogged leaks.

Current Review – At PGW, leaks are classified into “work immediate” and “safe to hold”. “Work immediate” leaks are repaired as soon as possible. “Safe to hold” leaks are categorized into “work leaks” and “leak rechecks”. All “work leaks” are rechecked, at a minimum, every 15 to 30 days. Based on the reading and location, “leak rechecks” are put in one of three recheck buckets: one, six or twelve months. Leak rechecks have decreased notably since 2014 as shown in Exhibit VI-6. Taking frequency of inspection into consideration, the company had approximately 7,400 leak rechecks in 2014 compared to about 6,000 leak rechecks in 2017.

**Exhibit VI-6
Philadelphia Gas Works
Leak Rechecks
For the Years 2014 and 2017**

Recheck Intervals	2014	2017
30-day leak rechecks	201	194
6-month leak rechecks	2,230	1,667
12-month leak rechecks	507	323
Leak rechecks per year	7,379	5,985

Source: Data Request GO-10, 2015 PGW Management Audit, Auditor Analysis.

As illustrated in Exhibit VI-7, PGW reduced the number of open or backlogged leaks from 3,129 in 2015 to 2,355 in 2017. Open leaks per mile of main have declined from 1.03 in 2015 to 0.77 in 2017. Although it has reduced the number of open or backlogged leaks from 2015 to 2017, PGW still carries a high number of open leaks.

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**Exhibit VI-7
Philadelphia Gas Works
Open Leaks per Mile of Main
January 1, 2012 through December 31, 2017**

	2012	2013	2014	2015	2016	2017	Average
Open Leaks	2,756	2,895	3,023	3,129	2,824	2,355	2,830
Miles of Main	3,026	3,024	3,023	3,030	3,031	3,040	3,029
Open Leaks/Mile of Main	0.91	0.96	1.00	1.03	0.93	0.77	0.93

Source: Data Request GO-23

PGW attributes its reduction in open leaks to three primary conditions. First, PGW indicated that mild winters in 2016 and 2017 led to a decrease in the number of new leaks discovered, which has allowed the company to dedicate more resources to reduce backlogged leaks. Furthermore, to decrease the number of leak rechecks, PGW crews are now more likely to repair a leak than categorizing it as “safe to hold”. Lastly, increased cast iron main replacement has reduced the number of leaks but may take years to fully improve leak rates.

PGW had a six-year average (2012-2017) of 2,830 open or backlogged leaks at the rate of 0.93 open leaks per mile of main. Backlog leak data analyzed for PGW’s peer NGDC’s in Pennsylvania showed an average of 0.43 backlogged leaks per mile of main from 2012 through 2016¹⁹. The PUC auditors recognize that a vast majority of PGW’s distribution system is low pressure which generally reduces the risk associated with open leaks but we contend that PGW should reduce its number of backlogged leaks to approximately 1,300 to achieve the peer company average of 0.43 open leaks per mile of main. PGW believes that with its aggressive cast iron main replacement, particularly 12” and 30” high pressure mains, and its “repair first” methodology over a “safe to hold” status, the company could eliminate a vast majority of open leaks, thereby significantly reducing its open or backlog leak count. Open leaks, no matter how insignificant, increase the likelihood of an incident and represent a failure within the pipe. Therefore, effective management of leaks is necessary to ensure the safety and reliability of the system.

Follow-up Recommendation – Continue to emphasize the methodical reduction in open leaks through cast iron replacement and a “repair first” practice and reduce th enumber of open or backlogged leaks.

¹⁹ 2017 data for PGW’s peer natural gas distribution companies (NGDC) was not readily available.

Finding No. VI-5

Prior Situation – PGW uses *Main Replacement Prioritization (MRP)* software to predict main breaks for planning purposes. For the years 2010 to 2013, the number of actual cast iron breaks were greater than the number of breaks predicted by its the *MRP* software. Furthermore, the software predicted that the number of leaks on 8” and smaller diameter cast iron mains would continue to increase. The mains in the *MRP* model are ranked on a segment basis (i.e., length of pipe where all parameters are the same). The *MRP* contains an algorithm that weights these factors to develop a relative ranking of pipe segments based on risk and condition. Schumaker recommended that PGW analyze its model, the input parameters and actual results. More specifically, the use of PGW’s *enforced replacement program*²⁰) on pipe that did not fall within the top 10% of the high-risk segments was a factor for the model’s inaccuracy.

Prior Recommendation VII-10 – Reconcile the output from the Main Replacement Program with the actual leak experience to validate its predicted outcomes.

Follow-up Finding and Conclusion – PGW has reduced its cast iron main breaks and leaks by incorporating additional factors into its *MRP* modeling.

Current Review – The input parameters for the *MRP* model includes several factors such as pipe material, pipe diameter, pressure, proximity to buildings, main break/leak history, etc. The mains in the *MRP* model are ranked on a segment basis (i.e., length of pipe where all parameters are the same). The *MRP* contains an algorithm that weights these factors to develop a relative ranking of pipe segments based on risk and condition. The formula for prioritizing mains for replacement is as follows:

$$\text{Prioritization Formula} = (\text{Normalized Condition Score} \times \text{Condition Score Weighting}) + (\text{Normalized FFW Score} \times \text{FFW Weighting})$$

FFW or Front Foundation Wall readings occur when gas can be measured at the front of a structure’s foundation wall. PGW believes that the presence of FFW readings at mains provides a better indicator of future risk than the standard *MRP* risk model. PGW assigns an equal weighting of 50% to both, the condition score and the FFW or risk indicator.

The condition model requires data for each pipe segment for material, age, length, previous leaks, and background failure zone (BFZ), which are “hotspots” of failure activity and are generated by examining all metallic pipes, their locations, and associated leaks within the past five years. Condition scores are calculated after loading this data into PGW’s geodatabase. The *MRP* software can produce several model runs using different scenarios of condition and risk.

Therefore, predictive modeling is a tool used to plan resources by forecasting future outcomes. It is the process of creating, testing, and validating a model to best

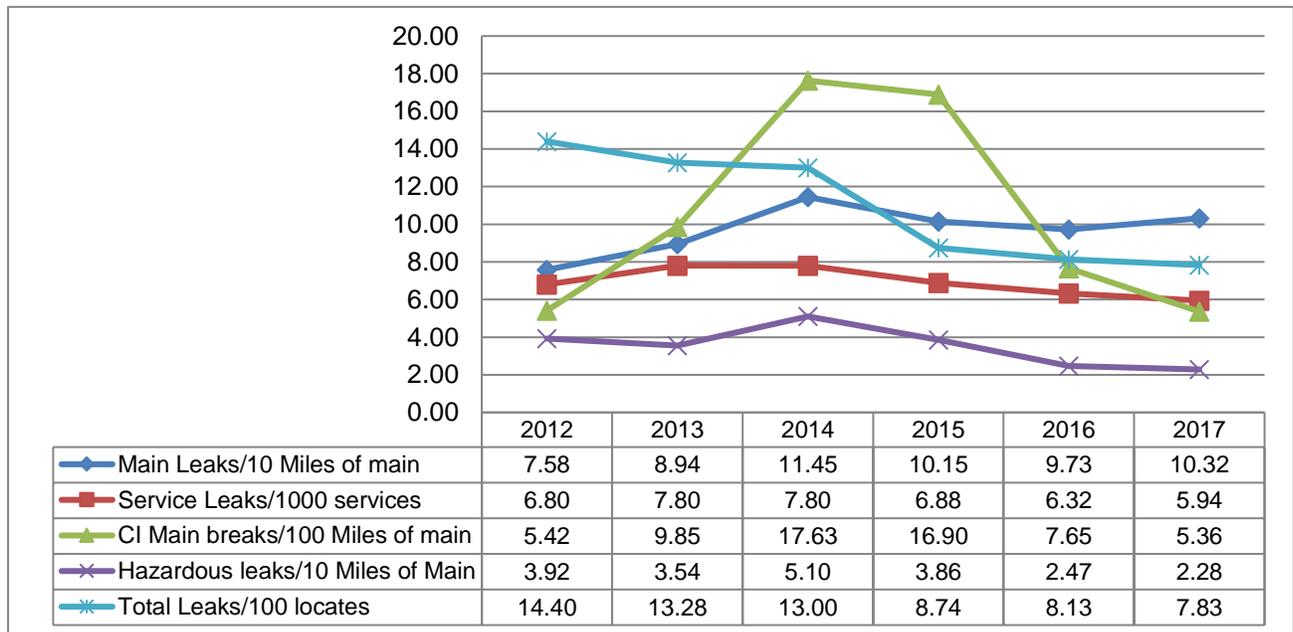
²⁰ *Enforced main replacement* is typically driven by work projects that are performed by Pennsylvania Department of Transportation, the Philadelphia Water Department, and other neighboring utilities. Therefore, enforced replacement is usually driven by work projects outside PGW’s control.

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predict the probability of an outcome. To be effective, predictive modeling must be coupled with other tools such as the DIMP, LTIP, benchmarking/prioritization analyses, etc. These tools should be used collectively to formulate a comprehensive main replacement program that is aimed at removing the riskiest pipe, decreasing the number of leaks, and avoiding main breaks.

PGW’s main replacement efforts have reduced the number of cast iron main breaks and leaks, hazardous leaks on mains and services, and several leak and break metrics as shown in Exhibit VI-8. Main leaks per mile of main increased slightly in 2017 primarily due to the company repairing its backlogged leak inventory and has been on a downward trend since 2014. All other metrics have decreased since 2014 including hazardous leaks per mile of main and total leaks per locates.

**Exhibit VI-8
Philadelphia Gas Works
Leak Metrics
January 1, 2012 through December 31, 2017**



Source: Data requests GO-7, GO-22, Auditor Analysis.

By including historical leak data into the prioritization algorithm, PGW is ensuring that the model run by the *MRP* software is incorporating all relevant leak data in its prioritization calculations. Furthermore, by using a combination of the DIMP to measure threat and evaluate risk, the benchmarking analysis to develop an annual replacement strategy and the *MRP* software to prioritize segments of pipe deemed to be most “at-risk” and in need of replacement or removal, PGW has accelerated its cast iron main replacement focusing on the riskiest pipe and subsequently reducing the number of cast iron breaks and leaks.

Follow-up Recommendation – None

Finding No. VI-6

Prior Situation – As part of its 2006 negotiated union agreement, PGW established departmental productivity standards. These productivity standards identified tasks that could be measured and compared to average completion times. These tasks included duties such as bridge main inspections, control valve inspections, street regulator inspections, blocks surveyed, gas leak investigations, main repairs, etc. Furthermore, the Field Operations and Planning department maintained several goals as part of its department scorecard to monitor performance. However, the goals did not appear to help drive efficiency or productivity nor the behavior of individual employees.

Prior Recommendation VII-12 – Develop a set of goals and reports for Field Operations and Planning and cascade them down through the organization to drive efficiency and operational and individual performance improvements.

Follow-up Finding and Conclusion – PGW tracks individual employee productivity levels for coaching purposes but has not established formal goals tied to individual performance measures.

Current Review – PGW tracks key performance indicators (KPIs) for the Field Operations department and reports performance to the CEO and COO. However, the PUC auditors found no evidence that individual employee productivity goals had been established.

The Field Operations department recently deployed a web-based interactive business intelligence software solution to organize and share metric/productivity information throughout the department. The software is also used to display monthly and annual performance data to several management personnel within the group. Supervisors use this performance data to review the amount of time it takes individuals to complete tasks and monitor progress. The Field Operations department maintains the following reports and scorecards to monitor individual employee productivity:

- Number of completed orders (i.e., AMR installs, new sets, rebuilds, pre-inspection, etc.);
- Average time to complete an order;
- Damage preventions jobs per day;
- Service abandonments (by PGW and contractors crews), etc.

These reports and scorecards help supervisors coach individuals within their respective sections when performance falls or capture best practices if performance is superior.

Company management contends that union contract provisions prohibit measuring employee performance relative to established goals. Therefore, the reports and scorecards that measure individual productivity are used solely as monitoring tools to assist with coaching employees and providing refresher training. The reports and scorecards provide an opportunity for departments to improve performance and give supervisors information to effectively coach employees. Nonetheless, creating measurable goals for employees would help drive further improvement. Moreover, the

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auditors argue that by not measuring employee performance relative to established goals hampers management's capability to evaluate its employees against these goals and hinders management's ability to establish performance expectations from its employees.

Follow-up Recommendation – Develop a set of individual productivity goals for the Field Operations and Planning department and compare with actual performance to drive productivity improvement.

Finding No. VI-7

Prior Situation – The design criteria for the system model was not up-to-date and PGW was not aware of the last time the design day²¹ criterion was evaluated. PGW’s network design parameters were based on a negative five-degree one-hour specification, which was determined by the *Winter Load Committee (WLC)*. The *WLC* needed to review the ground rules for the design day planning document and update using the latest design day temperature and load profile forecast. PGW was taking steps to link the customer system to the system model to bring actual customer loads into the model, which was expected to be completed in 2016 and could be used to more effectively reevaluate the company’s design day.

Prior Recommendation VII-13 – Update the system model design criteria.

Follow-up Finding and Conclusion – The *Winter Load Committee* validated the existing design hour criteria, but the link between the *Billing Collection Customer Service System (BCCS)* and *Network Model* has yet to be reestablished.

Current Review – The *WLC* consists of 13 members from various departments within PGW such as Engineering & Construction, Field Services and Maintenance, Gas Control, Gas Planning, Pipeline Integrity and Pressure Control, etc. The *WLC* is responsible for updating the design day planning document and the maximum capabilities of existing plant facilities. Moreover, to update the design day planning document, consideration is given to design day gas sendout requirements, potential supply problems inclusive of Liquefied Natural Gas (LNG), plant maintenance problems, potential gate station failures, etc. The *WLC* met six times in 2017 to discuss several design day topics including:

- Prior year ground rules;
- Update current design day and hour forecast load;
- BTU conversion rate;
- Lateral flow capacities;
- Review supply plans and update failure scenarios;
- Replacement of network modeling software; and
- Review maximum volume of gas available at each gate station.

PGW uses software for design day planning and gas network modeling including scenario testing. The Network Modeling group in coordination with the *WLC* perform two studies annually: experience day study and design day study. The experience day study tracks send out information on the coldest days and analyzes load data on 5-10 of the coldest days of the year to verify the network model parameters (i.e., pressure, supply, etc.) The design day study helps PGW plan for its peak days by anticipating demand load on the coldest days using historical load and weather data to produce

²¹ A design day is a 24-hour period of the theoretically greatest gas volume demand, used as a basis for designing purchase and transportation contracts, and delivery capacity. It typically is the coldest day of the year. Design days for each utility is litigated as part of the PA PUC’s 1307(f) proceeding.

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hypothetical demand conditions. Therefore, the *WLC* has reviewed and validated the PGW's design day requirements.

Major new loads over 1,000 ft³/hour are added manually into the *Network Model* while minor loads under 1,000 ft³/hour are not updated. Because customer loads are currently entered manually into the *Network Model*, there is no way to establish a relationship between individual customer locations, customer loads, weather, etc. The link between the *BCCS* system and the *Network Model* was disabled in 2009 and has not been reestablished. However, PGW anticipates linking its *Network Model* with other systems during its 2020 fiscal year. The project will not start until after the GIS data migration project is complete²². After which time, PGW plans to leverage its GIS information to provide geospatial positioning of assets within the *Network Model*. It can then import customer information from the *BCCS* to create an accurate model both in terms of actual usage and location. Integrating the *BCCS* with the *Network Model* would allow PGW to capture accurate customer load data while analyzing historical gas usage patterns from each customer.

Follow-up Recommendation – Reestablish the link between the *BCCS* and the *Network Model* to enable the input of actual customer loads into the model.

²² See Finding No. VI-1 for more information about the GIS conflation/data migration project.

Finding No. VI-8

Prior Situation – As of the conclusion of the Stratified Management and Operations Audit conducted in 2014/2015, PGW only had four approved contractors available to perform main installation work. Therefore, only two to three responses were typically received for request for bids. PGW personnel expressed the desire to have more contractors compete for work but had trouble adding new firms to the list of approved contractors. Considering the substantial number of mains to be replaced annually, four qualified contractors were insufficient to generate adequate competition.

Prior Recommendation VII-14 – Increase the number of qualified contractors to perform gas main installation work.

Follow-up Finding and Conclusion – PGW has solicited and qualified three new contractors to perform gas main installation work.

Current Review – PGW currently has six active contractors on its approved contractor list. In 2016, the company performed two pilot programs to recruit more contractors. The pilot programs allowed PGW to utilize two new contractors on work to evaluate their performance. As a result, both contractors who participated in the pilot program were added to the approved contractor list but have not subsequently bid on any construction projects.

Historically, PGW used contractors for new business, enforced main relocation, and main replacement projects. The scope of the projects was generally confined to a fixed price per foot and could be completed within a year. Beginning in the summer of 2017, PGW started using longer term contracts for approved contractors, which typically include a two-year scope with two optional one-year extensions. These long-term contracts allow PGW to solidify resources and eliminate the monthly bidding process, approval levels, etc. Longer contracts can also offer stability to the contractor yielding more competitive pricing and/or improved workmanship.

Follow-up Recommendation – None

Finding No. VI-9

Prior Situation – As of the conclusion of the 2015 Management Audit, PGW did not have a formalized change order process for work performed by contractors. The field inspector, engineer, or area supervisor were tasked with approving change orders, with no escalation process to move approvals depending on the dollar amount of the change order. Furthermore, the final inspection report did not compare and analyze the actual cost of the contract with the estimated cost.

Prior Recommendation VII-15 – Implement financial controls on work performed by contractors.

Follow-up Finding and Conclusion – PGW has not implemented a standardized change order approval and variance explanation process.

Current Review – Construction contractors are typically managed by field inspectors assigned on one to three projects depending on the size and scope of the job. Field inspectors complete Final Inspection and Review reports for all contractor work to monitor progress and compliance with company standards and contract specifications. The Final Inspection and Review reports include an account of work quantities completed (i.e., footage of main, number of services, etc.), items used, and a log of work performed daily. PGW management reviews the Final Inspection and Review reports for accuracy and completeness. Once the reports are approved, final payment is made, and the project is closed.

Meanwhile, construction change orders submitted by the contractor are reviewed initially by inspectors and subsequently evaluated and approved or rejected by the supervisors. PGW management indicated that changes in the unit cost or number of units triggers the change order approval process. The company indicated that very large dollar amount scope changes would be reviewed by the Construction Project Manager. However, the company does not have a set policy on what constitutes a minor or significant dollar amount.

In addition, PGW does not have a policy for when project variances require written explanation. Variance explanations are only generated when a project is over budget, but what constitutes “over budget” is determined by the supervisor. As mentioned above, PGW utilizes several reports and tools to monitor construction projects, which includes project costs. Moreover, PGW plans to deploy tablets to its field inspectors so that project costs can be entered timelier, yielding a more accurate picture of the project to supervisors.

Variances are commonplace for any construction project and can result from a wide variety of causes. Comparing and evaluating actual costs with projected expenditures is an effective tool to improve estimates, identify emerging trends (i.e., new requirements, changing field conditions, increased costs for particular material, etc.) and crew/contractor performance. The company has the tools to track costs and monitor variances, but it needs to develop a policy and/or process that would set a variance threshold between projected and actual costs. Actual construction

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expenditures that are above or below the projected costs by the pre-determined threshold would then need detailed explanations describing the reason for the variance.

Change order approval processes are an important aspect of project management and help ensure proper management approval levels are set. Chiefly, it provides effective checks and balances through segregation of duties and helps to ensure that no individual has too much authority or control of the construction process. Furthermore, by having a streamlined pre-determined change order approval process, PGW would be able to quickly and efficiently complete and sign-off on any change orders that are submitted by contractors or that are required for projects with minimal project delay.

Follow-up Recommendation – Implement a standardized change order approval process with appropriate segregation of duties for approval levels and provide unit and cost variance explanations on the Final Inspection and Review reports.

Finding No. VI-10

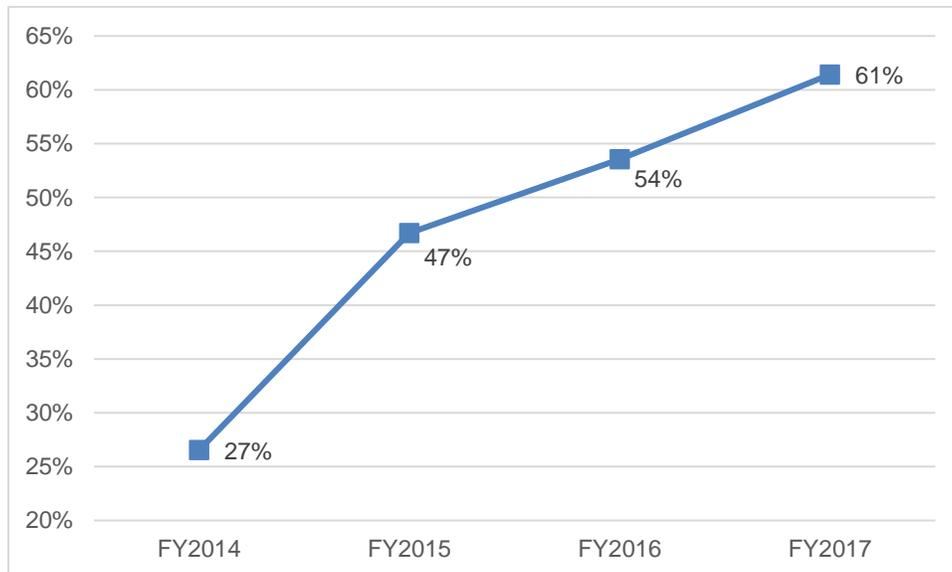
Prior Situation – PGW’s peak-day requirements and total gas volume sales had been slowly declining from 2004 to 2014. This was likely due to poor economic conditions, energy efficiency gains, and businesses moving off PGW gas supply and onto transportation (i.e., buying their own gas.). PGW had reduced gas supply assets, by eliminating PGW’s Equitrans storage contract, reducing demand charges and other costs through LNG sales, and releasing capacity. However, PGW had not reduced gas supply assets in line with this decline, causing excess costs and inefficient use of financial resources.

Prior Recommendation VII-3 – Continue to take steps to reduce PGW gas supply assets.

Follow-up Finding and Conclusion – PGW has reduced gas supply assets.

Current Review – One method PGW employed to reduce the costs associated with gas supply is to maximize the amount of gas purchased from the Marcellus Basin, which can be less expensive than alternatives. As shown in Exhibit VI-9, average supplies for each fiscal year increased from 27% in FY 2014 to 61% in FY 2017. From August 2015 through October 2017, it is estimated that PGW saved approximately \$45.4 million by purchasing Appalachian Basin-produced gas.

**Exhibit VI-9
Philadelphia Gas Works
Volumetric Percentage of Gas Supplied from Marcellus Basin
September 2013 through August 2017**



Source: Data Request GO-16

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Although the gas purchased from the Appalachian Basin increased relative to the total volume purchased, its gross volume actually decreased over time and in a similar trend to Peak Day sendout and total sales. Peak Day sendout and total sales decreased by 18.2% from FY 2014 to FY 2017. Because of the reduction in overall gas supplied, the actual volume supplied by Appalachian Basin sources decreased from an annual average of about 2,050,000 mcf to a 2017 average of 1,900,000 mcf. In addition, the reduction in sales volumes and use of Marcellus Shale gas has allowed PGW to cancel two Eminence Storage Contracts, which the PUC's audit staff estimates saved the company an additional total of \$1.9 million as of October 2017, or \$1.4 million annually.

In addition to altering its purchasing behavior in response to falling demand, PGW has also made changes in how it plans. PGW altered its degree days basis from a 30-year to a 20-year average. This shorter span should make predictions more responsive to changes in demand for long term planning. Moreover, the company accounts for falling demand²³ by using the previous year's usage data for gas efficiency projections, which ensures PGW captures more real time data when planning for the next year. PGW's purchase of Appalachian Basin sourced gas and cancellation of storage contracts saved the company an estimated \$47 million since 2015, within the company's purchased gas costs.

Follow-up Recommendation – None

²³ PGW attributes falling demand to be primarily driven by energy efficiency.

Finding No. VI-11

Prior Situation – During the period of the last audit, PGW asset records were stored in multiple databases, which required reconciliation and maintenance of multiple separate systems, causing potential inaccuracies in data. Most of these databases were using the Automated Information Management System (AIMS) database as a secondary or backup database.

Prior Recommendation VII-8 – Integrate the corrosion work order database into AIMS.

Follow-up Finding and Conclusion – PGW has not integrated the corrosion work order database into AIMS.

Current Review – To increase efficiency, asset records should reside in the lowest number of databases (excluding backups), where possible. PGW has not yet integrated the corrosion work order database into AIMS, and therefore the number of databases has not been reduced to the least possible amount. Integrating the corrosion work order database into AIMS is a capital project scheduled for completion by September 2019.

Follow-up Recommendation – Complete the project to integrate the corrosion work order database into AIMS.

VII. EMERGENCY PREPAREDNESS

Background – The Philadelphia Gas Works (PGW) 2015 Management Audit did not contain an Emergency Preparedness functional area, though there were findings related to Emergency Preparedness within other sections of the report. In this chapter, five prior recommendations and prior situations are reviewed. In addition, the PUC auditors 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. Therefore, five follow-up findings, seven additional findings, and 12 recommendations are presented.

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?	
2	Has your physical security plan been reviewed in the last year and updated as needed?	
3	Is your physical security plan tested annually?	
4	Does your company have a cyber security plan?	
5	Has your cyber security plan been reviewed in the last year and updated as needed?	
6	Is your cyber security plan tested annually?	
7	Does your company have an emergency response plan?	
8	Has your emergency response plan been reviewed in the last year and updated as needed?	
9	Is your emergency response plan tested annually?	
10	Does your company have a business continuity plan?	
11	Does your business continuity plan have a section or annex addressing pandemics?	
12	Has your business continuity plan been reviewed in the last year and updated as needed?	
13	Is your business continuity plan tested annually?	

* 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

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While conducting our Management Efficiency Investigation, the PUC auditors reviewed the most recent Self-Certification form submitted by PGW. 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 PUC's audit staff performed inspections at a sampling of PGW's facilities. Due to the sensitive nature of the information reviewed, specific information has not been provided as part of the findings and recommendations.

Finding No. VII-1

Prior Situation – The last two disaster recovery tests had been conducted in October and December of 2013, revealing relatively minor issues. No tests were conducted in 2014 and the next test was scheduled to occur in 2015 so that a new system could be included in the testing.

Prior Recommendation III-8 – Perform disaster recovery tests semi-annually to adhere to established goals and objectives.

Follow-up Finding and Conclusion – **PGW is performing disaster recovery tests, but not always according to its frequency goal.**

Current Review – Since 2014, PGW has not devoted sufficient resources and time to meet its goal of testing disaster recovery at least twice annually. Data recovery testing is performed as part of Vulnerability Assessments, which also test the company's Cyber Security Plan. PGW's IS department has a goal of performing at least two disaster recovery tests annually. In the last five years, PGW has run five disaster recovery tests, which tested the IS department's ability to restore from backups located at an offsite, third-party owned location: two tests in 2013, one in 2015, and two in 2016. Testing did not include some newer systems. PGW installed a new billing collection customer service (BCCS) system and new work management system database in 2014, for which data recovery testing was deferred during 2014 and the beginning of 2015.

PGW does not test all of their backup methods. PGW claims that data recovery specialists audit the backup location annually to verify that specific tapes are available. These tapes are a secondary backup method, as PGW has another, faster method to restore and recover their critical business application, file systems, and databases. That being stated, every backup method should be regularly tested to ensure that all options are available in an emergency.

Follow-Up Recommendation – **Perform disaster recovery tests semi-annually, making sure that all backup and restoration methods used by PGW are regularly tested.**

Finding No. VII-2

Prior Situation – The last penetration test and vulnerability assessment (VA) was conducted in late 2011. A contract had been awarded to perform a penetration test and VA in 2015. Several issues found in the 2011 assessment were addressed, but no assessments had been performed in the three years since.

Prior Recommendation III-9 – Perform annual penetration testing and vulnerability assessments.

Follow-up Finding and Conclusion – PGW has been conducting annual penetration testing and vulnerability assessments since 2015.

Current Review – Annual VAs have been conducted since 2015. These tests have included penetration testing of physical facilities as well as of cyber assets. These tests included a variety of different testing methods such as physical, social engineering, cyber, and telephonic to gather data and to compromise network security. In addition, the VAs have included studies on components like wireless connections.

In 2015, important issues were discovered that led to changes in perimeter security at several facilities. In 2016, a few more issues with physical and cyber security were both discovered and addressed, and new training was developed to help security guards protect against social engineering attempts. Subsequently, 2017's vulnerability assessment revealed marked improvements in overall security, particularly in the abilities of the guards to stop intrusion attempts. The one physical security weakness identified in the 2017 VA is being addressed in a project in 2018. PGW's security has been strengthened as a direct result of its use of annual VAs since 2015. Results of each successive test have improved, revealing a measurable increase in security at PGW's facilities.

Follow-Up Recommendation – None

Finding No. VII-3

Prior Situation – During the previous management audit, PGW did not run training drills for any scenarios in their emergency procedures manual. The documents in the emergency procedures manual were dated from 2008 to 2014. Gate station failure plans, area segregation plans, and system maps within the emergency procedures manual were not updated.

Prior Recommendation VII-11 – Improve emergency response capability by conducting periodic drills, simulating potential emergency situations, and updating area segregation plans.

Follow-up Finding and Conclusion – PGW conducts annual emergency response drills but has not updated its emergency plans.

Current Review – PGW has participated in drills and exercises with Federal, State, County, or local government emergency managers at least annually since 2015. PGW also participates in regular Office of Emergency Management (OEM) conference calls. The last exercise was a tabletop exercise simulating a major center city event, conducted in the winter of 2016-2017. However, some drills have not been tested since at least 2009. In addition, the emergency plans for certain rarely tested scenarios have not been updated. For example, one plan was last updated on November 29, 2012, with parts of it not updated since June 2005.

Pa Code 52 § 101.3 requires a jurisdictional utility to review, update, and test their emergency plans annually. To fulfill these requirements, procedure manuals, contact information, equipment and systems information, and system maps must be reviewed annually and updated as needed. PGW has not devoted the time and resources to update certain parts of its emergency plans and has not conducted drills of certain scenarios. Consequently, PGW may not have the required information on hand, and personnel may not be prepared to respond correctly to an untested emergency.

Follow-Up Recommendation – Review all emergency plans annually, update as needed, and consider testing scenarios on a rotating basis.

Finding No. VII-4

Prior Situation – PGW conducted only eight tabletop exercises or live drills (i.e., tactical drill simulating loss of one of their plants) over six years (i.e., 2009 through 2015). PGW developed After Action Reports (AARs) for only four of these exercises and for one snowstorm. However, many departments or scenarios remained untested over this timeframe and should be considered for testing on an expedited basis.

Prior Recommendation VII-17 – Develop and implement an expanded Business Continuity Plan (BCP) schedule that includes tabletop exercises and live drills annually.

Follow-up Finding and Conclusion – PGW has conducted tabletop exercises, but live drills have not been scheduled or performed on a regular basis.

Current Review – According to Pa Code 52 § 101.3, jurisdictional utilities are required to maintain and implement an annual testing schedule of BCPs. PGW predominately performs tabletop exercises to test its BCP. PGW attempts to involve every department within BCP exercises or drills, and every department has been involved in at least one drill. In addition, PGW performed two live BCP drills in 2017 where the company transferred operations to a different facility.

While PGW is complying with the regulations by conducting annual tabletop exercises and fire drills, it would benefit from additional live drill tests, such as the exercises previously run that simulated the loss of a plant. The PUC auditors believe live drills should occur periodically, supplemented with tabletop exercises between live drills. Live drills allow the company to more accurately test and gauge responses from personnel than during tabletop exercises. However, live drills are more expensive and resource intensive. Therefore, PGW should incorporate live drills into its testing schedule with a goal to complete one every three years.

Follow-Up Recommendation – Incorporate live drills into the Business Continuity testing schedule.

Finding No. VII-5

Prior Situation – PGW used software to give departments a format to develop business continuity plans, which guided department planners through a set framework to develop a plan. It had been using this software since the 2007 Stratified Management and Operations Audit. However, no specific, standard format was used to ensure that procedures, standardization, and content of the plans were complimentary and optimized.

Prior Recommendation VII-18 – Develop and implement a sample plan framework for PGW departments to use when developing their BCPs.

Follow-up Finding and Conclusion – PGW has not developed a sample plan framework for departments to develop their BCPs.

Current Review – PGW did not develop a sample plan framework for departments to develop their BCPs because the software automatically tailors conformity between departments. PGW lacked proper guidance for departments to use the software. The software was designed to create the plan by asking the operator questions, which PGW contended was enough guidance to ensure conformity. Regardless, PGW is in the process of consolidating its Business Continuity Plans thus departments will no longer need to create their own individual plans. A single plan should ensure the entire plan is consistent.

Follow-Up Recommendation – Consolidate department BCPs into centrally developed BCPs.

Finding No. VII-6

Additional Follow-up Finding and Conclusion – Security, safety issues, and areas for improvement were discovered during facility tours.

Current Review – Physical security should be continuously reviewed and inspected, and deficiencies should be addressed as soon as possible. Ideally, risk mitigation is incorporated into physical security requirements with critical facilities warranting additional security measures. The PUC auditors randomly inspected several facilities at PGW including office, storage, and operations facilities, while focusing on compliance as well as vulnerability identification.

Several minor vulnerabilities or deficiencies in physical security were noted. Most deficiencies were due to facility age, oversight, weather, or general wear and tear. In addition, the PUC auditors identified additional security concerns that are specifically addressed in Finding No. VII-7 and VII-9. As PGW is currently undergoing a facilities consolidation study, the security at some facilities has been allowed to deteriorate, especially where the facility is expected to be sold. While levels of security should differ based on criticality of facilities, at PGW they vary greatly due to the lack of uniform application of security standards.

Many locations had sufficient or commendable security while others had observable deficiencies. This difference may be planned or justified by a business case, but it still increases security risk overall. A cost-benefit analysis should be performed for identified deficiencies, even if the facility may be abandoned in the future, to properly prioritize upgrades and repairs. Regardless, all identified vulnerabilities or deficiencies should be classified and addressed in a standardized and prioritized order.

Follow-Up Recommendation – Address security and safety issues based on priority level.

Finding No. VII-7

Additional Follow-up Finding and Conclusion – The Gas Control Rooms' security could be improved.

Current Review – The PUC's audit staff inspected two of PGW's three gas control rooms. While the security at PGW's gas control rooms was better than PGW's other facilities, several opportunities to improve the security at the gas control rooms were identified. In fact, some of the improvements are already planned in future projects but have yet to be implemented. Since gas control rooms are considered more critical, the PUC auditors chose to highlight this issue separately from Finding No. VII-6.

Follow-Up Recommendation – Consider upgrading security features at PGW's Gas Control Rooms.

Finding No. VII-8

Additional Follow-up Finding and Conclusion – PGW lacks or does not communicate its plan to evacuate handicapped workers or guests from upper floors in an emergency evacuation.

Current Review – PUC auditors discovered that PGW either does not have an evacuation plan for physically disabled employees and guests, or they do not communicate this plan to their employees. According to the Office of Disability Employment Policy (ODEP) of the United States Department of Labor,

In order to be as prepared as possible for the needs of everyone, the emergency plan must consider those persons needing extra assistance, as well as the responders assisting them. People with disabilities should be consulted and be part of the decision-making process with regard to the evacuation plan when possible—particularly when related to emergency movement in stairwells.

In addition, the Americans with Disabilities Act requires that equal access to facilities be provided, which includes equal exit during emergencies. Due to PGW's lack of a plan to facilitate the evacuation of handicapped employees and guests, a handicapped person could either be unable to evacuate, or could cause additional confusion in an emergency, potentially contributing to a dangerous situation and increasing company liability.

Follow-Up Recommendation – Design, implement, and educate necessary employees on a plan to evacuate handicapped workers or guests in an emergency.

Finding No. VII-9

Additional Follow-up Finding and Conclusion – PGW’s facilities use multiple camera management software systems that do not communicate with each other, and there are areas where additional cameras would improve security.

Current Review – PGW uses three separate camera control and communication systems, which were installed separately, by different companies, at different times. Because of this, the systems cannot communicate and are not integrated. A single, consolidated system would allow camera feeds at all facilities to be viewed at any other facility’s security stations, and cameras to be controlled remotely from all security stations. This consolidation would increase the security team’s awareness, ability to gather intelligence, and respond appropriately in an emergency. In addition, during tours of PGW’s facilities, several locations were identified where the installation of new cameras would provide better coverage of PGW’s facilities. Therefore, PGW should explore the integration of its camera systems or migrate to a single system that meets all its needs.

Follow-Up Recommendation – Consider upgrading to a single consolidated camera management system and install additional cameras where needed.

Finding No. VII-10

Additional Follow-up Finding and Conclusion – Safety Data Sheets (SDS) have been reviewed but not regularly updated.

Current Review – PGW's Safety Data Sheets (SDS) were reviewed in March 2017. However, some of the individual pages have not been updated since 1996. OSHA regulation 29 CFR 1910.1200(a)(1) states that:

The purpose of this section is to ensure that the hazards of all chemicals produced or imported are classified, and that information concerning the classified hazards is transmitted to employers and employees...The transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include labeling and other forms of warning, safety data sheets, and employee training.

As highlighted in OSHA regulations above, chemical hazards must be communicated to employees. In most cases, this is done with SDS sheets that provide pertinent information on the chemicals. For this type of communication plan to be effective, the SDS must be accurate and up-to-date. While SDS data does not change much from year-to-year, lack of up-to-date information could prevent proper treatment of a chemical related injury or inhibit proper response to a chemical related fire.

Follow-Up Recommendation – Update and make available SDSs for all chemicals.

Finding No. VII-11

Additional Follow-up Finding and Conclusion – The Emergency Response Plan (ERP) needs minor improvements.

Current Review –The company’s ERP has lists of critical customers and contact information for some of the necessary government agencies, but lacks a centralized contact information list. More specifically, the ERP contains no contact information for the Pennsylvania PUC, federal law enforcement, the Homeland Security Agency, or critical customers. In addition, the ERP contains no contact information for SCADA technicians, which may be needed during a SCADA problem.

52 PA Code Section 101.3 requires that an ERP include, “Notification of the appropriate emergency services and emergency preparedness support agencies and organizations.” 52 PA Code Section 67.1 (b) further requires that all electric, gas, water, steam, and telephone utilities shall notify the Commission when 2,500 or 5.0%, whichever is less, of their total customers have an unscheduled service interruption in a single event for six or more projected consecutive hours. However, there is no requirement within PGW’s ERP to report any such unplanned outage to the PUC. In addition, the ERP does not appear to incorporate any risk analysis for prioritizing the company’s security and emergency planning.

Although, PGW has, in some form, all the missing data cited within this finding; it is not part of the ERP. The lack of a centralized contact list in PGW’s ERP could cause a breakdown in communications during an emergency, and the lack of a risk analysis and the requirement to contact the PUC leaves open the possibility that the ERP is not optimized for every major threat. Furthermore, if the noted deficiencies were addressed, it would strengthen PGW’s documentation and improve its emergency preparation.

Follow-Up Recommendation – Update the ERP to address noted deficiencies.

Finding No. VII-12

Additional Follow-up Finding and Conclusion – PGW does not have a policy promoting cyber-safe usage of electronic communications devices.

Current Review – It is a best practice to implement a policy mandating that employees use electronic communication devices in a cyber-safe manner and delineating how employees can accomplish this. PGW’s electronic communications device policies prohibit the usage of phones and electronic communication devices while driving PGW vehicles and require employees to obey all laws using such devices while driving. These policies are limited to issues of physical safety. These policies do not address cyber-safe usage of approved personal bring your own device (BYOD) and company electronic devices. It is important to note that PGW has taken steps to mitigate the risk of personal devices by restricting access to the company’s network. Nonetheless, the lack of an effective cybersecurity policy for electronic communications devices increases risk to employees and the company. While PGW has some cybersecurity defenses in place, employees, particularly with their own electronic devices, can be a vulnerability. Education, training, and effective policies are required to continuously improve employee posture in cybersecurity.

Follow-Up Recommendation – Develop and implement a policy promoting cyber-safe usage of electronic communications devices.

VIII. SUPPLY CHAIN

Background – The mission of PGW’s Supply Chain department is to provide the highest levels of service while continually working to drive cost out of the supply chain, minimize inventory investment and promote supplier diversity. Supply Chain encompasses Materials Management; Fleet; Purchasing and Supplier Diversity; and Controls, Analytics, and Office Services. These functions primarily support Field Operations’ Distribution or Field Services groups with support also being provided to Gas Processing, Facilities, and Fleet. Warehouse consolidation may have a significant impact on Supply Chain.

In this chapter, seven prior recommendations and prior situations are reviewed, and seven follow-up findings and four follow-up recommendations are presented. The findings primarily relate to Supply Chain’s documentation of policies, procedures and strategic plans, analyses related to outsourcing, system integration, inventory management, vendor partnering, and vendor evaluation.

Finding No. VIII-1

Prior Situation – At the time of the 2015 Management Audit, the Supply Chain department at PGW encompassed the following functions: Purchasing, Materials Management, Fleet and Office Services. Historically Supply Chain conducted a considerable amount of inventory related analysis, but it was mostly informal and not integrated into a comprehensive Supply Chain business plan, complete with specific company goals and objectives; discussion of ongoing and planned efforts; identification of benefits; and current key performance indicators.

Prior Recommendation III-15 – Develop a Supply Chain business plan that fully integrates into a PGW strategic plan.

Follow-up Finding and Conclusion – The Supply Chain department created a comprehensive business plan.

Current Review – As discussed in Finding No. III-2, PGW revised its strategic planning process during 2017, which resulted in the creation of a new mission, vision, and set of goals and objectives for the company. In October 2017, Supply Chain created a draft business plan for fiscal year 2018 incorporating PGW’s strategic vision into Supply Chain’s own vision, mission and set of goals and objectives. Supply Chain presented four strategic initiatives that it plans to undertake to achieve its goals and objectives:

- Implement an Integrated Supply Model²⁴
- Update PGW Procurement Rules
- Automate Manual Processes
 - Electronic Bidding and Subcontract Reporting

²⁴ See Finding No. VIII-6 for additional information about integrated supply.

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- Utilize Barcoding or Radio Frequency Identification (RFID) Technology for Inventory Management
- AIMS to Oracle Integration for Supply Chain²⁵
- Develop a Robust Supplier Diversity Program²⁶

Within the description of these strategic initiatives, Supply Chain presented the expected benefits; a timeline detailing the steps it plans to take; and when each step is expected to occur. Supply Chain further defined three large projects within the initiative to automate manual processes.

Supply Chain's business plan incorporates all aspects of a comprehensive business plan such as the relationship to specific company goals and objectives; discussion of ongoing and planned efforts; identification of benefits; and current key performance indicators. Supply Chain's business plan should ensure its operational initiatives align with the company's overall goals and objectives.

Follow-up Recommendation – None

²⁵ See Finding No. VIII-4 for additional information about integration of Supply Chain's systems.

²⁶ See Finding No. XII-5 for additional information about PGW's supplier diversity program.

Finding No. VIII-2

Prior Situation – During the 2015 Management Audit, the Supply Chain department lacked documented procedures for Supply Chain functions. The Supply Chain department's guidelines for the materials management process was limited to flowcharts and instructions via system screenshots. The instructions provided a visual representation of where to enter data within the system but did not provide any guidance on how to interpret or analyze the data.

Prior Recommendation III-16 – Develop written procedures for all Supply Chain processes.

Follow-up Finding and Conclusion – Supply Chain expanded written policies and procedures for department processes.

Current Review – Written procedures lend detail and discipline to an organization's processes while providing a vehicle for making needed changes and updates. Outdated procedures may cause errors, lead to confusion, and often erode employee reliance on document procedures. It is important that companies review documented processes regularly to ensure the documentation is as accurate as possible.

Subsequent to the 2015 Management Audit, Supply Chain reviewed processes within its department and documented policies and procedures as needed. Supply Chain's policies and procedures were uploaded into the centralized document management system (discussed in more detail within Finding No. III-9). In addition, the document management system uses a prescribed schedule (i.e., annually) to certify that procedures were revised or reviewed. Nonetheless, there were a few documents that contained procedures that were more than 30 years old. Although the company has made progress, PGW should strive to ensure all documented processes and procedures are reviewed and updated every three to five years.

Follow-up Recommendation – Maintain up-to-date written procedures for all Supply Chain processes.

Finding No. VIII-3

Prior Situation – At the time of the 2015 Management Audit, the Manager of Controls and Analytics had begun benchmarking PGW’s Supply Chain department with its peer utilities. As part of that benchmarking, the company had not conducted evaluations to outsource any Supply Chain functions.

Prior Recommendation III-17 – Perform an analysis on the value of outsourcing Supply Chain function(s).

Follow-up Finding and Conclusion – **Supply Chain evaluated and outsourced certain functions.**

Current Review – PGW bases its decision to outsource Supply Chain functions on impact (i.e., in terms of time and money) and ease of transition to implement. Based on these criteria, PGW outsourced the acquisition and delivery of various material items such as hoses and pipes by the vendor directly to a job site rather than PGW's warehouse. By doing so, PGW researched and identified the cost savings relative to employee productivity and expense associated with processing the material order and delivery from the warehouse.

Supply Chain’s business plan (discussed in detail in Finding No. VIII-1) contains a section regarding the department’s pursuit of cost saving opportunities. This section of the business plan states Supply Chain’s intention to continue to evaluate functions for subcontracting. These efforts align with the department’s strategic initiative to implement an integrated supply model, which is discussed further in Finding No. VIII-6.

Follow-up Recommendation – **None**

Finding No. VIII-4

Prior Situation – At the time of the 2015 Management Audit, major contract work was largely controlled through paper processes, and automated systems were not completely integrated. Oracle (Financial system used for inventory management) and AIMS (work management system used by Field Operations) were not integrated. PGW has been historically slow to embrace technologies in Supply Chain. Lengthy evaluation periods were noted for implementation of modern technologies or streamlined warehouse operations and procurement.

Prior Recommendation III-18 – Integrate all systems used by Supply Chain.

Follow-up Finding and Conclusion – Supply Chain is evaluating the integration of its systems.

Current Review – As discussed in Finding No. VIII-1, Supply Chain recently created a business plan, which describes the department's efforts to provide parts and materials for its client departments: Field Operations, Gas Processing, Fleet Operations, and Facilities. Each department uses their own work management system that identifies the parts and materials needed. Because none of the work management systems are fully integrated with Oracle, a manual order management process is required.

Each department sends orders to the storeroom either by fax, e-mail, or paper ticket. Storeroom personnel issue parts and materials from stock via a miscellaneous transaction that reduces inventory and charges the cost of the item to the requesting department's expense or project accounts. There are no direct links between the order being sent to the storeroom and the subsequent inventory transaction to fill the order. Thus, Supply Chain cannot track order status, determine the amount of stock currently allocated to existing orders, determine the amount of stock available for future orders, or reconcile order costs.

Supply Chain plans to integrate the AIMS work management system used by Field Operations with Oracle to automate the materials request process. However, PGW indicated that other AIMS related initiatives have higher priority, thereby deferring initiation of Supply Chain's AIMS to Oracle Integration until fiscal year 2021 or later. With manual replication of data, the possibility of overlooked transactions, inaccuracies and most importantly the loss of critical analysis of inventory increasingly hinders Supply Chain's efforts to become more effective and efficient.

Follow-up Recommendation – Expedite system integration within Supply Chain to improve automation.

Finding No. VIII-5

Prior Situation – As of the 2015 Management Audit, PGW was experiencing some deficiencies in managing its inventory, including inaccurate inventory counts and low turnover. In response to a 2014 internal audit, the Supply Chain Department committed to performing physical inventories in addition to cycle counts. PGW’s cycle count accuracy was approximately 80%, which was too low, creating the need for disruptive and time consuming physical counts. Inventory turnover was also an issue. Turnover is a measure of the number of times inventory is used in a period such as a year. PGW’s Supply Chain had a total inventory turn goal of 2.2 but actual rates were around 2.0. Inventory turnover rates between 2.0 and 4.0 are typical for utilities.

Prior Recommendation III-19 – Improve cycle count accuracy levels to at least 90% and increase analysis on inventory turn rates.

Follow-up Finding and Conclusion – Cycle count accuracy levels exceed 90% and inventory turn rates have begun to improve.

Current Review – In 2016, Supply Chain evaluated its cycle count process and increased the number of items required to be counted daily from 5 to 20. In addition, employees were retrained on the cycle count process which improved awareness of the materials management function. Subsequently, each PGW storeroom achieved a cycle count accuracy greater than 90% in fiscal years 2016 and 2017. PGW subsequently eliminated physical inventory counts outside of the cycle counting.

In addition to accuracy improvements, PGW’s overall inventory turnover ratio improved from fiscal year 2014 to fiscal year 2017 as shown in Exhibit VIII-1.

**Exhibit VIII-1
Philadelphia Gas Works
Inventory Turnover Rates by Storeroom
For the fiscal years 2014 - 2017**

Storeroom (Material Type)	FY 2014	FY 2015	FY 2016	FY 2017
Tioga (Gas Distribution)	1.97	2.20	2.18	2.37
Montgomery (Field Services)	2.39	2.27	2.84	3.97
Passyunk Mini (Passyunk Plant)	1.59	1.21	0.95	0.25
Passyunk (Spare Parts for Plants)	0.36	0.32	0.28	0.17
Richmond (Richmond Plant)	0.42	0.57	0.33	0.39
Stationery (Office Supplies)	1.83	1.44	1.31	1.52
Fleet (Vehicle and Equipment Parts)	2.5	2.51	1.80	2.05
Overall Total	2.01	2.09	2.10	2.35

Source: Data Request SC-1 and SC-12

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PGW attributes their inventory turnover improvements to the following recent changes: removing obsolete materials, better materials planning for upcoming projects or seasons, and improved minimum/maximum levels for inventory purchasing.

Supply Chain analyzed its inventory turnover by storeroom and noted that the relatively low inventory levels at the Passyunk, Passyunk Mini, Richmond, Fleet, and Stationery storerooms are more likely to experience variability in turnover from year to year due to the nature of their inventory. Accelerated main work has improved inventory turnover at Tioga while Montgomery inventory turns have increased due to better seasonal planning and analysis. Because of these efforts, PGW's accuracy and inventory turnover have improved.

Follow-up Recommendation – None

Finding No. VIII-6

Prior Situation – Supply Chain had only one vendor partnering agreement in place as of the 2015 Management Audit. Cost savings through partnering arrangements were not actively pursued by Supply Chain. In addition, the Operations Department’s informal planning on upcoming projects projected out six months to one year, which potentially limited the value and opportunity of vendor partnering arrangements.

Prior Recommendation III-13 – Pursue additional vendor partnering opportunities

Follow-up Finding and Conclusion – Supply Chain developed, but did not implement, the necessary tools to pursue additional vendor partnering opportunities.

Current Review – As presented in Finding No. VIII-1, the Supply Chain business plan contains an integrated supply model that would transform the structure of the company’s supply chain. Currently, Supply Chain purchases, warehouses, and delivers all materials used by PGW. However, this integrated supply model would shift the warehousing and delivery functions to several supply partners. Supply Chain would then serve in an oversight role by supervising and managing the supply partners, while also continuing inventory planning and delivery schedule duties. The timeline for implementing this model stretches into the third quarter of 2021 and still must be approved. Therefore, any timeline for implementation is a rough estimate until the plan is approved.

In addition to the integrated supply model, Supply Chain is proposing changes to PGW’s procurement rules. This change would allow emphasis on best value to the company, rather than lowest price. Because the new model entrusts vendors with many service-type responsibilities, lowest cost is not always the most advantageous. Supply Chain believes the changes to the procurement rules are very important to the integrated supply model, even if indirectly, to ensure supply functions maintain prescribed service levels.

Companies should periodically evaluate cost savings available through vendor partnering arrangements. Outsourcing inventory supply and delivery to a firm that specializes in materials management can save money and provide additional flexibility to focus on core business functions. However, it is important to remember proper inventory management is necessary for the business to function properly. Turning over major support components should not be taken lightly and should follow a deliberate process.

Follow-up Recommendation – Implement the integrated supply strategy, update procurement rules, and balance productivity, effectiveness, and cost savings of vendor partnership agreements.

Finding No. VIII-7

Prior Situation – As of the 2015 Management Audit, the Supply Chain Department did not maintain a documented list of approved vendors, nor were approved vendor selections impacted by any type of routine vendor evaluations. Supply Chain would solicit feedback from client departments via a Vendor/Contractor Performance Evaluation form; however, the form only covered goods and not contracted services, and the results were not summarized or used as an explicit part of the bid process. Furthermore, PGW did not include any type of vendor database and vendor feedback was not used in bid evaluation.

Schumaker noted that Supply Chain had already taken steps toward developing a written vendor management process, but that the document was still in the draft stage and dealt only with corrective action feedback to vendors.

Prior Recommendation III-14 – Develop and implement a Vendor Evaluation Program.

Follow-up Finding and Conclusion – PGW’s vendor evaluation program deals with poor performance and corrective action, but it is not used in the bid process.

Current Review – PGW implemented the vendor evaluation program without incorporating a vendor database or using the data in the bid process. The program allows client departments to identify poor performing vendors to Supply Chain. Supply Chain’s Sourcing Specialist is responsible for meeting with the client department and vendor to institute any corrective action. The program is not designed to evaluate vendors on overall quality or be used in the bidding process.

Supply Chain uses vendor scorecards to assist in bid evaluation, but they are only completed for goods suppliers and not service providers. It is important to note that PGW’s existing procurement rules limit its ability to incorporate past vendor performance into the selection process. Instead, Supply Chain, as required by City rules, evaluates bids strictly based on lowest cost. The lowest cost may not provide the best overall value to PGW, particularly if historic performance indicates a problem. PGW may be able to mitigate some poor performing vendors by eliminating them from the bidding process. As discussed in Finding No. VIII-6, Supply Chain has proposed some changes to the procurement process, but these changes were not approved by the end of fieldwork.

Follow-up Recommendation – Expand the vendor scorecard to include contracted service providers.

IX. FLEET AND FACILITIES MANAGEMENT

Background – PGW’s fleet and facilities represent motor vehicles, equipment, and structures necessary for the organization to provide gas service to its customers. The Fleet Operations division, an operational unit of the Supply Chain department, supports the organizations by maintaining more than 850 vehicles and equipment through preventive maintenance, service calls, repair and replacement of vehicle and equipment, and fuel administration. The mission of the Facilities Management department is to provide and maintain a safe, productive, and comfortable environment for all of PGW’s facilities, which includes providing proactive responses to building maintenance, energy management, and climate control issues.

In this chapter, four prior recommendations and prior situations are reviewed, and four follow-up findings and four recommendations are presented. The findings primarily relate to fleet maintenance, the fleet management information system, driver safety programs and facilities planning.

Finding No. IX-1

Prior Situation – As of the 2015 Management Audit, PGW had not considered or researched whether outsourcing more complex support functions, such as Fleet Operations, would achieve performance, efficiency, and/or cost savings.

Prior Recommendation III-10 – Periodically analyze outsourcing the Fleet function(s) to an outside contractor.

Follow-up Finding and Conclusion – **Preliminary analysis revealed potential cost savings from outsourcing fleet maintenance activities.**

Current Review – In April 2017, a consultant completed a comprehensive review of PGW’s fleet maintenance operations and practices. This review included analyzing whether fleet functions are cost-effective and efficient, evaluating benefits to outsourcing certain fleet maintenance activities, and proposing recommendations to improve overall performance and reduce costs.

The review revealed a potential for significant cost savings by outsourcing to services providers, but also expressed caution because these results were preliminary. The consultant built a cost model that allocated PGW’s budgeted costs into several major fleet functions, so they could be compared against known benchmarks. This process introduced the potential for interpretation or error in the report’s conclusions.

In August 2017, PGW finished full implementation of the FleetFocus M5 Fleet Management Information System (M5 System or FMIS). The consultant noted that poor installation and capabilities of the previous FMIS caused many problems, especially as it pertains to data collection and reliability. To avoid repeating the same mistake, Fleet employees received training for the new M5 system on multiple occasions. The M5 System may not solve all data issues upon implementation, but it will provide increased

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data collection and reporting capabilities, which should allow future analyses to identify issues and propose solutions.

Fleet Operations expects to begin auditing the M5 System in April 2018 (see Finding No. IX-2 for additional details related to auditing the M5 System). Once the audit is completed, PGW expects to issue an RFP for formal and detailed analysis of outsourcing its fleet maintenance activities. In the meantime, Fleet Operations began outsourcing transmission work and is investigating the benefits of leasing, instead of purchasing, its fleet of approximately 500 light-duty vehicles.

Fleet Operations are a critical non-core functional area with significant financial and operations impacts. Vehicles and equipment used by public utilities and the work performed often requires distinctive maintenance routines and human expertise, ongoing training and education to maintain parity with the industry's technological and functional changes, seasonal workload flexibility, and major IT resources. The costs and complexities may make contracting some or all of fleet's services appealing, yet the possible downsides of ceding control could be problematic. Any analysis for outsourcing should be exhaustive, deliberate, and consider internal capabilities. Furthermore, outsourcing decisions should balance cost and efficiency with control and service level to ensure a comprehensive business case.

Follow-up Recommendation – Develop a detailed business case for outsourcing fleet maintenance activities.

Finding No. IX-2

Prior Situation – PGW originally planned to fully implement the new M5 system in the first quarter of 2014 but delayed the project due to the potential sale to UIL Holdings Corporation. After the sale fell through, PGW planned an August 2015 implementation, but later updated the implementation timeline until the third quarter of 2017. The vendor and system requirements of the new M5 system were designed to increase automation and system functionality for all fleet operations processes, particularly in scheduling and forecasting. Despite an impressive array of potential system capabilities, no formal documentation or specific plan addressed what the management processes and reporting systems will be incorporated into the M5 system. The new system’s impact on management activities, processes, and reports will need to be developed during implementation.

Prior Recommendation III-11 – Conduct a post implementation audit of the new M5 system.

Follow-up Finding and Conclusion – PGW has not conducted a post implementation audit of the new M5 system.

Current Review – PGW Fleet Operations completed implementation of the M5 system in August 2017. Audits of an asset management software are typically conducted post-implementation to identify inefficiencies and breakdowns between the system and the company’s business practices. The solutions to these efficiencies and breakdowns help minimize decreased productivity from learning new software, verify data collection, assess system performance, and ensure the system is operating as intended. The post-implementation audit was scheduled for April 2018 subsequent to the PUC auditors’ field work.

Follow-up Recommendation – Conduct a post implementation audit of the new M5 system.

Finding No. IX-3

Prior Situation – PGW launched a comprehensive driver safety program in December 2013, which included a trial dashboard camera program with a company called DriveCam. This program encouraged safe driving performance and the reduction of at-risk behaviors. Upon activation in installed vehicles, the DriveCam system saved captured video inside and outside the vehicle. The exception-based system only saved data from before and after a sudden shift in the vehicle's g-force. DriveCam units were installed in approximately 40 employee assigned vehicles as of January 2014. Despite these initiatives, PGW continued to experience a high frequency of preventable motor vehicle accidents (PMVAs).

Prior Recommendation III-24 – Fully implement the DriveCam initiative and increase the number of loss controls to address PMVAs.

Follow-up Finding and Conclusion – PGW fully implemented DriveCam and actively uses it to promote safe driving behaviors and reduce preventable motor vehicle accidents.

Current Review – PGW fully implemented the DriveCam initiative and uses the program to teach good driving habits, prevent bad driving habits, and help mitigate risk, with an end goal of reducing preventable motor vehicle accidents. Risk Management analyzes DriveCam footage daily and conveys the results to departmental supervisors and managers responsible for discussing the footage with employees. A list and description of all preventable motor vehicle accidents is provided to upper-management bi-monthly.

Despite the variety of uses and benefits identified by Risk Management, it is still too early to determine how successful the program will be and if it can maintain success moving forward. In the six-year period from 2012 – 2017, PGW incurred the highest number of PMVAs in 2015, after beginning the DriveCam initiative. Since that time, PGW reduced PMVAs by 29% from 2015, down to 58 PMVAs in 2017. However, there is still plenty of room for improvement to reduce PMVAs further. Nonetheless, preliminary results indicate the program is working and should be continued.

Follow-up Recommendation – Continue loss prevention and positive driver behavior initiatives to reduce preventable motor vehicle accidents.

Finding No. IX-4

Prior Situation – The facilities department had documented its standard operating procedures and enhanced its maintenance tracking systems in the last several years prior to the audit. However, a comprehensive facilities plan had not been undertaken since 1986.

Prior Recommendation III-12 – Develop a comprehensive facilities plan.

Follow-up Finding and Conclusion – PGW has not developed a comprehensive facilities plan.

Current Review – PGW decided to postpone development of the comprehensive facilities plan until after the facilities consolidation study is finished. This study refers to PGW's evaluation of its aging facilities infrastructure, whether it can be expected to meet the company's needs long-term, and optimal solutions if new or updated facilities are necessary. The implications of the study could result in major changes in which facilities are used and how they are managed. The facilities consolidation study is ongoing and an approximate timetable for its completion and any decisions are unknown as of the end of field work.

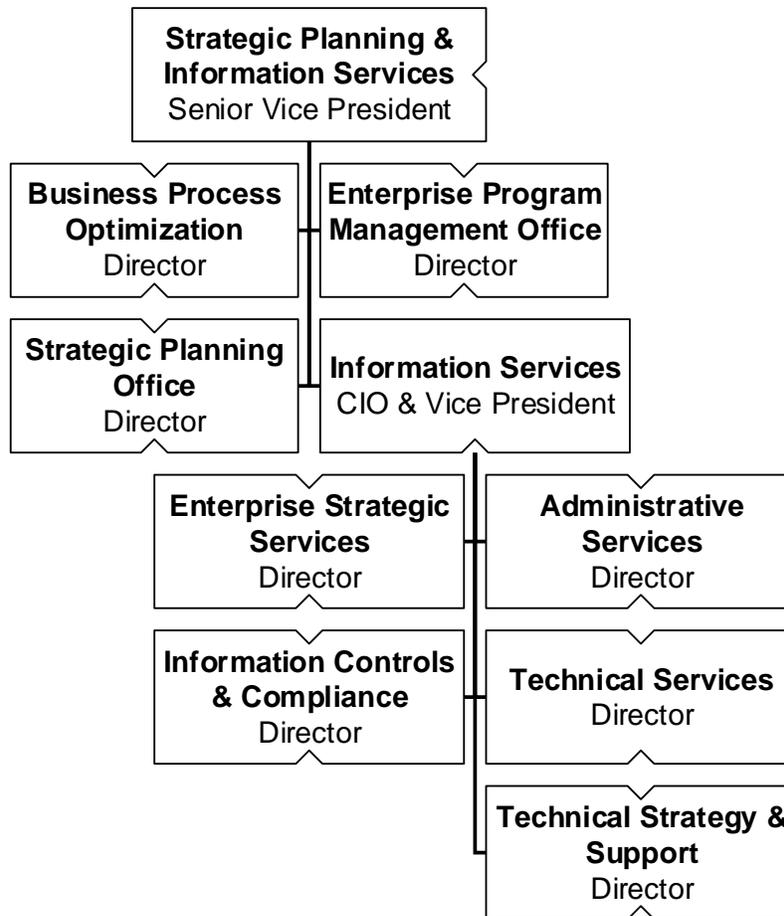
A comprehensive facilities plan helps in making optimal use of space and land resources, creating a physical environment that effectively supports the organization's key activities, and maximizes the useful life of capital assets. The Facilities Department is reluctant to begin facilities planning prior to any decisions that may result in major changes to existing facilities, including constructing new facilities, renovating buildings, and abandoning buildings. This reluctance should not preclude the department from documenting general guidelines and best practices. A draft version of the Facilities Department policy was developed in 2018 but was not finalized by the end of field work. The policy contains a mission statement and broad overview of the organizational structure and department functions but is missing or omits many topics and descriptions due to being in the very early draft stages.

Follow-up Recommendation – Continue developing effective facilities management policies with a focus on guiding principles, best practices, and general procedures easily incorporated in a future comprehensive facilities plan.

X. INFORMATION TECHNOLOGY

Background –The IS Department is functionally divided into Enterprise Strategic Services, Administrative Services, Information Controls & Compliance, Technical Services, and Technical Strategy & Support. Exhibit X-1 illustrates the organizational structure of the Information Services organization.

**Exhibit X-1
Philadelphia Gas Works
Strategic Planning & Information Services Organizational Structure
As of January 18, 2018**



Source: Data Request EM-1 (as updated in January 2018)

In this chapter, seven prior recommendations and prior situations are reviewed, and seven follow-up findings and one follow-up recommendation are presented. The findings primarily relate to project management, invoice approval, IS employee development, help desk response times, and IS expense allocation. In addition, one

information technology recommendation was not investigated due to its minor nature and overall low impact to the company.

Finding No. X-1

Prior Situation – At the time of the 2015 Management Audit, Enterprise Strategic Services (ESS) employed several IS project managers that focused on large IS projects and used PGW’s standard forms for managing projects and its project management methodology. However, PGW did not have a formal project management office (PMO) to provide broad oversight of projects.

Prior Recommendation III-1 – Conduct a formal assessment study for adding a formal PMO to the IS organization as soon as possible.

Follow-up Finding and Conclusion – PGW established an Enterprise Program Management Office.

Current Review – In October 2015, PGW issued an RFP for strategic planning consulting services to work on two related initiatives: strategic planning process formulation²⁷ and PMO development. In 2016, PGW conducted its own Project Management Maturity Assessment, which guided the vendor’s efforts regarding both initiatives.

In October 2017, PGW formed its Strategic Planning Office (SPO) and Enterprise Program Management Office (EPMO). Exhibit X-1 shows the reporting relationships of the newly formed offices within PGW. The EPMO was created to provide enterprise wide support on governance, project portfolio management best practices, project delivery, mentoring tools, and standardized processes.

In January 2018, the EPMO initiated Phase 1 of its planned roll out by testing the newly developed project management methodology on small and large projects that involve multiple departments. Phase 1 is expected to last three months. Phase 2 will expand to include additional projects and additional departments. Phase 3, which is expected to begin in July 2018, will roll out the EPMO to the whole company.

The EPMO will not replace the ESS function within IS for managing projects. Instead the EPMO will seek to enhance project management maturity throughout PGW. With the formation of the EPMO, ESS anticipates adopting aspects of the EPMO’s project management methodology, which is discussed in Finding No. X-2 within this chapter.

Follow-up Recommendation – None

²⁷ For additional information about the strategic planning initiative see Chapter III – Executive Management.

Finding No. X-2

Prior Situation – Most IS processes were described in summary form within the *Blueprint of Operational Excellence* and *Project Development Methodology* documentation, which had not been revised since September 2011 and August 2010 respectively. Sufficient examples were also not provided in the *Project Development Methodology* documentation to ensure an IS employee could easily understand how to implement topics discussed within the document.

Prior Recommendation III-2 – Expand IS project management methodology documentation and review at least annually, and revise as appropriate.

Follow-up Finding and Conclusion – Project management methodology documentation has been revised and is reviewed annually.

Current Review – The IS project management methodology documentation was updated in March 2016 with revisions occurring in 2017. PGW plans to review the documents annually. As discussed in Finding No. X-1 within this chapter, the IS project management methodology will be revised in 2018 to align with the newly formed EPMO. Having more detailed guidelines in place increases the likelihood that IS employees will easily understand how to implement the methodology requirements. Furthermore, the newly formed EPMO may have a positive effect on project management methodology throughout PGW by standardizing documentation and enhancing understanding of project management.

Follow-up Recommendation – None

Finding No. X-3

Prior Situation – The ESS group within the IS department oversaw the management of projects at PGW involving technology. During the 2015 Management Audit, more than 35% of the projects were behind schedule, despite being within budget. However, it was found that the project plan and schedule provided was not sufficiently detailed to show the work breakdown structure of the projects reviewed. To facilitate project management, project plans and schedules should include a work breakdown structure, plus a schedule showing actual results of individual tasks against a baseline schedule.

Prior Recommendation III-3 – Develop comprehensive project plans and schedules by incorporating additional detailed information and data.

Follow-up Finding and Conclusion – PGW's IS projects have comprehensive project plans and schedules.

Current Review – After implementation of new project management software in 2015, PGW has more robust project plans, status reports, and project dashboards. Project plans include the project timeline with a detailed work breakdown structure. According to IS leadership, the new project management software is a vast improvement over the homegrown system that it replaced because it allows PGW to standardize documentation and reporting via a web-based platform. The new documentation is used in weekly meetings by IS management and project managers to discuss the status of projects.

Follow-up Recommendation – None

Finding No. X-4

Prior Situation – During the 2015 Management Audit, PGW did not utilize automated electronic workflows, which resulted in paper copies of invoices being sent to appropriate IS directors for approval. Paper copies of IS invoices were then sent to Accounts Payable (AP) for payment processing.

Prior Recommendation III-4 – Configure the Accounts Payable system to allow electronic workflow, including approval of vendor invoices, and eliminate the need for sending paper invoices to the Accounts Payable group for payment processing.

Follow-up Finding and Conclusion – PGW now uses an electronic workflow for approving IS invoices.

Current Review – As of September 2015, all vendor invoices are submitted electronically for director approval via Oracle. When a paper invoice is received, it is scanned, and an electronic version is uploaded into Oracle to enable an automated electronic workflow for approval. The paper invoice is still sent to AP consistent with its policy for record retention but is no longer used for approval purposes. In addition, PGW has started to request electronic invoices from its vendors, which would reduce the need to scan and retain paper invoices.

Follow-up Recommendation – None

Finding No. X-5

Prior Situation – IS employees attended an average of roughly six technical training sessions annually over a five-year period with a large variation in the number of sessions by employee. No formal development plans were in place to ensure that IS management were properly monitoring and addressing training requirements for its employees. The lack of plans made it difficult for IS management to assess if additional training was required for specific employees.

Prior Recommendation III-5 – Implement use of systematic employee development plans for IS employees.

Follow-up Finding and Conclusion – Employee development plans are utilized for IS employees.

Current Review – IS leadership created *Excel* spreadsheets to track skill sets and completed trainings for each employee. At the beginning of each fiscal year, IS leadership reviews employees' skills and discusses training needs. In 2017, three individual goals were created for each IS employee based upon company goals and employee aspirations. Each IS employee's training requirements and individual goals form the basis of the employee development plans. These employee development plans are maintained manually until the HR department transitions from its current performance management system to new software. With increased focus on employee development, IS leadership can more accurately track the training needs of its employees and better align employee goals with the company and departmental objectives.

Follow-up Recommendation – None

Finding No. X-6

Prior Situation – PGW tracks their help desk response times, dividing them into three categories, based on the required task: high security level, medium security level, and medium security contractor. Medium security contractor tasks are those handled by contractors, such as providing replacement desktops, or reinstalling the operating system. As of the 2015 Management Audit, help desk response times were generally met, except for the medium security-level category for contractors. Of the three categories where activities occurred (high, medium, and medium contractor), the result for the high category was good and the result for the medium category was reasonable; however, the result for the medium contractor was unsatisfactorily low. The medium contractor response time was below 90% of tickets completed within 2 hours.

Prior Recommendation III-6 – Take actions to improve Help Desk performance to meet targets.

Follow-up Finding and Conclusion – PGW has acted to improve help desk performance but has not consistently achieved its targets.

Current Review – Subsequent to the Management Audit, an investigation was conducted into why medium security-level help desk activities, especially those performed by contractors, were not meeting a 90% service level. The primary cause was determined to be the fact that computer replacement tickets are time-consuming to complete. PGW claimed that computer upgrades and deployments require analysis and testing time, and therefore should not be included in the Service Level Agreement (SLA) metric reporting. However, PGW has not altered its ticket tracking methodology or found a way to accelerate computer replacement. Instead, PGW focused on retraining their ticket submitters to enter SLA response times correctly and had desktop technicians attend weekly Customer Value meetings, where open tickets are discussed and monitored.

The average SLA on-time response ratio for medium contractors from September 2016 to August 2017 was 92%; however, the response time declined to 85% in March 2017 and to 86% in August 2017. Thus the 90% service level was met for eleven of the 13 months surveyed. PGW determined that the cause of the lower response time ratios was due to laptop deployments as described above, though eliminating those deployments from the reported statistics would still not allow PGW to meet its 90% service level. PGW's internal service level standard is 95% of tickets completed within 2 hours, which was only met for two of the thirteen months surveyed.

The actions taken to improve the help desk service levels have resulted in an improvement in service levels, but the main cause of the issue, computer replacement tickets, was not addressed and is still captured within the metric. Therefore, PGW is still failing to meet its internal 95% service level standard.

Follow-up Recommendation – Improve medium security-level help desk ticket performance.

Finding No. X-7

Prior Situation – Between the 2007 and 2015 Management Audits, the IS department revised how it charged other departments within PGW for IS services (a process referred to as IS chargebacks). An IS Allocation spreadsheet was developed to budget the anticipated costs charged to each department based on estimated actual costs, and estimated allocated default and telecom costs, which are based on device counts. IS management estimated that 45% of its expenses could be charged directly, whereas the other 55% was charged based on device count data. Schumaker could not verify that actual monthly charges to each department reflected periodic changes to the number of devices (i.e., PCs, phones, etc.).

Prior Recommendation III-7 – Develop detailed policies and procedures involving IS chargebacks, not only during the budget cycle but also involving any changes in actual charges during the fiscal year.

Follow-up Finding and Conclusion – **The IS department developed procedures for budgeting and allocating IS chargebacks; actual charges reflect changes to the number of devices used by each department.**

Current Review – The Administrative Services function within the IS department is responsible for updating the IS Allocation spreadsheet annually as part of the budgeting process. An *IS Planning and Budgeting Procedures* guide describes the IS assets (computers, laptops, printers, phones, etc.) that are used as the basis for the allocated expenses portions within the IS allocation spreadsheet. The Finance department uses the IS Allocation spreadsheet to charge actual IS expenses each month to the appropriate departments based on their percentage of total devices. The Manager of Administrative Services is responsible for maintaining the inventory count of IS assets and provides updated information to the Finance department monthly. As a result, PGW is allocating and charging IS department expenses to departments based on the number of IS assets used by that department.

Follow-up Recommendation – **None**

XI. CUSTOMER SERVICE

Background – PGW’s customer service organization²⁸ includes marketing, regulatory compliance and customer programs, and customer service and collections. The focus of this chapter is PGW’s customer service and collection functional area, which is led by the vice president of customer service and collections (VP CS). The VP CS has three direct reports, including the Director of Customer Service Operations (Director CSO), the Director of Credit and Collections, and the Director of Commercial Resource Center. The Director CSO is responsible for PGW’s call center, district offices (DOs), and quality assurance department. The Director of Credit and Collections is responsible for billing and payment processing, account management, and collections for all customers (residential, commercial, and industrial).

In this chapter, nine prior recommendations and prior situations are reviewed and nine follow-up findings, one additional finding, and six recommendations are presented. The findings primarily relate to: customer service satisfaction, separate tracking for DO expenses, alternative in-person payment options, enhancement of customer systems, implementation of risk-based collections for commercial and industrial customers, reduction of long-term accounts receivable balances, investigation of unrefunded credit balances, remediation of underbilling for gas service, redress of incorrectly installed metering devices, and call center turnover rates. In addition, one customer service recommendation was not investigated due to its minor nature and overall low impact to the company.

Finding No. XI-1

Prior Situation – PGW’s overall customer service satisfaction scores reflected performance below the average of Pennsylvania’s regulated natural gas distribution companies (NGDCs). More specifically, PGW’s scores from 2011 through 2014 were the lowest of the eight participating NGDCs. PGW hired a new Director CSO in May 2014 who increased hiring standards and implemented a more robust training program including: continuous employee development, more frequent monitoring and feedback, and periodic refresher training for call center customer service representatives (CSRs). Due to the relative timing, there was insufficient data to determine the overall impact of the initiatives implemented by the new Director CSO on customer service performance.

Prior Recommendation VIII-1 – Continue to institutionalize recent efforts to strengthen call center operations.

Follow-up Finding and Conclusion – PGW’s overall customer service satisfaction scores have significantly improved.

Current Review – PGW conducts a layered hiring process for CSRs that includes preliminary role-playing scenarios and written assessments, candidates who achieve

²⁸ PGW’s Executive Vice President and Acting Chief Operating Officer has oversight of PGW’s company-wide customer service organization, as well as other functional areas, including Gas Management and Technical Compliance and Gas Planning.

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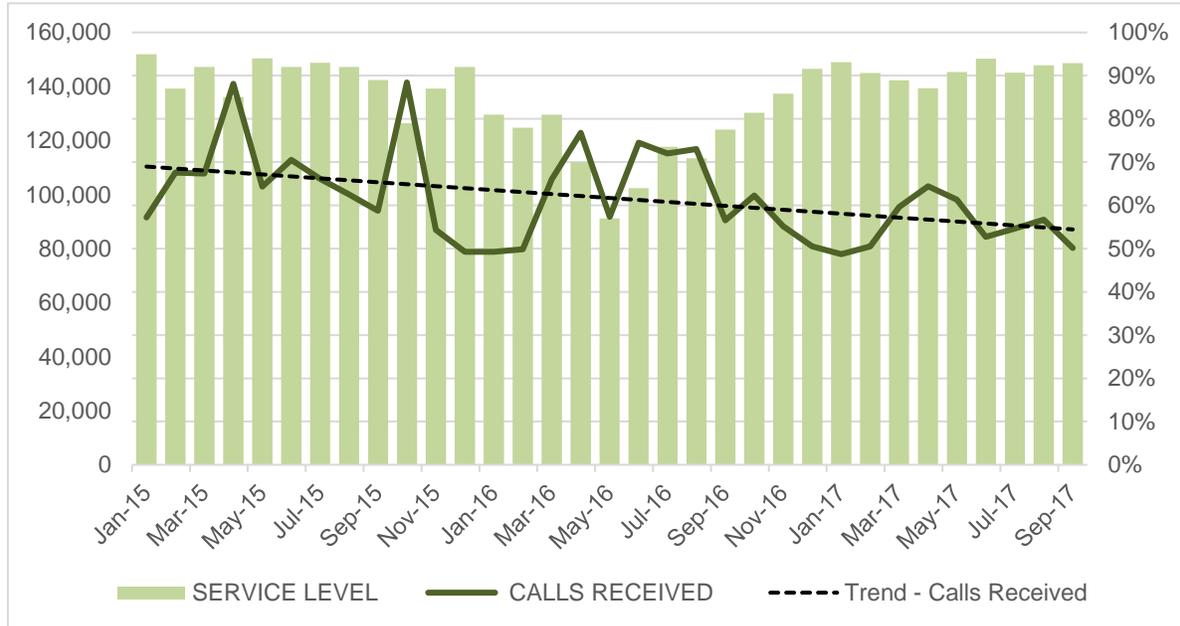
satisfactory scores are immediately interviewed. Upon hire, new CSRs enter a comprehensive four-month training program that combines classroom, observation, and hands-on educational measures. The training program includes three training segments followed by a one-month incubation period. Each training segment is comprised of three weeks of curriculum and one week of active phone work. The incubation period provides additional oversight and training support for the newly hired CSRs prior to their placement within their respective call center teams.

PGW's CSRs receive feedback through rigorous call monitoring and quality assurance support. PGW's Quality Assurance Department monitors a minimum of four calls per CSR per month. Every month each call center supervisor monitors and assesses two calls for each of their direct reports. Calls are evaluated to identify areas of weakness for supplemental training and support. CSRs are provided with weekly feedback on their evaluations by their supervisors and monthly coaching sessions which include individualized supplemental support and performance trends.

In addition to the changes made in CSR hiring, training and call quality assurance, PGW launched a new phone system in February 2016. The new system enhanced the call center by integrating PGW's DO staff so they could provide call support. The new telephone system is used during periods with increased collections activities, such as supporting after-hours calls. During periods of high call volume, the new system allows customers the virtual hold option. The virtual hold allows customers to receive a call back from PGW, rather than wait on hold. These features and improved training contributed to PGW's average call abandonment rate decreasing from 7.7% in 2015 to 3.7% between January and October 2017. As shown in Exhibit XI-1 from January 2015 through October 2017, PGW's call center performance metrics reflected significant service level²⁹ improvements along with a substantial decrease in call volume.

²⁹ Service level is the percentage of received calls that are answered within 30 seconds by a CSR.

**Exhibit XI-1
Philadelphia Gas Works
Call Center Service Level^ and Calls Received Statistics
January 2015 through October 2017**

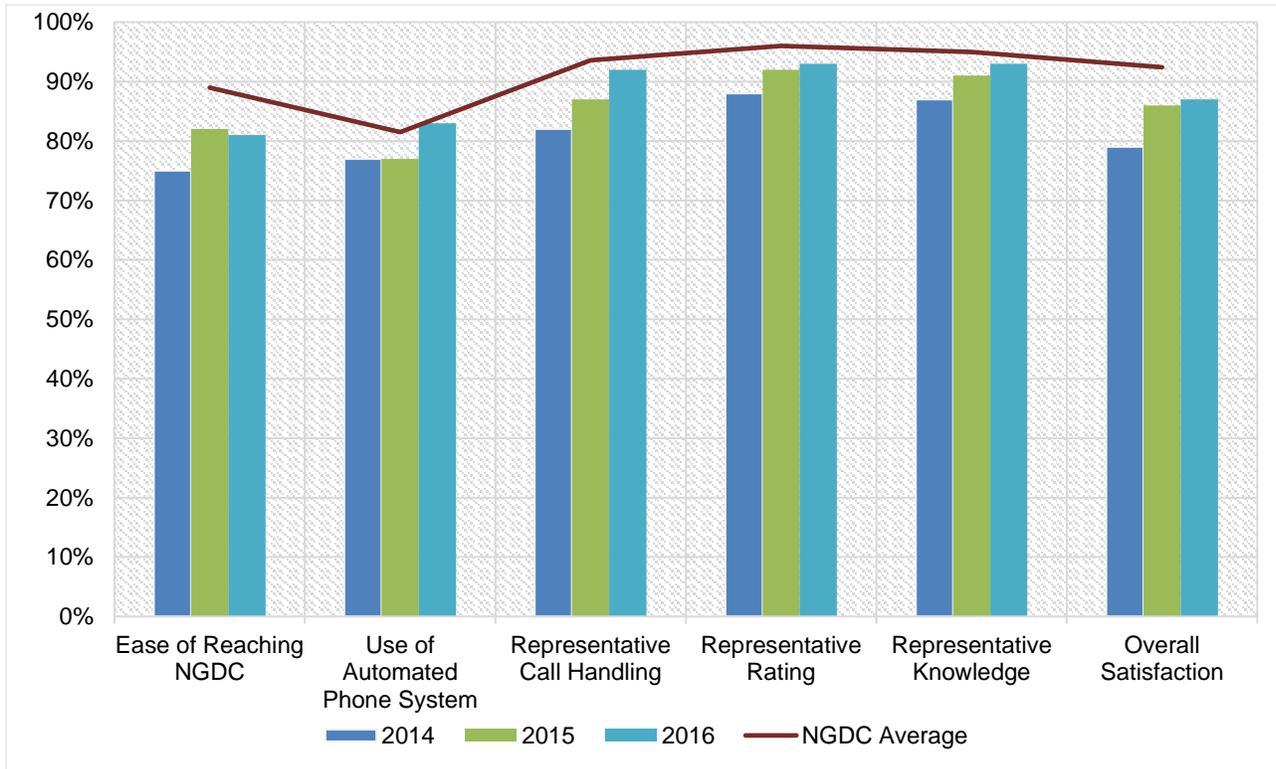


^ Service level is the percentage of calls answered within 30 seconds

Source: Data request CS-1

PGW primarily focuses on call quality to facilitate first call resolution, which eliminates repeated calls to resolve customer inquiries and drives customer satisfaction. First call resolution performance is measured by PGW’s third party surveyor, who contacts customers for post-transaction confirmation. As shown in Exhibit XI-2, the changes implemented by PGW have significantly improved PGW’s customer service performance between 2014 and 2016. Furthermore, as demonstrated in Exhibit XI-2, PGW’s customer service satisfaction performance more closely aligns with the Pennsylvania NGDC average.

**Exhibit XI-2
PGW versus 2016 NGDC Average
Customer Service Performance Report
Summary of Customer Transaction Survey Results
For the Years 2014, 2015, and 2016**



Note: Pennsylvania NGDC Average includes data from NFG, Peoples-Equitable, Columbia, Peoples, UGI Penn Natural, UGI Gas, and PGW

Source: Customer Service Report 2014, Customer Service Report 2015, and Customer Service Report 2016

PGW strives to improve customer experience through its efforts impacting CSR hiring, training, engagement, and retention, as well as leveraging technology to more effectively meet customer needs. Exhibits XI-1 and XI-2 highlight that PGW’s hiring, training, and technology deployment efforts have improved performance. For additional details related to company efforts concerning CSRs see Finding No. XI-2 and for more information on PGW’s technology enhancements see Finding Nos. XI-4 and XI-5.

Follow-up Recommendation – None

Finding No. XI-2

Additional Finding and Conclusion – PGW’s call center experiences high turnover.

Current Review – As discussed in Finding No. XI-1, PGW achieved significant improvements in call center performance through a myriad of efforts. However, PGW customer satisfaction scores remain lower than the PA NGDC average.

While many factors impact customer satisfaction performance, the PUC auditors observed a markedly higher than average level of turnover³⁰ for PGW’s call center CSRs from 2015 to 2017. The International Customer Management Institute’s (ICMI) 2012 Contact Center Agent Salary, Retention, and Productivity Report surveyed 444 call centers and reported the median of approximately 10% for employee turnover due to departures (i.e., external departures). As shown in Exhibit XI-3, PGW’s call center CSR turnover rates far exceed the average reported by ICMI.

**Exhibit XI-3
Philadelphia Gas Works
Call Center CSR Turnover Rates and Departures
January 2015 – December 2017**



Source: Data Requests CS-3 and CS-15

PGW postulated that they operate in a highly urbanized area with a competitive job market thus PGW’s call center experiences higher levels of separations due to

³⁰ Excludes internal separations (e.g., job promotion or transfer).

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employee mobility. Other factors, such as stress, may also play a role in the high turnover rate.

In 2017, the Director CSO began holding exit interviews for CSRs. The exit interviews reflected a high stress, demanding work environment as the main cause for separation. In response to the feedback received, the Director CSO expanded training to include proactive support for CSRs (i.e., to alleviate stress due to the reactive nature of the job). For example, prior to PGW's collections campaign, the Collections Department gave a presentation to the CSRs which included a review of the form letters being sent to customers and helped to prepare CSRs for the types of questions that would be asked by affected customers. These efforts appear to have been successful.

As shown in Exhibit XI-3, PGW reduced the level of its call center employee turnover in 2017. The company attributes the improvements to the continuing and comprehensive efforts made through PGW's hiring, training, employee engagement, and retention initiatives. PGW's Customer Service and Human Resources departments work together to improve hiring and selection techniques on an ongoing basis. In addition, these departments work together in establishing engagement and retention measures which include wellness programs, team building, etc.

Based upon the reduction in separations in 2017 and the improvement in call center statistics in Finding No. XI-1, it would appear PGW may have an effective program to reduce turnover. However, these initiatives take time to fully develop and often must adapt to changing conditions. PGW should continue to work on improving turnover and fostering engagement with its call center employees.

Follow-up Recommendation – Improve call center employee turnover levels closer to industry averages.

Finding No. XI-3

Prior Situation – PGW maintained six customer service district offices (DOs) where customers could make payments and account inquiries, as well as request service, LIHEAP³¹ assistance grants, and payment arrangements. No more than four DOs were open on any business day, with DO availability attributed to staffing constraints. Generally, most investor-owned and municipal utilities have migrated away from the high cost of maintaining multiple customer service district offices. The costs associated with PGW’s DOs was not tracked separately from other customer service function costs, nor were individual DO costs identifiable. As such, PGW was not able to assess the costs associated with maintaining each of the six DOs, and therefore, PGW lacked the cost-benefit data required to develop the most effective strategy for customer service.

Prior Recommendation VIII-2 – Budget and track costs separately for each District Office.

Follow-up Finding and Conclusion – PGW tracks charges related to the operations of its District Offices.

Current Review – PGW’s customer service operations budget encapsulates PGW’s six DOs and its Center City Operations that includes the call center. Although it is not a common industry practice, PGW views its operation of the DOs as an effective and necessary strategy for delivery of customer service within Philadelphia and does not budget by individual DO. Alternatively, the company tracks and identifies a significant portion of the expenses related to each DO (i.e., staffing, rents, and parking expenses).

A review of the 2018 budgeted expenses reflect a limited amount of the budget committed to the operation of PGW’s DOs. The expenses related to the operation of PGW’s DOs include DO-specific expenses and other common expenses that are not broken out by DO. For example, DO-specific expenses include rent and parking fees. It is noteworthy to mention that three of the six DOs are rented, whereas the other three are PGW-owned. Whereas, common expenses, such as security systems, remittance pick-up, etc. are not assigned or allocated between the individual DOs but are captured as independent budget line items. The total expenses³² for operation of the DOs comprises approximately 16% of the overall 2018 customer service operations budgeted expenses.

PGW’s most significant cost of operation of the DOs is labor, which is tracked via PGW’s staffing levels for customer service operations. DO staffing levels are determined based upon customer needs, averaging 44 CSRs between 2015 and 2017. As staffing levels are driven by customer volume, cost benefits from the reduction of staff related to the closure of any DO would be blunted from the increased customer demands at the remaining DOs, likely requiring additional staffing.

³¹ Low Income Home Energy Assistance Program is a United States Department of Health and Human Services social services program that provides grants to assist qualifying low-income households with energy costs.

³² Total expenses, as calculated by PUC auditors, exclude labor costs and are limited to: rent and parking fees (direct expenses) and other purchased service expenses (indirect expenses).

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PGW's DOs perform a substantial level of in-person transactions to serve customers, averaging 500,000 customer transactions annually between 2015 and 2017. These customer services include the intake for LIHEAP and Customer Responsibility Program³³ applicants. Such programs are critical for low-income customers struggling to maintain natural gas service and require submission of private and sensitive customer information. As PGW's customer base includes a significant level of low-income customers, the company provides multiple DOs throughout the City of Philadelphia to serve customers who would otherwise be subject to hardship in accessing services. PGW considers the operation of its DOs as essential for the delivery of services to its customers. Furthermore, the company is committed to ensuring the security and availability of customer services throughout its service territory.

While PGW does not track all its DO costs separately, it captures enough expense data to evaluate the cost effectiveness of its DOs should it need to reevaluate the cost benefit for maintaining all six locations in the future. For now, PGW's Management emphasized the importance of the six DOs in meeting customer demand and company strategy. Should conditions change, particularly with increasing online resources, PGW may need to reconsider the cost effectiveness of its DOs.

Follow-up Recommendation – None

³³ PGW's PUC-approved customer assistance program for low-income customers.

Finding No. XI-4

Prior Situation – PGW’s DOs experienced nearly a 20% decline in the number of in-person payments between 2007 and 2014 while customer service inquiries at DOs increased. Customer inquiries included requests for service, account inquiries, assistance with applications for LIHEAP grants, and payment arrangements. In addition to the DOs, PGW customer payments were also accepted via third-party locations throughout the City of Philadelphia.

Prior Recommendation VIII-3 – Evaluate and implement alternative in-person customer service options.

Follow-up Finding and Conclusion – PGW plans to implement an alternative in-person payment option at its District Office locations in 2018.

Current Review – In response to PGW’s strategic initiative to improve customer services³⁴, PGW initiated a request for proposals for the enhancement of customer services, including placement of automated kiosks in its DOs. The kiosks will provide an alternative in-person payment option for PGW customers, providing increased convenience while reducing wait times and positively impacting overall customer satisfaction.

PGW’s kiosks will serve as an alternative for in-person customers to make payments. Initially, PGW anticipates that the kiosks will accept both cash and credit card payments. The kiosks provide additional security by detecting counterfeit cash and pre-set parameters will enforce restrictions on specific accounts. For example, a subset of in-person customers are subject to cash-only alerts, where a customer account who previously paid with a returned check (due to insufficient funds or fraudulent use) is subject to a 12-month period where payments must be made only by cash, cashier’s check, or money order. The kiosk parameters will require those accounts with cash-only alerts to be made by cash.

PGW estimates that the kiosks will substitute for one DO staff member in each location which will free up the remaining staff for value-added services. Thus, PGW projects a payback period of one to two years, allowing for customers to adjust to use of the kiosks. Initially, PGW plans to introduce a kiosk at one DO by April 2018 and upon successful implementation, place additional kiosks in the remaining five DOs by the end of the calendar year. The addition of automated kiosks should provide an improved customer experience and a less costly delivery platform for receipt of PGW customer payments.

Follow-up Recommendation – None

³⁴ For additional information about the strategic planning initiative see Finding No. III-2.

Finding No. XI-5

Prior Situation – PGW expressed a desire for functional enhancements to customer systems, including payments, billing, and notifications through mobile applications, email and text alerts, and self-service kiosks in the Customer Service Centers.

Prior Recommendation VIII-4 – Develop a plan for enhancing customer systems, including use of mobile applications for making customer payments.

Follow-up Finding and Conclusion – Although PGW plans to begin installing kiosks in early 2018; mobile applications and electronic alerts remain in the planning phase.

Current Review – PGW plans to begin installing kiosks in their customer service centers in 2018. The kiosks are intended to provide a fast and convenient in-person payment alternative to customer-representative interactions and should indirectly improve waiting time by reducing the number of customers in line. Overall service-levels should improve as a result; however, the kiosks will provide no benefit pertaining to electronic communications such as mobile applications, which were still being developed by the vendor during the audit period.

The company selected a vendor to create and develop mobile application software, but the project remains in the planning phase. There are numerous conditions that necessitate a customer's interactions with their utility. Modern technology should be leveraged to offer solutions that make these tasks simpler and more convenient.

Follow-up Recommendation – Expand and improve customer engagement through mobile applications.

Finding No. XI-6

Prior Situation – Beginning in 2008, PGW’s residential customer accounts have been subject to a risk-based collections process, in which an account’s risk rating would determine how PGW attempted to collect on the debt. Conversely, commercial and industrial accounts with outstanding balances were written off and were not referred to collection agencies. Only commercial accounts with residential end use, such as landlord-tenant accounts, were included in PGW’s risk-based collections process.

Prior Recommendation VIII-5 – Further incorporate commercial/industrial accounts into PGW’s risk-based collections process, including sending more accounts to collection agencies.

Follow-up Finding and Conclusion – PGW is in the process of implementing risk-based collections for its commercial and industrial accounts.

Current Review – Generally, commercial and industrial risk-based collections processes would be similar to the processes employed for residential risk-based collections; however, a portion of the scoring element for commercial and industrial customers would include the level of usage. PGW’s residential risk-based collections follow specified collections paths depending upon risk score: low, moderate, or high risk. Risk score is based upon historical data (number of payments made, number of collections events, etc.). The prompt collection of outstanding balances reduces the risk of loss for non-payment; therefore, higher risk scores should follow more aggressive collections paths. In this fashion, risk-based collections should increase collection rates and reduce uncollectable balances.

PGW began placing its closed commercial and industrial accounts with final outstanding balances with its third-party collections agencies in October 2017. However, due to the limited timeframe evaluated, PGW had not realized any material improvement in collections. As of December 2017, PGW was working with a third-party vendor to implement processes for risk-based collections for its commercial and industrial accounts, which it plans to complete in 2018. It is worth mentioning that PGW’s commercial account collections processes must offer special protections and exceptions to certain customers such as hospitals.

Follow-up Recommendation – Complete the implementation of risk-based collections processes for commercial and industrial accounts.

Finding No. XI-7

Prior Situation – In 2014, approximately 78% of PGW’s residential customer accounts receivable were greater than 90 days old. PGW attributed the high delinquency percentages to the sizable poverty base in Philadelphia, affecting a significant number of PGW’s residential customers. PGW’s average residential customer account balances exceeding 90 days was approximately \$2,500. In most cases, low-income customers did not make payments between December 1 through March 30³⁵, increasing PGW’s residential accounts receivable balances greater than 90 days old.

Prior Recommendation VIII-7 – Place greater emphasis on decreasing the number and amount of over-90-day-old accounts.

Follow-up Finding and Conclusion – **PGW has reduced its levels of residential accounts receivable balances; however, the over 90-day accounts receivable aging balances remain high.**

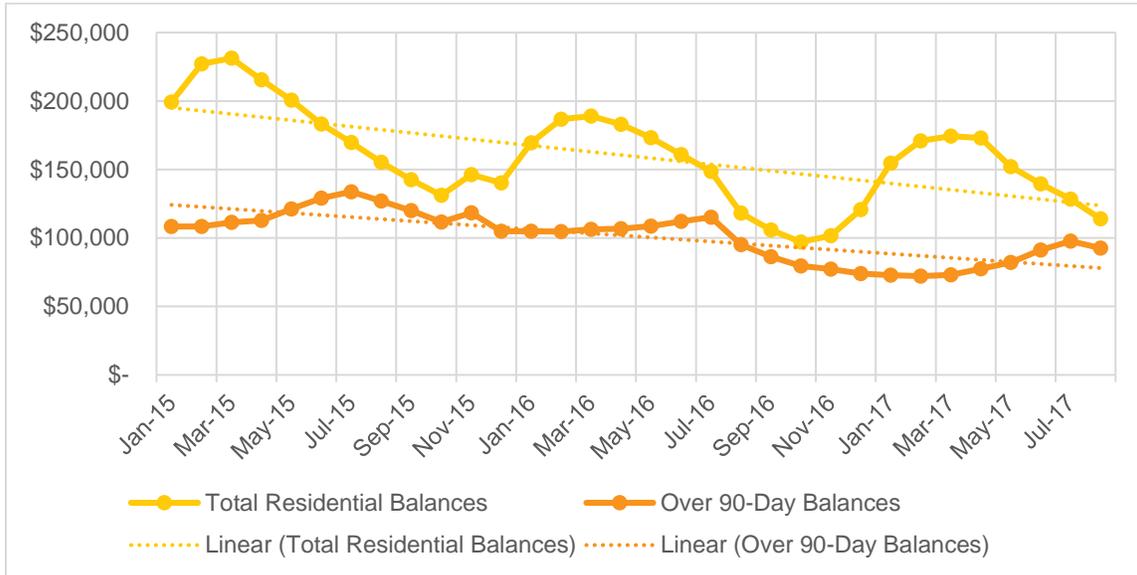
Current Review –The PUC auditors’ review determined that PGW continues to experience a high level of over 90-day accounts receivables. The review consisted of an analysis of PGW’s 2015 through 2017 residential accounts receivable balances, as well as examination of the company’s efforts to reduce its long-term outstanding accounts receivable balances including PGW’s third party collections practices and risk-based collections procedures. The PUC auditors concluded that PGW should continue to reduce their level of over 90-day account receivable balances through their collections efforts.

An analysis of PGW’s residential accounts receivable aging reports reflected a decrease in overall account balances. As shown in Exhibit XI-4, a comparison of PGW’s total residential accounts receivable balances and over 90-day residential accounts receivable balances illustrate the decrease in accounts receivable balances for both total and over 90-day aged balances. PGW’s residential account receivable balances are directly affected by the seasons, with the company’s peak total residential balance occurring in March (the end of the cold weather interim period) of each year, as reflected below. A factor in the decline was a 7% decrease in PGW’s overall gas rates in 2017, from 2015 gas rates³⁶. As such, PGW’s residential accounts receivable balances have trended lower overall, at least partially due to the reduction in natural gas prices between 2015 and 2017 but could also be influenced by other factors such as affordability, energy efficiency, etc. Nonetheless, the PUC auditors also examined the company’s efforts to improve long-term outstanding accounts receivable balances.

³⁵ Low income customers are protected from termination for non-payment during this period per 66 Pa. C.S. Chapter 14.

³⁶ Data provided in the 2015, 2016, and 2017 PUC Annual Rate Comparison Reports.

**Exhibit XI-4
Philadelphia Gas Works
Total Residential Accounts Receivable Balances vs.
Over 90-Day Accounts Receivable Balances (\$ in thousands)
January 2015 – August 2017**



Source: Data Request CS-8

As of October 15, 2017, PGW began using a third party to manage accounts distributed between multiple collection agencies based upon performance. Additionally, PGW also increased the number of collection agencies it uses from five to nine. Due to the timing of the implementation, the PUC auditors were unable to determine the impact due to PGW’s collections performance on accounts receivable balances.

As mentioned previously in Finding XI-6, PGW also implemented a risk-based residential collections processes in 2008, which may be influencing the trend in Exhibit XI-4. Risk-based collections focus on overdue accounts that are not exempt from PGW’s collections efforts (e.g., CAP, PAR, and low-income customers who forgo making regular payments during the cold weather interim period, etc.). These collection efforts attempt to change the behavior of late paying customers and focus collection activities based upon risk score (see Finding No. XI-6 for additional details related to PGW’s residential risk-based collections). Risk-based collections target overdue and high balance accounts, which are not exempt from PGW’s collection efforts, to drive down balances before the account attains a high risk status.

Despite the company’s efforts, PGW’s total residential accounts receivables continue to be largely comprised of over 90-day aged balances. The over 90-day aged account balances ranged between 42% to 84% of PGW’s total residential accounts receivable balances between January 2015 and August 2017. The timely collection of outstanding balances reduces the risk of loss from non-payment. Therefore, PGW

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should continue to apply its collection strategies in effort to reduce its high level of long term account receivable balances.

Follow-up Recommendation – Continue to reduce long term accounts receivable balances through risk-based collections practices.

Finding No. XI-8

Prior Situation – Between 2009 and 2013, PGW’s rate for completed refunds of terminated customers’ credit balances exceeded 60%. However, the success rate for completing refunds to terminated customers dropped to 27% in 2013.

Credit balances on customer accounts occur from customer overpayments, customer deposits, and budget billings. Once the customer account was closed, credit balances were refunded to the terminated customer. When refunds total \$300 or more, PGW’s Customer Accounting group reviewed the amount prior to sending the refund. In cases where the refund payment was returned to PGW, the company attempted to resolve the credit balance within the next five years. In July 2014, the timeframe for resolution was reduced to three years. Upon expiration of the resolution timeframe, unclaimed refunds are forwarded to the escheat program at the Pennsylvania Treasury Department.

Prior Recommendation VIII-8 – Identify and address why the number of customers being refunded their credit balances following closing has decreased from roughly 62% to 27%.

Follow-up Finding and Conclusion – PGW’s investigation into credit balance refunds is ongoing.

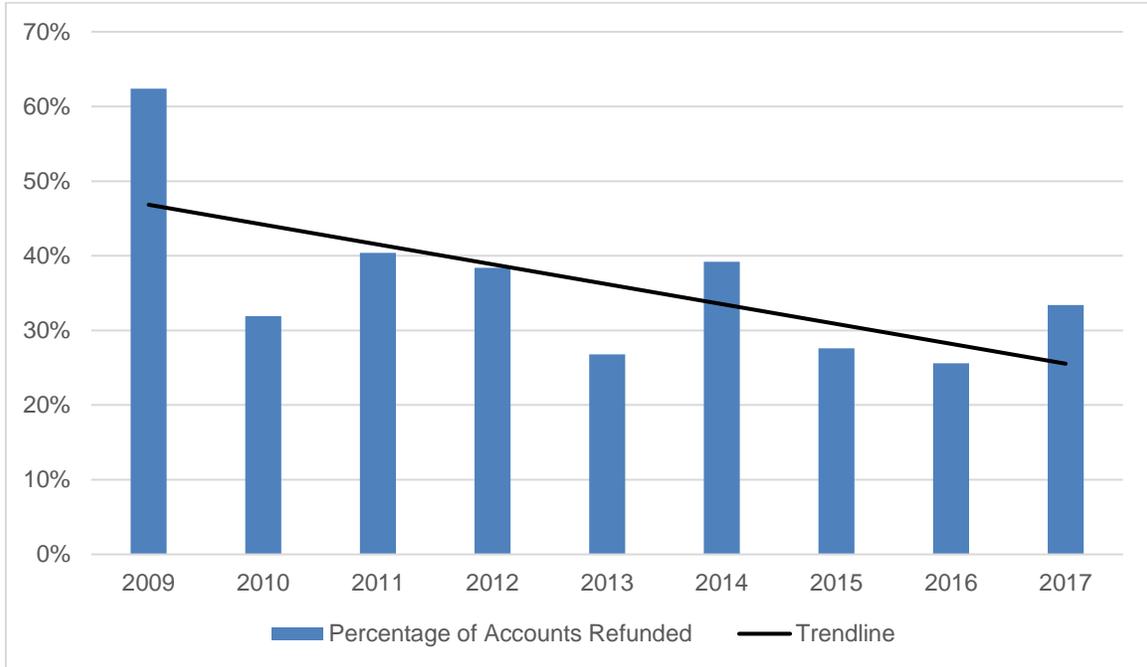
Current Review – In 2017, in response to the 2015 Management Audit recommendation, PGW began conducting a root cause analysis to determine why the rate for credit balance refunds had dropped precipitously. As of November 2017, PGW had found several possible explanations, including challenges from LIHEAP grant requirements³⁷ and escheatment³⁸. PGW also identified several transient customers (i.e., college students), who failed to provide forwarding addresses, as a contributing cause.

However, PGW is still reviewing its escheat process and projects completion of the root cause analysis in the second quarter of 2018. Exhibit XI-5 summarizes the annual percentage of closed accounts with credit balances successfully refunded from 2009 through 2017. As demonstrated by Exhibit XI-5, the ratio of successful account refunds has continued to decline over the period.

³⁷ Excess amounts derived from LIHEAP grants must be returned to the Pennsylvania Department of Health and Human Services within one year.

³⁸ Process used to distribute refunds due to deceased account holders without a legal heir or will. In 2014, the Commonwealth of Pennsylvania changed the holding period for escheatment from 5 years to 3 years. Thus PGW’s 2014 escheatment totals were much higher than in other years.

**Exhibit XI-5
Philadelphia Gas Works
Percentage of Credit Balances Refunded
For the Years 2009 through 2017**



Source: Data Request CS-13

Customers with credit balances should receive timely refunds. PGW has not completed its root cause analysis, and therefore, is unable to determine the actions required to increase the rate of successful refunds to customers with final accounts containing credit balances.

Follow-up Recommendation – Complete the root cause analysis and adjust processes as needed to resolve completion of refunds to customers with credit balances.

Finding No. XI-9

Prior Situation – In 1995, PGW began installing encoder receiver transmitter (ERT) devices on meters to achieve efficiencies via automated meter reading. Due to PGW’s lack of standardized installation protocols for the ERT devices, contractors and PGW internal staff incorrectly installed an unknown number of ERT devices. This resulted in underbilled accounts for affected customers due to inaccurate meter readings which in some cases extended over a period of several years. Consequently, PGW issued make-up bills to rebill customers once the affected ERT devices were identified. PGW had implemented corrective procedures in 2004; however, PGW was unable to confirm the number and location of improperly installed ERT devices as of 2014 that remained actively in service.

Prior Recommendation VII-16 – Determine the number and location of residential meters that may have the incorrect ERT protocol and implement corrective measures.

Follow-up Finding and Conclusion – PGW identified and replaced all incorrectly installed ERTs by 2017.

Current Review – Upon review, PGW confirmed that 1,000 ERTs installed during the final phase of its meter changeover from manual to automated meters was performed with the wrong protocol. Under PGW’s 20-year meter replacement schedule³⁹, all residential meters in the final phase were due for replacement prior to the close of 2017. PGW implemented adequate corrective processes and quality control measures to remedy the problem caused by the incorrect ERT installations. Due to the company’s diligence in resolving the issue, PGW was able to successfully identify and resolve the meter reading inaccuracies produced by the improperly installed ERT devices.

Follow-up Recommendation – None

³⁹ 52 Pa. Code § 59.21(c) requires residential meter testing at a minimum of every 20 years.

Finding No. XI-10

Prior Situation – The issuance of make-up bills, for extended periods of previously undetected gas service (i.e. several years in some cases), led to a considerable number of customers to file complaints with the Pennsylvania Public Utility Commission. The Customer Accounting group was responsible for issuing make-up bills once notified by Field Services or another Customer Service group (e.g., Dispute Resolution Unit) tasked with investigating or analyzing these cases. The Customer Accounting group did not have the appropriate tools and information to readily diagnose these situations of undetected and unbilled service. An outside firm, Detectent, reviewed meter reading data for anomalies via computer algorithms and notified PGW if a questionable situation existed. Schumaker recommended Field Services, Customer Service, and Regulatory Compliance groups work together, investigate casual factors, and develop formal communication protocols to mitigate and/or eliminate the problem.

Prior Recommendation VIII-9 – Formalize communication protocols between PGW groups to readily identify and remediate underbillings for gas service.

Follow-up Finding and Conclusion – **PGW should investigate solutions to prevent undetected service to eliminate issuance of large make-up bills.**

Current Review – The Vice President of Customer Service (VP CSC) indicated the investigative and bill processing groups are separated by design to avoid instances of an employee investigating and rebilling the same customer. This dotted line between the investigative and bill processing groups means that, by design, certain investigative tools are unavailable to Customer Accounting group employees. The company does not expect to change the current structure, which limits options for formalizing communication protocols between the groups. The VP CSC estimated formalized communication protocols may reduce the time to rebill for past service by several days, but not enough to benefit cases where customers are billed months or even years for underbilled usage. Due to these constraints, the company did not investigate process improvements nor formalize communication protocols between the various groups.

The processes for identifying undetected gas usage remains in place. Failure to account for all customer gas usage creates unnecessary problems, risks, and cost shifting from undetected accounts to paying customers. Therefore, it is more practical and efficient to focus efforts on preventing and discovering previously undetected gas use.

Follow-up Recommendation – **Focus efforts toward preventing or quickly identifying undetected gas use.**

XII. HUMAN RESOURCES AND DIVERSITY

Background – PGW’s Human Resources function, led by the Director of HR Administration, is separated into three main groups: administration; staffing and special projects; and organizational development. PGW is required by the Commission to submit annual diversity reports to the PUC. These annual diversity reports include two sections; the first section addresses the company’s efforts to increase diversity within its workforce and the second section details the company’s efforts to increase procurements with diverse suppliers. The Commission’s diverse suppliers are defined as minority, women, and persons with disability owned business enterprises (MWDBEs). All Supplier Diversity activities are performed by the PGW’s Supply Chain organization which is an integration of the Purchasing, Materials Management, and Fleet Departments. The Supply Chain Organization is responsible for the purchasing/acquisition of materials and services in support of PGW operations.

In this chapter, five prior recommendations and prior situations are reviewed and five follow-up findings, one additional finding, and four recommendations are presented. The findings primarily relate to: development of the safety committee scorecard, reporting of safety performance data, initiatives to increase diversity in PGW’s workforce, integration of diversity as a business strategy, increasing supplier diversity, and the filing of PGW’s Annual Reports on Diversity with the Commission. In addition, two human resources and diversity recommendations were not investigated due to their minor nature and overall low impact to the company.

Finding No. XII-1

Prior Situation – PGW had departmental safety committees for Distribution, Field Services, and Gas Processes prior to 2014. In 2014, departmental safety committees for Facilities, Supply Chain, and Fleet were created to fulfill PGW’s goal that all Operations employees are represented by a safety committee. However, PGW lacked any procedure or method to evaluate committee effectiveness with commensurate standards.

Prior Recommendation III-26 – Create a safety committee scorecard.

Follow-up Finding and Conclusion – PGW developed and implement a scorecard in the 2nd Quarter of 2016 to support and evaluate safety committee effectiveness and performance.

Current Review – Each of PGW’s eight safety committees completes and submits scorecards to the Safety Manager in Risk Management. The scorecard accounts for the number of meetings held by the committee, meeting attendance, incident recordkeeping, hazard recordkeeping, safety violations, and injury and illness rates. Recording and maintaining this data via the scorecard should be an effective way to acquire data that is comparable across every department. It allows the organization, through Risk Management, to affect each committee’s approach to safety. For the departments, it clearly illustrates concerns resulting from past safety performance.

Follow-up Recommendation – None

Finding No. XII-2

Prior Situation – Historically, PGW based corporate safety goals on cumulative preventable motor vehicle accidents (PMVA) and injury totals. The goals did not account for the relative frequency and severity of these incidents. Departmental safety scorecards totaled injuries, PMVAs, and various safety violations. The lack of standardized metrics, severity rates, and industry benchmarks prevented comparisons across the organization and against industry equivalents.

Prior Recommendation III-27 – Measure and report safety performance using standard industry benchmarks.

Follow-up Finding and Conclusion – PGW records and tracks safety performance data; however, a goal has only been established for the incidence rate of total recordable cases.

Current Review – As discussed in the Facilities and Fleet Management chapter, PGW fully implemented the DriveCam initiative to reduce PMVAs. In addition, PGW evaluated and changed other metrics relating to safety issues. Historically, PGW created safety goals for the number of recordable injuries and the incidence rate for total recordable cases. Management determined that both goals tracked total injuries and were redundant. As a result, PGW eliminated the total number of recordable injuries goal in fiscal year 2017 and now relies solely on the incidence rate for total recordable cases goal.

The incident rate goal encompasses the number of hours worked by employees and is much more common in benchmark comparisons. PGW tracks the data necessary to evaluate safety using standard industry benchmarks beyond just the incidence rate for total recordable cases (e.g., days away from work/restriction/transfer or DART, lost time, and injury severity); however, it does not use this data to set goals or actively monitor other conventional standardized industry benchmarks. These benchmarks could help assess the company's safety performance and afford performance comparisons to other utilities and the overall industry.

Benchmarks can be the basis for effective goal setting. Effective goals are necessary to drive improvement and measure success. PGW would benefit from other safety goals like DART, lost time, or similar metrics. From there, improving PGW's individual performance should be the primary objective, while ensuring it meets or exceeds standard industry benchmarks.

Follow-up Recommendation – Develop additional safety goals and compare to standard industry benchmarks.

Finding No. XII-3

Prior Situation – Between 2006 and 2013, PGW’s utilization of minorities and females reflected limited improvements in diversity. Consequently, PGW did not achieve diversity in about half of the its job groups⁴⁰. Furthermore, while PGW achieved its utilization goals within four job groups between 2006 and 2013, the company’s 2013 results also reflected four additional underutilized job groups.

Prior Recommendation VI-1 – Leverage opportunities to increase diversity through retirements, workforce planning, and succession planning.

Follow-up Finding and Conclusion – PGW’s workforce and succession planning efforts are supported by long-term initiatives to increase diversity.

Current Review – In response to the 2015 Management Audit recommendation, PGW further expanded its outreach and training efforts to increase diversity within its workforce. PGW’s outreach efforts increased through its participation in outside organizations; PGW began serving as an Advisory Board Member with the National Utilities Diversity Council in 2015 and has been a recruiting partner with the Youth Build Charter School since 2016. PGW expanded its training efforts in 2017 by implementing training on unconscious bias. PGW plans to further extend the unconscious bias training to all hiring managers in 2018.

Between 2015 and 2017, PGW successfully eliminated underutilization in five job groups three of the job groups had previously experienced underutilization of minorities and the other two job groups had impacted females. Furthermore, the company’s 2017 results highlighted that no other job groups became underutilized resulting in an overall improvement. PGW attributes these improvements to its ongoing, long-term efforts to increase diversity throughout the organization.

PGW’s human resources department is responsible for increasing diversity throughout the organization by focusing on workforce and succession planning. Diversity is part of PGW’s strategic plan, noting that a talented and diverse workforce is needed to fulfill PGW’s mission. However, PGW’s workforce and succession planning for two-thirds of all employees is affected by its union contract.

PGW’s union employees are primarily promoted based on seniority, with the union contract specifying the internal progression required to fulfill positions. Human Resource Management noted that many job groups within PGW, particularly those noted previously, are largely or entirely filled from internal recruitment candidates. Thus, diverse hiring practices must be practiced at the entry-level and a long-term effort is required to produce improvements in certain job groups. As such, of PGW’s 24 job group, the company continues to experience underutilization of females in 11 job groups and underutilization of minorities in five job groups, highlighting the need for a continued

⁴⁰ PGW’s job groups follow the classification prescribed by the United States Equal Employment Opportunity Commission for reporting purposes. These job groups often include multiple job titles but may be limited to a single job title (i.e., laborers)

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focus. Nonetheless, PGW's robust efforts are commendable and the company should continue to implement its strategy that resulted in the 2017 improvements noted above.

Follow-up Recommendation – Continue to increase diversity in underutilized job categories.

Finding No. XII-4

Prior Situation – PGW had developed a strong affirmative action plan that included training and recruitment efforts, however its efforts were compliance based. The compliance-oriented activities focused upon benchmarking goals and tracking achievements based upon these efforts. PGW did not implement a comprehensive, company-wide diversity program. A comprehensive diversity program should incorporate diversity in the overall business strategy, thereby integrating diversity within PGW’s business objectives and practices.

Prior Recommendation VI-2 – Integrate diversity as an overall business objective.

Follow-up Finding and Conclusion – PGW incorporates diversity on an ongoing basis into its business strategy, corporate initiatives, employee engagement, training, and development.

Current Review – PGW continues to incorporate diversity in its business strategies, both internally and externally through employee engagement, training and development, and through involvement with outside organizations like PGW’s supplier diversity plan. Additionally, as highlighted in Finding No. XII-3, PGW’s overall corporate objectives include efforts to increase diversity and inclusion through engaging its workforce. In addition, PGW’s corporate objective includes outreach to the community, in which the company supports local organizations by engaging its workforce with community involvement and volunteer opportunities.

PGW conducted an employee engagement survey in May 2016 which focused on role clarity, work environment, job satisfaction, and employee commitment to PGW’s vision. The survey included questions assessing PGW employees’ perception of whether they felt they were treated fairly and in accordance with U.S. Equal Employment Opportunity Commission laws and statutes. The results reflected high scores in role clarity, accountability, and personal accomplishment and identified challenges in job recognition, compensation, management, and employee growth. The employee engagement surveys allow PGW to identify items for redress. For example, PGW successfully petitioned the City of Philadelphia, the Philadelphia Gas Commission, and Philadelphia Facilities Management Corporation for the budget approval to increase its nonunion compensation⁴¹ companywide⁴² to levels more commensurate⁴³ with the industry average. The 2017 compensation increases impacted approximately 360 employees, 64% of which were minorities or females. In addition, PGW performs biannual compensation analyses to ensure fair compensation of minority and female nonunion employees. As indicated by the survey results, PGW has incorporated diversity within its business strategy, corporate initiatives, and employee engagement.

Follow-up Recommendation – None

⁴¹ PGW’s last review for adjustments to its nonunion compensation structure occurred in 2005.

⁴² PGW’s Executive Management (i.e., vice presidents, executive vice presidents, officers, etc.) salaries remain at 37th percentile.

⁴³ Nonunion compensation levels were adjusted to the 50th percentile of the industry average surveyed.

Finding No. XII-5

Prior Situation – While PGW had substantially improved its MWDBE participation in 2014 from its 2006 participation rate, the company’s MWDBE participation rate was less than half the rate of the City of Philadelphia. More specifically, PGW experienced a significantly low level of MWDBE participation at its subcontractor level.

Prior Recommendation VI-3 – Develop specific procedures to improve Minority, Women, and Disabled Business Enterprise (MWDBE) subcontractor participation for the next five years and include revised internal, external, and subcontracting efforts in the next Annual Diversity Report.

Follow-up Finding and Conclusion – PGW developed and began implementing its comprehensive supplier diversity plan.

Current Review – In response to the 2015 Management Audit recommendation, PGW established a comprehensive supplier diversity plan aimed at increasing diverse business enterprise (DBE)⁴⁴ participation levels. PGW’s supplier diversity plan includes multiple components (e.g., tracking and reporting of DBE spend, increasing DBE participation, improving contract processes, etc.).

As part of these efforts, PGW completed the assignment of NAICS⁴⁵ codes within its DBE dashboard which improved diverse supplier reporting capabilities from the system. In addition, PGW conducted a supplier disparity study to help identify areas of opportunity for increased DBE participation. The results of the study allowed PGW to focus its efforts in specific spending categories with market availability (i.e., where both PGW needs and potential partners exist).

In contrast, tracking and reporting subcontractor DBE vendor participation is a challenge for PGW. PGW’s subcontractor spending is tracked manually when information is provided by the company’s prime contractors. Therefore, PGW’s opportunity to monitor MWDBE subcontractor participation is limited to information provided by its vendors. PGW plans to implement software by April 2018 to track DBE subcontractor spending but will continue to rely upon prime contractors to facilitate the information exchange. The software will also allow PGW to monitor payments from its prime contractors to the subcontractors.

From a contract perspective, PGW is developing a process to calculate DBE participation based upon contract value. This will allow PGW to benchmark its performance with the City of Philadelphia. In fiscal year 2019, PGW plans to implement an electronic bidding system which will provide a transparent and centralized process for receipt of bids and proposals. Moving forward, PGW’s long-term comprehensive supplier diversity plan includes: implementation of request for proposals assembly tool and a future partnering with the City of Philadelphia’s Office of Economic Opportunity for a more robust supplier disparity study.

⁴⁴ PGW’s diverse business enterprises include MWDBEs and other diverse business enterprises (Veteran owned).

⁴⁵ North American Industry Classification System (NAICS) is the standard codification utilized by U.S. Federal agencies for classifying business establishments.

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PGW is working on various initiatives to increase opportunities to engage DBEs and to improve its tracking and reporting of DBE spend. However, some parts of the supplier diversity plan are still in progress. Therefore, PGW should continue to work on its supplier diversity plan with an overall goal of increasing DBE participation and maximizing DBE spending.

Follow-up Recommendation – Complete implementation of the comprehensive supplier diversity plan.

Finding No. XII-6

Additional Finding and Conclusion – PGW did not file an annual Report on Diversity with the PUC in 2015 or 2016.

Current Review – Since 1995, the Commission has encouraged Pennsylvania utilities to file annual Reports on Diversity under 52 Pa. Code § 69.809. More specifically, Pennsylvania’s major jurisdictional utility companies are encouraged to file with the Secretary of the Commission and the Bureau of Public Liaison an annual report describing their diversity program activity for the prior year. All company annual Reports on Diversity are filed with the Commission under Docket No. M-00940557.

PGW filed annual reports in 2010 through 2014 and 2017, however, the company failed to submit reports in 2015 and 2016. No explanation was provided for the missing reports, and PGW lacked documented process or procedures related to the filing of annual PUC Diversity Reports. Discussion with management seemed to indicate that the failed filings may have been an oversight. Without the filed reports, the Commission does not have the opportunity to monitor the results of PGW’s human resources and procurement efforts to improve diversity.

Follow-up Recommendation – Document the process and procedures used for filing annual PUC Diversity Reports to the Commission.

XIII. ACKNOWLEDGEMENTS

We wish to express our appreciation for the cooperation and assistance provided by the officers and staff of Philadelphia Gas Works during this Management Efficiency Investigation.

This audit was conducted by Krystle Daugherty, Porus Irani, Deron Henry, Jennie Banzhof, Barry Keener, Darrell Baxter and Michael Flynn of the Management Audit Staff of the PUC Bureau of Audits.

APPENDIX OF SCHUMAKER RECOMMENDATIONS

EXECUTIVE MANAGEMENT AND HUMAN RESOURCES

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| Recommendation II-1 | Develop an organizational review and development process. (Refer to Finding II-1.) |
| Recommendation II-2 | Coordinate the procedures review process. (Refer to Finding II-2.) |
| Recommendation II-3 | Reinstitute the Strategic Focused Organization or similar strategic planning process. (Refer to Finding II-3.) |
| Recommendation II-4 | Develop a comprehensive Corporate Communications business plan. (Refer to Finding II-4.) |
| Recommendation II-5 | Develop an External Relations communications plan. (Refer to Finding II-5.) |
| Recommendation II-6 | Expand the capacity of the Human Resources staffing function. (Refer to Finding II-6 and Finding II-7.) |
| Recommendation II-7 | Develop a comprehensive workforce plan. (Refer to Finding II-6 and Finding II-9.) |
| Recommendation II-8 | Perform a management compensation study (including incentive compensation) to assess compensation levels as compared to market and realign as deemed appropriate. (Refer to Finding II-6 and Finding II-8.) |

SUPPORT SERVICES

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| Recommendation III-1 | Conduct a formal assessment study for adding a formal PMO to the IS organization as soon as possible. (Refer to Finding III-2.) |
| Recommendation III-2 | Expand IS project management methodology documentation and review at least annually, and revise as appropriate. (Refer to Finding III-3.) |
| Recommendation III-3 | Develop comprehensive project plans and schedules by incorporating additional detailed information and data. (Refer to Finding III-4.) |

APPENDIX OF SCHUMAKER RECOMMENDATIONS (continued)

SUPPORT SERVICES (continued)

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| Recommendation III-4 | Configure the Accounts Payable system to allow electronic workflow, including approval of vendor invoices, and eliminate the need for sending paper invoices to the Accounts Payable group for payment processing. (Refer to Finding III-5.) |
| Recommendation III-5 | Implement use of systematic employee development plans for IS employees. (Refer to Finding III-6.) |
| Recommendation III-6 | Take actions to improve Help Desk performance to meet targets. (Refer to Finding III-7.) |
| Recommendation III-7 | Develop detailed policies and procedures involving IS chargebacks, not only during the budget cycle but also involving any changes in actual charges during the fiscal year. (Refer to Finding III-8.) |
| Recommendation III-8 | Perform disaster recovery tests semi-annually to adhere to established goals and objectives. (Refer to Finding III-9.) |
| Recommendation III-9 | Perform annual penetration testing and vulnerability assessments. (Refer to Finding III-10.) |
| Recommendation III-10 | Periodically analyze outsourcing the Fleet function(s) to an outside contractor. (Refer to Finding III-12.) |
| Recommendation III-11 | Conduct a post implementation audit of the new M5 system. (Refer to Finding III-13.) |
| Recommendation III-12 | Develop a comprehensive facilities plan. (Refer to Finding III-14.) |
| Recommendation III-13 | Pursue additional vendor partnering opportunities. (Refer to Finding III-15.) |
| Recommendation III-14 | Develop and implement a Vendor Evaluation Program. (Refer to Finding III-16.) |
| Recommendation III-15 | Develop a Supply Chain business plan that fully integrates into a PGW strategic plan. (Refer to Finding III-17.) |
| Recommendation III-16 | Develop written procedures for all Supply Chain processes. (Refer to Finding III-18.) |

APPENDIX OF SCHUMAKER RECOMMENDATIONS (continued)

SUPPORT SERVICES (continued)

Recommendation III-17	Perform an analysis on the value of outsourcing Supply Chain function(s). (Refer to Finding III-19.)
Recommendation III-18	Integrate all systems used by Supply Chain. (Refer to Finding III-20 and Finding III-23.)
Recommendation III-19	Improve cycle count accuracy levels to at least 90% and increase analysis on inventory turn rates. (Refer to Finding III-21 and Finding III-22.)
Recommendation III-20	Enhance PGW's ERM program. (Refer to Finding III-24.)
Recommendation III-21	Enhance PGW's risk management training programs. (Refer to Finding III-25.)
Recommendation III-22	Develop a plan for making organizational changes and for enhancing reporting capabilities. (Refer to Finding III-27.)
Recommendation III-23	Standardize any procedures, including numbering, developed by the Risk Management Department. (Refer to Finding III-28.)
Recommendation III-24	Fully implement the DriveCam initiative and increase the number of loss controls to address PMVAs. (Refer to Finding III-32.)
Recommendation III-25	Certify PGW's safety committees with the PA Department of Labor and Industry, Bureau of Workers' Compensation. (Refer to Finding III-33.)
Recommendation III-26	Create a safety committee scorecard. (Refer to Finding III-29, Finding III-30, Finding III-31, Finding III-32, Finding III-33, and Finding III-34.)
Recommendation III-27	Measure and report safety performance using standard industry benchmarks. (Refer to Finding III-34.)
Recommendation III-28	Perform a formal technology review, including systems and document management applications used by the Legal Services organization, to determine if changes would be beneficial and should be implemented in the near future. (Refer to Finding III-35.)

APPENDIX OF SCHUMAKER RECOMMENDATIONS (continued)

CORPORATE GOVERNANCE

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| Recommendation IV-1 | Improve the structure and processes of Board governance. (Refer to Finding IV-1.) |
| Recommendation IV-2 | Strengthen ethics procedures and processes. (Refer to Finding IV-2.) |
| Recommendation IV-3 | Revise the Internal Auditing Department reporting structure so that the Manager of Internal Audits reports directly to the PFMC Board's Audit Committee and no longer administratively to the CFO. (Refer to Finding IV-3.) |

FINANCIAL MANAGEMENT

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| Recommendation V-1 | Adjust the bank reconciliation process so that reconciling items are cleared in a timely manner. (Refer to Finding V-1.) |
| Recommendation V-2 | Employ the use of a process checklist for the closing of capital projects. (Refer to Finding V-2.) |
| Recommendation V-3 | Develop a systematic plan and process to review fixed assets across PGW and determine which recorded assets are no longer in service and need to be removed from the records. (Refer to Finding V-3.) |
| Recommendation V-4 | Develop a systematic plan and process to review unclassified assets with the end goal of classifying those assets to the proper account. (Refer to Finding V-4.) |
| Recommendation V-5 | Explore alternatives for fulfilling internal audit requirements. (Refer to Finding V-5.) |
| Recommendation V-6 | Create a new system and method to accumulate audit findings and recommendations that allows for retrieval based on different criteria. (Refer to Finding V-6.) |

DIVERSITY AND EEO

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| Recommendation VI-1 | Leverage opportunities to increase diversity through retirements, workforce planning, and succession planning. (Refer to Finding VI-2.) |
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APPENDIX OF SCHUMAKER RECOMMENDATIONS (continued)

DIVERSITY AND EEO (continued)

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| Recommendation VI-2 | Integrate diversity as an overall business objective. (Refer to Finding VI-3.) |
| Recommendation VI-3 | Develop specific procedures to improve MWDBE subcontractor participation for the next five years and include revised internal, external, and subcontracting efforts in the next Annual Diversity Report. (Refer to Finding VI-5.) |
| Recommendation VI-4 | Update policies to ensure consistent and accurate communication of EEO and Supplier Diversity programs. (Refer to Finding VI-6.) |

SYSTEM RELIABILITY PERFORMANCE & OTHER RELATED OPERATIONS

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| Recommendation VII-1 | Take steps to plan for the retirements that could have a major impact on the ability to staff the Gas Control Center. (Refer to Finding VII-2.) |
| Recommendation VII-2 | Develop a mechanism for accounting for the carrying charges in the LNG sales pricing. (Refer to Finding VII-5.) |
| Recommendation VII-3 | Continue to take steps to reduce PGW gas supply assets. (Refer to Finding VII-6.) |
| Recommendation VII-4 | Evaluate an all-inclusive or enterprise computer system to track the gathering of transactions so that supplier invoices, transportation invoices, and sales of excess supplies are captured. (Refer to Finding VII-7.) |
| Recommendation VII-5 | Migrate all asset data into a single geospatial database. (Refer to Finding VII-8.) |
| Recommendation VII-6 | Take corrective action to timely address the noted deficiencies in the portions of the DIMP that were deemed unsatisfactory. (Refer to Finding VII-9.) |
| Recommendation VII-7 | Aggressively accelerate the replacement of high risk mains, specifically cast iron mains. (Refer to Finding VII-10.) |

APPENDIX OF SCHUMAKER RECOMMENDATIONS (continued)

**SYSTEM RELIABILITY PERFORMANCE & OTHER RELATED OPERATIONS
(continued)**

Recommendation VII-8	Integrate the corrosion work order database into AIMS. (Refer to Finding 0-10.)
Recommendation VII-9	Reduce the number of open leaks by outsourcing the excavation work and using PGW crews to make repairs. (Refer to Finding VII-11.)
Recommendation VII-10	Reconcile the output from the Main Replacement Program with the actual leak experience to validate its predicted outcomes. (Refer to Finding VII-11.)
Recommendation VII-11	Improve emergency response capability by conducting periodic drills, simulating potential emergency situations, and updating area segregation plans. (Refer to Finding VII-12.)
Recommendation VII-12	Develop a set of goals and reports for Field Operations and Planning and cascade them down through the organization to drive efficiency and operational and individual performance improvements. (Refer to Finding VII-13)
Recommendation VII-13	Update the system model design criteria. (Refer to Finding VII-14.)
Recommendation VII-14	Increase the number of qualified contractors to perform gas main installation work. (Refer to Finding VII-15.)
Recommendation VII-15	Implement financial controls on work performed by contractors. (Refer to Finding VII-15.)
Recommendation VII-16	Determine the number and location of residential meters that may have the incorrect ERT protocol and implement corrective measures. (Refer to Finding VII-16.)
Recommendation VII-17	Develop and implement an expanded BCP schedule that includes tabletop exercises and live drills annually. (Refer to Finding VII-17.)
Recommendation VII-18	Develop and implement a sample plan framework for PGW departments to use when developing their BCPs. (Refer to Finding VII-18.)

APPENDIX OF SCHUMAKER RECOMMENDATIONS (continued)

CUSTOMER SERVICE

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| Recommendation VIII-1 | Continue to institutionalize recent efforts to strengthen call center operations. (Refer to Finding VIII-1, Finding VIII-2, and Finding VIII-3.) |
| Recommendation VIII-2 | Budget and track costs separately for each District Office. (Refer to Finding VIII-5.) |
| Recommendation VIII-3 | Evaluate and implement alternative in-person customer service options. (Refer to Finding VIII-4, Finding VIII-5, and Finding VIII-7.) |
| Recommendation VIII-4 | Develop a plan for enhancing customer systems, including use of mobile applications for making customer payments. (Refer to Finding VIII-6 and Finding VIII-7.) |
| Recommendation VIII-5 | Further incorporate commercial/industrial accounts into PGW's risk-based collections process, including sending more accounts to collection agencies. (Refer to Finding VIII-8.) |
| Recommendation VIII-6 | Identify and address increasing customer disputes and PaPUC complaints. (Refer to Finding VIII-9.) |
| Recommendation VIII-7 | Place greater emphasis on decreasing the number and amount of over-90-day-old accounts. (Refer to Finding VIII-10.) |
| Recommendation VIII-8 | Identify and address why the number of customers being refunded their credit balances following closing has decreased from roughly 62% to 27%. (Refer to Finding VIII-11.) |
| Recommendation VIII-9 | Formalize communication protocols between PGW groups to readily identify and remediate underbillings for gas service. (Refer to Finding VIII-12.) |

APPENDIX OF SCHUMAKER FINDINGS

EXECUTIVE MANAGEMENT AND HUMAN RESOURCES

- Finding II-1 A company-wide organizational evaluation process has not been performed on a regular basis.
- Finding II-2 Procedures are not centrally controlled and there are no requirements to periodically review and update them.
- Finding II-3 The strategic planning process is not comprehensive.
- Finding II-4 There is no comprehensive Corporate Communications plan.
- Finding II-5 The External Affairs function does not have a comprehensive communications plan.
- Finding II-6 PGW has an exceptionally high number of employees who are currently or soon to be eligible for retirement.
- Finding II-7 PGW has a small recruitment staff.
- Finding II-8 Compensation for management-level positions is below market, making it difficult to attract talent.
- Finding II-9 PGW does not have a workforce plan for hourly employees.
- Finding II-10 PGW has reduced employee absences.
- Finding II-11 PGW has done an effective job of managing healthcare costs.

SUPPORT SERVICES

- Finding III-1 The IS organization's ability to find and keep staff has been limited in the past by its relatively low pay to market compensation, but has recently taken steps to address this issue.
- Finding III-2 Formal project management office activities has no support of the ESS group.
- Finding III-3 PGW's project management methodology documentation is not sufficiently detailed, and although under revision, PGW's project management methodology documentation is not regularly reviewed.
- Finding III-4 The plans and schedules for all major ESS projects are not sufficiently detailed.

APPENDIX OF SCHUMAKER FINDINGS (continued)

SUPPORT SERVICES (continued)

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| Finding III-5 | Approval of IS vendor invoices includes excessive amounts of manual processing. |
| Finding III-6 | The staff in IS divisions has no systematic employee development plans. |
| Finding III-7 | Help Desk response time metrics are generally met except medium severity level for contractors. |
| Finding III-8 | PGW management was unable to provide adequate information as to how chargebacks (for allocating IS costs to user departments) are handled during the fiscal year following the initial budget development, or if the basis for allocations changes during the fiscal year. |
| Finding III-9 | Disaster recovery tests conducted in 2013 yielded relatively minor issues, but testing for 2014 did not adhere to the goals of having tests performed twice annually. |
| Finding III-10 | PGW does not regularly perform penetration testing and vulnerability assessment projects. |
| Finding III-11 | The QA/testing activities performed by the Information Controls & Compliance QA group have become more robust than in prior years. |
| Finding III-12 | An outsourcing analysis of the Fleet Operations function has not been conducted. |
| Finding III-13 | Fleet Operations' maintenance, planning, and evaluation processes are too manual. |
| Finding III-14 | The Facilities Department does not have a comprehensive facilities plan. |
| Finding III-15 | There is little vendor partnering. |
| Finding III-16 | There is no consistent vendor performance evaluation or program. |
| Finding III-17 | Supply Chain conducts a considerable amount of analysis, but much of it is informal and not tied together into a business plan. |
| Finding III-18 | There is a lack of written procedures for all Supply Chain processes. |

APPENDIX OF SCHUMAKER FINDINGS (continued)

SUPPORT SERVICES (continued)

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| Finding III-19 | There has not been any evaluation on the outsourcing of any Supply Chain functions. |
| Finding III-20 | Major contract work is still largely controlled through paper processes, and automated systems are not completely integrated. |
| Finding III-21 | Cycle count accuracy levels are too low. |
| Finding III-22 | Inventory turns are reported and evaluated in total only, not by class of inventory. |
| Finding III-23 | PGW is slow to embrace technologies in Supply Chain |
| Finding III-24 | The PGW enterprise risk management program is still being developed even though it was initially started in the mid-2000s. |
| Finding III-25 | PGW management only receives basic risk management training. |
| Finding III-26 | PGW's Risk Management Department actively participates in numerous PGW committees, as well as AGA and other committees. |
| Finding III-27 | Selected Risk Management changes have not yet been addressed. |
| Finding III-28 | Procedural documentation developed by the Risk Management Department is formatted differently whether encompassing corporate-wide procedures or not. |
| Finding III-29 | PGW's safety incidence rates compare negatively to industry benchmarks. |
| Finding III-30 | PGW's injury severity rate compares favorably to industry benchmarks. |
| Finding III-31 | PGW's motor vehicle accident rate compares unfavorably to industry Benchmarks. |
| Finding III-32 | A high frequency of preventable motor vehicle accidents in recent years has caused PGW to implement an aggressive policy to reduce such accidents. |

APPENDIX OF SCHUMAKER FINDINGS (continued)

SUPPORT SERVICES (continued)

- Finding III-33 PGW has a comprehensive safety committee structure but the committees are not certified by the PA Department of Labor and Industry, Bureau of Workers' Compensation and may not fulfill all of the duties specified in the certification requirements.
- Finding III-34 PGW's internal safety goals and scorecards are based solely on occurrence.
- Finding III-35 PGW's Legal Services organization does not currently use a formalized legal management system.

CORPORATE GOVERNANCE

- Finding IV-1 The corporate governance structure and processes for PGW are not optimal.
- Finding IV-2 Ethics procedures and processes are not properly documented.
- Finding IV-3 Internal Audit's reporting structure as reported to the Audit Committee does not ensure independence.

FINANCIAL MANAGEMENT

- Finding V-1 One active bank account has not been reconciled for a considerable period of time.
- Finding V-2 A checklist is not being used in the routine closing process for capital projects.
- Finding V-3 Retiring assets are not being removed in a consistent or timely manner from financial records as associated replacement assets are being added.
- Finding V-4 The balance in the Unclassified Assets account has been increasing significantly over time.
- Finding V-5 Internal Audit's use of an outside contractor to conduct audits may not be the most cost-effective solution.
- Finding V-6 The current method of accumulating Internal Audit findings and recommendations does not lend itself to retrieving that data in various sorts.

APPENDIX OF SCHUMAKER FINDINGS (continued)

DIVERSITY AND EEO

- Finding VI-1 PGW has various formal policies and procedures in place that support diversity objectives.
- Finding VI-2 Minorities and women continue to be underutilized in several job groups at PGW.
- Finding VI-3 Diversity as a comprehensive PGW-wide initiative has not been fully implemented.
- Finding VI-4 PGW has fostered strong alliances with Supplier Diversity stakeholders to attract more diverse firms to participate in its procurement opportunities.
- Finding VI-5 PGW's diverse business participation at the subcontractor level remained relatively constant during the five-year review period and lower than direct spend levels.
- Finding VI-6 EEO and Supplier Diversity policies are outdated and not consistently communicated.

SYSTEM RELIABILITY PERFORMANCE & OTHER RELATED OPERATIONS

- Finding VII-1 PGW has implemented an effective computerized maintenance management system at the LNG facility.
- Finding VII-2 PGW has increased its staffing of gas controllers to ensure that two controllers are on duty each shift, year round; however, the area could see a reduction due to retirements.
- Finding VII-3 PGW has increased its portion of Appalachian (or Marcellus Shale) gas in its supply portfolio.
- Finding VII-4 PGW has been able to sell excess LNG inventory to realize some financial benefits to PGW ratepayers.
- Finding VII-5 The costs for carrying the inventory at the LNG plant have not been considered in assigning costs to LNG sales.
- Finding VII-6 PGW's peak-day requirements and total gas volume sales have been slowly declining over the last decade.

APPENDIX OF SCHUMAKER FINDINGS (continued)

**SYSTEM RELIABILITY PERFORMANCE & OTHER RELATED OPERATIONS
(continued)**

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| Finding VII-7 | PGW does not have an enterprise computer system for managing gas supply and gas transportation. |
| Finding VII-8 | Asset (mains, services, valves, meters, etc.) records reside in multiple databases, which requires reconciliation, and maintenance of multiple systems, causing potential inaccuracies in data. |
| Finding VII-9 | PGW has not addressed the PaPUC noted unsatisfactory aspects of its DIMP in a timely manner. |
| Finding VII-10 | The number of leaks on cast iron mains are increasing while leaks on services are decreasing. |
| Finding VII-11 | The amount of open leaks is high, leading to extensive field rechecking and auditing for duplication. |
| Finding VII-12 | There are no training drills conducted in the field to simulate emergencies such as loss of a gate station. |
| Finding VII-13 | Current goals do not include efficiency measures such as man-hours per unit, cost per unit, travel time, etc. and there is no formalized productivity/efficiency measurement system for Distribution or Field Services; productivity measurement is left up to the discretion of the supervisor. |
| Finding VII-14 | The design criteria for the system model is not up-to-date. |
| Finding VII-15 | Contractor management needs improvement. |
| Finding VII-16 | The number of residential meters installed with the incorrect ERT protocol is unknown. |
| Finding VII-17 | PGW has conducted a limited number of tabletop exercises and live drills in the past five years. |
| Finding VII-18 | PGW's framework for developing a Business Continuity Plan is not provided to departments in a specific format, making it difficult for departments to complete. |
| Finding VII-19 | PGW has met all required elements of the Chapter 101 emergency preparedness self-certifications. |

APPENDIX OF SCHUMAKER FINDINGS (continued)

CUSTOMER SERVICE

- Finding VIII-1 Customer satisfaction scores for PGW are lower than the average of other Pennsylvania gas distribution companies.
- Finding VIII-2 Recent improvements in PGW’s Call Center training, development, and quality assurance are consistent with industry best practices.
- Finding VIII-3 Call center service levels have improved as a result of increased training, and ongoing employee development.
- Finding VIII-4 District Office service levels and operating hours are inhibited by insufficient staffing.
- Finding VIII-5 PGW continues to operate costly District Offices contrary to industry trends and prior audit recommendations.
- Finding VIII-6 Enhancements to existing systems would provide added functionality and process improvements.
- Finding VIII-7 PGW customers cannot make payments via mobile applications.
- Finding VIII-8 Commercial/industrial accounts do not follow PGW’s risk-based collections process, nor are overdue commercial/industrial accounts typically submitted to collection agencies, unless they are accounts with residential end use.
- Finding VIII-9 Customer disputes and PaPUC complaints have increased from FY2010 to FY2014.
- Finding VIII-10 Timely customer payments remain a problem for PGW as indicated by the fact that the vast majority of customer aged receivables are greater than 90 days old.
- Finding VIII-11 For customers that have terminated service from 2009 to 2013 with credit balances, PGW has been successful at refunding at least 60% of the credit balances, although the number of customers being refunded has decreased from roughly 62% to 27%.
- Finding VIII-12 Rebilling of accounts may be negatively impacted by the lack of formal communications among PGW groups.

