OFFICE OF THE NEW YORK STATE COMPTROLLER

DIVISION OF LOCAL GOVERNMENT
& SCHOOL ACCOUNTABILITY

Upper Mohawk Valley Regional Water Board

Water Accountability

Report of Examination

Period Covered:

January 1, 2014 – June 30, 2015

2015M-300

Thomas P. DiNapoli

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State of New York
Office of the State Comptroller

Division of Local Government
and School Accountability

February 2016

Dear Authority Officials:

A top priority of the Office of the State Comptroller is to help local authority officials manage authorities efficiently and effectively and, by so doing, provide accountability for tax dollars spent to support authority operations. The Comptroller oversees the fiscal affairs of authorities statewide, as well as authorities' compliance with relevant statutes and observance of good business practices. This fiscal oversight is accomplished, in part, through our audits, which identify opportunities for improving authority operations and Board governance. Audits also can identify strategies to reduce authority costs and to strengthen controls intended to safeguard authority assets.

Following is a report of our audit of the Upper Mohawk Valley Regional Water Board, entitled Water Accountability. This audit was conducted pursuant to Article V, Section 1 of the State Constitution and the State Comptroller's authority as set forth in Article X, Section 5 of the State Constitution.

This audit's results and recommendation are resources for authority officials to use in effectively managing operations and in meeting the expectations of taxpayers. If you have questions about this report, please feel free to contact the local regional office for your county, as listed at the end of this report.

Respectfully submitted,

Office of the State Comptroller
Division of Local Government
and School Accountability

Introduction

Background

The Upper Mohawk Valley Regional Water Board (Authority)[1] was created in 1994 under New York State Public Authority Law pursuant to the Upper Mohawk Valley Regional Water Board Act and the Upper Mohawk Valley Regional Water Finance Authority Act, following approval from the New York State Legislature. The Authority acquired title to the City of Utica's water system in 1996 after an agreement was made between the Water Board, the Water Finance Authority and the City of Utica.

The Authority is governed by a 12-member Board of Directors (Board). The Board is responsible for the general management and control of the Authority's financial operations. The Board appoints an Executive Director who is the Authority's chief executive officer, responsible for day-to-day operations. The Director of Water Quality is responsible for water production and treatment. The Plant Engineer, along with other engineering staff, oversees water distribution activities.

The Authority's operating expenditures for the nine months ending December 31, 2014[2] totaled approximately $15 million, funded primarily by revenues from water sales to residential, commercial, industrial and municipal customers. During the 2014 calendar year, the Authority supplied approximately 7.27 billion gallons of water to customers in eastern Oneida County and small suburban areas in western Herkimer County.

Objective

The objective of our audit was to examine the Authority's procedures for monitoring water accountability and addressing water loss. Our audit addressed the following related question:

- Does the Authority monitor the amount of water produced, in comparison to the amount of water sold and used, and is it taking action to address water loss?

[1] In 2003, the Water Board received a "Certificate of Amendment of Assumed Name" from the New York Department of State, Division of Corporations, which allowed the Upper Mohawk Valley Regional Water Board "to do business as" — dba — Mohawk Valley Water Authority.

[2] In 2014, the Authority changed its 12-month fiscal reporting period from a March to a December year-end. Because of this change, the expenditures and revenues reported represent a nine-month period of operation rather than a 12-month period of operation.

Scope and Methodology

We examined the Authority's process of monitoring water accountability and addressing water loss for the period January 1, 2014 through June 30, 2015.

We conducted our audit in accordance with generally accepted government auditing standards (GAGAS). More information on such standards and the methodology used in performing this audit are included in Appendix C of this report. Unless otherwise indicated in this report, samples for testing were selected based on professional judgment, as it was not the intent to project the results onto the entire population. Where applicable, information is presented concerning the value and/or size of the relevant population and the sample selected for examination.

Comments of Authority Officials and Corrective Action

The results of our audit and recommendation have been discussed with Authority officials, and their comments, which appear in Appendix A, have been considered in preparing this report. Except as specified in Appendix A, Authority officials generally agreed with our recommendation and indicated they planned to take corrective action. Appendix B includes our comments on issues raised in the Authority's response letter.

Good management practices dictate that the Board has the responsibility to initiate corrective action. As such, the Board should prepare a plan of action that addresses the recommendation in this report and forward the plan to our office within 90 days.

Water Accountability

An effective water accounting system includes the periodic reconciliation of water produced (treated) with water billed to customers and used for other municipal purposes. The reconciliation is a first step in controlling water losses, reducing system costs and identifying unaccounted-for water. Unaccounted-for water includes losses that could result from source meter errors, faulty customer meters, accounting procedure errors, storage tank overflows, theft or underground leaks. The Federal Environmental Protection Agency (EPA) has established an industry goal of 10 percent for unaccounted-for water system losses. Procedures should be in place to monitor and identify the cause of water loss that is greater than the industry goal.

The Authority monitors the amount of water produced and compares the production to the amount of water sold to customers on a monthly basis. The Authority also monitors additional water used for other municipal purposes and has implemented a leak detection program to identify and reduce water loss. Although the Authority is proactive in identifying and addressing unaccounted-for water, 43 percent of the water produced in 2014 was unaccounted-for. The variable costs of the water loss in excess of the 10 percent goal is $339,000.

The Authority distributes water to about 39,000 metered customers serving a population of 130,000. The water comes from the Hinckley reservoir, located in Herkimer County, and the Authority treats its water at a filtration plant using carbon-activated charcoal for filtering and then adding chlorine and fluoride. In addition, there are several chlorination booster stations throughout the system. The distribution system consists of over 700 miles of water main lines. The water is primarily conveyed by gravity and is pumped to higher elevations to provide sufficient pressure. Water is also used for unmetered purposes such as flushing main lines and storage tanks, firefighting and other miscellaneous uses.

The engineering department prepares an annual water report for the New York State Department of Environmental Conservation (DEC) that shows the amount of unaccounted-for water.[3] Figure 1 shows the results of the reconciliation:

Figure 1: Calculation of Unaccounted-for Water in 2014

Water Produced in Gallons	7,272,160,000
Less: Billed to Customers in Gallons	3,466,725,062
Less: Estimate of Other Non-Metered Use in Gallons	657,453,805
Unaccounted-for Water in Gallons	3,147,981,133
Unaccounted-for Water Percentage	43%

Unaccounted-for water increases production cost for the Authority without generating any additional revenue. We calculated that the Authority spent approximately $.14 per 1,000 gallons to distribute water in 2014.[4] Therefore, the cost of producing the unaccounted-for water in excess of the EPA goal was about $339,000 in 2014, as shown by Figure 2.

Figure 2: Variable Cost of Lost Water

Water produced in Gallons	7,272,160,000
Less: Billed to Customers in Gallons	3,466,725,062
Less: Estimate of Other Non-Metered Use in Gallons	657,453,805
Less: EPA Acceptable Water Loss in Gallons	727,216,000
Water Loss Above EPA in Gallons	2,420,765,133
Divided by 1,000	2,420,765
Cost of Lost Water at $.14 Per 1,000	$338,907

The Executive Director and Plant Engineer told us they believe the unaccounted-for water is due to underground leaks caused by an aging water system infrastructure. The Authority has taken steps to reduce water loss through a proactive leak detection program. In 2014, the Authority analyzed more than one-third of the system for leaks, or 288 miles, and in 2015, the Authority is analyzing the entire water system using an outside engineering firm.[5] The Authority receives a list of all leaks detected from the firm, prioritizes the list and schedules repairs throughout the year. In 2014, 151 leaks were reported from the Authority's detection process, all of which were repaired as of June 2015.

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[3] We recalculated the Authority's water loss for 2014 based on its records showing water produced, water sold to customers and other non-metered use. We did not note any material differences in the Authority's calculation.

[4] We computed the $0.14 per 1,000 gallons cost based on the 7.27 billion gallons of water distributed and the variable water fund costs ($1,022,000), as reported by the Authority in its accounting records for the entire 2014 calendar year. We did not include fixed costs such as debt service and salaries.

[5] To date, 465 out of 702 miles have been analyzed.

In addition to the leak detection program, the Authority is deploying new technology, referred to as advanced meter infrastructure (AMI)[6] for the gathering of consumption data from water meters throughout the service area. Authority officials told us this technology, when completed,[7] will allow the Authority to obtain real time information on consumption and pinpoint areas where water provided exceeds consumption, which is valuable information for locating system leakage. The Authority has also taken steps to more accurately measure water used for other municipal purposes. For example, the Authority has started using portable meters to track usage when possible, such as for estimating the water used from fire hydrants.

The Authority has also implemented a process for the routine repair and replacement of meters. The replacement of residential meters is scheduled based on the age of the meters which are generally replaced after 10 to 12 years. Commercial meter replacement is based on the size of the meter and the volume of water consumed. Due to the cost to replace commercial meters, it is not unusual for the Authority to rebuild rather than replace meters. In 2014, the Authority had replaced or recalibrated 1,070 meters.

To keep repair costs to a minimum, the Authority attempts to schedule its water system repair projects when State and local organizations perform their construction projects, thereby reducing road repair costs for the Authority. The Plant Engineer told us he is in regular contact with local municipalities to determine if there are targets of opportunity[8] relating to planned capital projects. For example, the Authority has been working with the New York State Department of Transportation (DOT) during a Route 12 Arterial project, in advising and inspecting the relocation of water mains along the arterial while DOT is paying for the replacement and paving in the area. A similar approach has been taken with the City of Utica in its combined sewer overflow (CSO) rehabilitation project. The Authority coordinates with the City in the replacement of water mains in the streets where the CSO project work is being completed, to take advantage of significant cost savings because the final paving restoration is being performed by the City.

Recommendation

1. The Authority should continue its efforts to investigate the causes of excessive water loss and take appropriate actions to reduce water loss and costs.

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[6] AMI is an integrated system of smart meters, communications networks and data management systems that enables two-way communication between a smart utility meter and a utility company.

[7] The project is projected to be completed in 2017.

[8] Targets of opportunity are projects that can be done in cooperation with local, county or State road construction projects.

APPENDIX A

RESPONSE FROM AUTHORITY OFFICIALS

The Authority officials' response to this audit can be found on the following pages.

Mohawk Valley Water Authority
One Kennedy Plaza
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Telephone (315) 792-0301
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MOHAWK VALLEY WATER AUTHORITY

January 21, 2016

Ms. Rebecca Wilcox
Chief Examiner
Office of the State Comptroller
State Office Building, Room 409
333 E Washington Street
Syracuse, NY 13202-1428

Dear Ms. Wilcox:

Please accept this letter as our official response to your draft audit of the Mohawk Valley Water Authority (MVWA) on what has been presented as an examination of water accountability. We have reviewed the draft report, participated in an exit interview, and we appreciate this opportunity to provide our feedback.

We wish to acknowledge the professionalism and diligent effort of your staff auditor. However, absent from your draft report is any mention of her considerable time and energy spent reviewing the numerous areas of our business operations. These areas included testing our internal controls and transaction testing related to financial reporting, budgets, customer billing, receipts and accounts receivable, purchasing and accounts payable, inventory, capital projects, bonded debt administration, payroll and retirement reporting. We do understand that the State Comptroller's Office conducts its audits in accordance with the Government Auditing Standards (GAS) but does not issue audit opinions. However, we think it worth noting that the Comptroller's Office found no areas of concern, which we feel is a testament to sound management and to the knowledge, training, and commitment of our hard working and dedicated employees.

See Note 1 Page 11

In general, we agree and concur with your finding and recommendation regarding water losses. However, we feel some clarifications are necessary in order to provide proper context for the outside reader. First, it is important to emphasize that the calculated cost to treat and distribute non-revenue water is based on the amount considered to be in excess of a limit recommended by the U.S. Environmental Protection Agency (USEPA).

The industry goal set by the EPA is that lost water should not exceed 10%. We wish to point out that the federal goal of 10% does not reflect the use of "best practices," but rather it reflects the existence of "best conditions." Specifically, those conditions would include warmer climate and the absence of deep winter frost, newer infrastructure installed within the past few decades, and a higher ratio of industrial vs. residential customers which results in larger water use requiring many less miles of pipe.

See Note 2 Page 11

As noted in your report, the MVWA water distribution system includes more than 700 miles of pipe. Approximately one third of this pipe is more than 100 years old. The quality and reliability of pipe materials, castings, and the installation practices varied considerably during the past century. Moreover, the MVWA service area is similar to most metropolitan areas in the Northeast United States regarding the pipe disturbances that occur when winter frost penetrates several feet deep.

February of 2015 was one of the coldest winter months on record in the Utica region. Our work crews reported frost as deep as six feet in some areas. The contraction and thawing of ground layers under these conditions caused a much higher than normal frequency of water main breaks. At times, we experienced as many as five pipe breaks per day. In addition, the deep frost also required much more time to excavate the frozen ground before repairs could be undertaken. Obviously, both the frequency and duration of main breaks result in higher water losses due to leakage than water systems located in warmer climates in the southern portions of the country.

Finally, we wish to point out that other public water authorities in New York State such as those headquartered in Onondaga County, Monroe County, or Erie County serve only the suburbs in those areas and are comprised of relatively newer piping infrastructure. These authorities do not serve the urban centers which include much older pipe. Those urban centers are served and maintained by city water departments in Syracuse, Rochester, and Buffalo respectively. The MVWA, on the other hand, includes the City of Utica, where some of oldest pipe exists.

In the absence of the "best conditions" noted above, we believe the EPA goal of 10% for total lost water is both unrealistic and unattainable without massive capital investment that would extend well beyond the affordability of the community. However, we do believe that "best practices" are certainly achievable and are in fact institutionalized at the MVWA. Your report acknowledges our use of best practices, which includes careful measurement and accounting of unmetered water uses, proactive leak detection programs, advanced metering technology, systematic replacement of older meters, continual repair efforts, and coordination with other agencies when replacing or rehabilitating sections of water mains in order to the reduce the cost of system renewal to the public.

Regarding that section of the report, we certainly agree with your findings. But we wish to clarify footnote #5 pertaining to our leak detection program. It states that "To date, 465 out of 702 miles of pipe have been analyzed." While this true within the reporting period of January 1, 2014 through June 30, 2015, it should be noted that all 665 miles of distribution pipe have been evaluated with electronic sound detection at least three times since the MVWA began managing the regional water system. The balance of the 702 miles is transmission pipe and is evaluated using different techniques. In the past, approximately one third of the distribution system was evaluated per year. Beginning in 2015, the entire distribution system will be investigated each and every year. But unfortunately, new underground leaks develop just as fast as existing underground leaks are detected and repaired.

Your report concludes with the recommendation that the MVWA should continue to investigate the causes of water losses and take appropriate actions to reduce water loss and costs. We agree wholeheartedly, especially with the use of the words "appropriate actions." We will continue our aggressive program to locate and repair leaking pipes with every means at our disposal. The implementation of new techniques and technologies enables us to locate leaks faster and repair them sooner. This is expected to achieve a marginal reduction in lost water over time by reducing the volume lost during each leak event. But listening devices and repairs after-the-fact will not reduce the overall number or frequency of leaks.

Major capital investment is necessary to achieve significant reductions in main breaks. For example, the MVWA could target its oldest and/or most unreliable 200 miles of water mains for replacement. This would represent only 28% of the pipes, but it could hypothetically reduce main breaks by perhaps as much as 60%. Based on your draft report, the cost of lost water above the federal goal of 10% is $339,000. Using your number, a reduction of 60% would equate to an annual savings of $203,400 in today's dollars. However, this savings would be achieved at a high cost.

The replacement cost of water mains within city streets, including street restoration, is approximately $175 per linear foot. Therefore, the cost per mile is approximately $924,000. To replace 200 miles would cost roughly $184.8 million. Since there are no significant sources of external funding for such projects, we would assume this work would be financed through the sale of water revenue bonds.

At current interest rates, the annual debt payments for the MVWA when borrowing money is approximately $65,000 for twenty years per million dollars borrowed. Therefore, the debt payments to finance the replacement of 200 miles of our worst pipe would be about $12 million per year. Obviously, the expenditure of $12 million per year to save $203,400 per year would not be considered "appropriate." Even if such a project could reduce leakage down to the 10% federal goal, the debt payments would still be 35 times greater than the $339,000 that could be saved.

Water mains can also be rehabilitated at approximately half the cost of replacement. This process involves cleaning the inside of the pipe and coating the inside surface with a durable liner. The MVWA does this type of project when appropriate, but it is not clear how long the life of the pipe is realistically extended. But even at half of the cost, the price to rehabilitate 28% of our system would still exceed $6 million in annual debt payments.

The board of directors of the MVWA, with support from experienced professional staff, strives to achieve sound public policy in managing this utility. This requires that we pursue the proper balance between system maintenance, reinvesting in the system at levels that are not overly burdensome, and yet being responsible to the next generation of water users in the Mohawk Valley.

Once again, we appreciate the opportunity to comment on your draft report, and we support your recommendation that we continue tackling the challenges of an aging infrastructure.

Sincerely,

Patrick J. Becher
Executive Director

cc: MVWA Chairman Elis J. DeLia
MVWA Board Members

APPENDIX B

OSC COMMENTS ON THE AUTHORITY'S RESPONSE

Note 1

Our audit was conducted in accordance with GAGAS, and we believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. Our audit objective focused on the Authority's procedures for monitoring water accountability and addressing water loss. Although we did review other aspects of the Authority's operations during our risk assessment process, those other aspects were not included in our audit objective. Therefore, no opinion can be rendered in those areas.

Note 2

The EPA has established an industry goal of 10 percent for unaccounted-for-water system losses. Although the extent of water system losses can vary from the EPA benchmark based on a variety of factors and conditions, 43 percent of the Authority's water produced in 2014 was unaccounted-for. We believe the Authority should continue its efforts to investigate the causes of water loss and take appropriate actions to reduce water loss and costs.

APPENDIX C

AUDIT METHODOLOGY AND STANDARDS

To achieve our audit objective and obtain valid evidence, we performed the following procedures:

- We interviewed Authority officials to obtain an understanding of their process for monitoring and reconciling water produced, water billings and other usage to determine the amount of unaccounted-for water.

- We calculated the amount of unaccounted-for water in 2014 and compared our results to the Authority's calculation and to the EPA standard.

- To confirm the reliability of water consumption reports provided to us by the engineering department, we compared two randomly selected months (May and July 2014) from the consumption reports and traced to billing registers. Also, to confirm the reliability of water production reports provided from the engineering department, we compared the amount of water produced in 2014 from the reports to meter reading reports and to production reports provided to us from the accounting department.

- We reviewed the Authority's methodology for measuring and accounting for other municipal uses for water (unbilled) for reasonableness.

- We reviewed variable costs associated with water production, from the Authority's accounting records, and computed a cost per 1,000 gallons of water. We then computed a cost for the Authority's 2014 unaccounted-for water.

- We interviewed Authority officials to gain an understanding of the causes for the unaccounted-for water.

- We reviewed and discussed with Authority officials the measures taken to reduce continued water loss.

We conducted this performance audit in accordance with GAGAS. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

APPENDIX D

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APPENDIX E

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