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Stepping Up Water Loss Control: Utility in Focus

Philadelphia Water Department, *Population Served: 1.5 million*

The Center for Neighborhood Technology (CNT) is working to help utilities embrace more sustainable water management practices. Our *Fixing the Leaks* initiative produces research, awareness, outreach, and assistance in ramping up water loss control and infrastructure reinvestment. The following is a case study that highlights the benefits of robust water loss auditing through the experience of the **Philadelphia Water Department**.

The M36 water auditing manual created by the American Water Works Association (AWWA) is internationally recognized as a best practice for achieving a robust and standardized water loss audit. Among other benefits, these methods allow utilities to:

- **Expand system knowledge and develop water loss control programs**
- **Reduce apparent and real losses**

Additionally, it helps states and regions look at wider-scale water loss trends, enabling them to more effectively reduce water waste and make a stronger economic case for infrastructure reinvestment.

UTILITY PROFILE

The Philadelphia Water Department (PWD) has long been a leader in adopting innovative water supply technology. The utility began using M36 in 2000 and was the first American water utility to employ the method.[1] The PWD provides water and sewer service to over 1.5 million customers. Its two primary water sources are the Delaware and Schuylkill Rivers.[2]

For more information on the Philadelphia Water Department, and its various initiatives, visit its website:
www.phila.gov/water/Pages/default.aspx

(Photo Source: Philadelphia Water Department; http://phillywatersheds.org/your_watershed/delaware)

(Photo Source: Philadelphia Water Department; http://phillywatersheds.org/your_watershed/schuylkill)

DRIVERS FOR UTILITY ADOPTION AND WATER LOSS CONTROL ACTIVITIES

KEY DRIVERS: WATER LOSS AND REVENUE PROTECTION

In the 1980s, the PWD realized that every day, 125 million gallons of treated water was not being recorded on customer meters. To get a handle on water loss control and revenue protection, the PWD wanted to adopt an annual water loss auditing process as a standard best practice. In 1992, the Department established a Water Accountability Committee to organize water loss reduction initiatives. The committee determined that the PWD should adopt the M36 method in order to most effectively measure internal leakage and revenue loss.[3]

Once the Department began carrying out audits in 2000 and gained a more complete picture of its system's operations, it focused on managing water loss by reducing apparent losses (customer meter inaccuracy, unauthorized consumption, and systematic data handling errors) and real losses (leakage). The PWD has reduced apparent losses by installing an automated meter reading (AMR) system and cutting unauthorized uses of water. It has reduced real losses by expanding its leak detection surveys and piloting district metered areas (DMAs) to facilitate proactive leakage management.[4]

M36 BENEFITS	BENEFITS FOR PHILADELPHIA [5-6]
Expand system knowledge and develop water loss control programs	**Adopting M36 has allowed the PWD to accurately track water consumption and losses.** The collection of these validated data and the use of the **M36 Water Loss Control Planning Guide** has enabled the PWD to **develop long-term water loss control programs, such as investing in an AMR system, identifying data gaps, organizing leak detection surveys, and measuring its Infrastructure Leakage Index** (ILI = ratio of current leakage to unavoidable annual real losses).
Reduce apparent losses	Between 1997 and 1999, the PWD invested in an AMR system for over 400,000 properties. The system allows for remote meter reading, which has **significantly reduced data handling errors, as well as the number of inaccurate water bill estimates. It has since recovered almost $32 million in revenue.**
Reduce real losses	**The PWD works continuously to reduce real losses by engaging in pressure management programs and acoustic leak detection surveys.** Prior to 2000, leakage stood at 90 mgd. **The PWD's 2013 level is 60 mgd, with an economic leakage level calculated to be 45 mgd.** Between 2000 and 2013, the PWD reduced its ILI from 12.3 to 8.8.

PHILADELPHIA WATER LOSS CONTROL PROGRAM ACTIVITIES AND FUNDING MATRIX [7-8]

ACTIVITY	TIMEFRAME	FUNDING
Assembled Water Accountability Committee to compile annual water audit and pursue sustained water loss reductions	1992	$30,000 annually
Consultation with international leakage experts to conduct a Leakage Management Assessment (LMA) project	2000	$60,000
Pilot DMA to investigate advanced pressure management and leakage control	2006-2009	$350,000
Acoustic Leak Detection Surveys (1,000 miles annually, one third of system)	Ongoing	$1 million annually
Maintenance of AMR System and launch of Revenue Protection Program, a significant accountability improvement	Ongoing	$2 million annually for monthly meter readings and maintenance

PWD'S TIPS AND TRICKS FOR OTHER UTILITIES [9]

Compile the water audit on an **annual basis** as a **standard business practice** and **be persistent with its use.**

Engage with a multi-disciplinary team to address all facets of water accountability and **network with water industry professionals** on water loss control.

Establish proactive loss control interventions.

"It is possible to be accountable, but not efficient. However, it is impossible to be efficient, if you are not first accountable. Start by creating a reliable water audit and auditing process."

- George Kunkel, PWD

To learn more about this report, CNT's *Fixing the Leaks* initiative, and the various resources available for your agency, please contact Danielle Gallet, Infrastructure Strategist and Water Supply Program Manager, at *danielleg@cnt.org*

REFERENCES

[1] IWA/AWWA, *Manual of Water Supply Practices: M36, 3rd Edition,* (2009), 259-265.

[2] Water Revenue Bureau, (2014). www.phila.gov/waterrev/watersewer.html

[3] IWA/AWWA, 260.

[4] IWA/AWWA, 260-263.

[5] IWA/AWWA, 259-265.

[6] Kunkel, George, *Long-Term Successes in Water Loss Control in Philadelphia,* AWWA Webcast Program, (n.d.). www.ncsu.edu/wrri/pdfs/pastevents/awwa102011/GeorgeKunkel.pdf

[7] IWA/AWWA, 259-265.

[8] Kunkel.

[9] Kunkel.