

WATER LOSS CONTROL – ADAPTING TO A NEW WAY OF BUSINESS

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Abstract. When managing water losses, the first step water providers must take is to ensure that they are accurately accounting for the water moving through the treatment and distribution systems. In Georgia, water providers have traditionally measured system efficiency using the expression unaccounted for water. Today, that method is considered to be imprecise, unreliable and inconsistent. Further, unaccounted for water should more accurately be replaced by the term non-revenue water. As recognized in the Water Stewardship Act of 2010, the International Water Association and American Water Works Association have developed a more accurate methodology for identifying and accounting for system leaks and un-metered uses. The IWA/AWWA water audit method provides detailed guidance for all water providers on measuring a water system’s water treatment and delivery performance based on system-specific features.

This presentation will review the new requirements in the Water Stewardship Act, outline some best practices for water loss control and present tools available to assist water providers in meeting these new requirements.

INTRODUCTION

Historically, Georgia’s water resources have been viewed as inexhaustible. In years with normal levels of rainfall, Georgia’s water resources are plentiful; however, the state’s water supplies are vulnerable to inevitable drought conditions. The state’s growing population and economy have intensified this vulnerability, and conflicts regarding water use have arisen. Ongoing droughts, increasing demands, and conflicts over water use will require more careful management so it is possible to meet water needs while minimizing impacts to the state’s land and water resources.

Georgians face the necessity of changing the way we view our water resources. Across the state, Georgia’s water providers are becoming aware of the need to change water management practices in order to help sustain water resources. As the commitment to sustaining water resources grows, our dependence on dry weather water use

restrictions and the need for emergency water use reductions diminishes. If, for example, Georgians conserve water more aggressively and use every gallon as efficiently as possible, communities will be more resilient to dry conditions when droughts occur – minimizing the need for emergency cutbacks to maintain finite supplies.

Water conservation is the beneficial reduction of water use, water waste and water loss. (SWP 2008; Vickers 2001). Conservation, implemented as a long-term water management practice, is fiscally responsible and can enhance our ability to grow. Water conservation does not lower our quality of life or deter business. It can lead to more efficient and effective business operations and help water users recognize the value of water.

The ultimate goal of water conservation is to maximize efficiency and the benefit from each gallon used. Efficient water use is considered the minimal amount of water that is technically and economically feasible to achieve an intended water use function (SWP 2008). Efficient use can be maximized by implementing water conservation efforts to 1) reduce water waste, which is water used for an intended purpose but may not be considered efficient; 2) reduce water loss, which is water that does not make it to the point of intended use, usually due to leaks or faulty equipment, and 3) reduce overall water use including water used for efficient applications, which when necessary (such as during prolonged drought conditions), can be accomplished through the use of new or high-efficiency technology or changing water-using behavior. The diagram below demonstrates this general relationship.

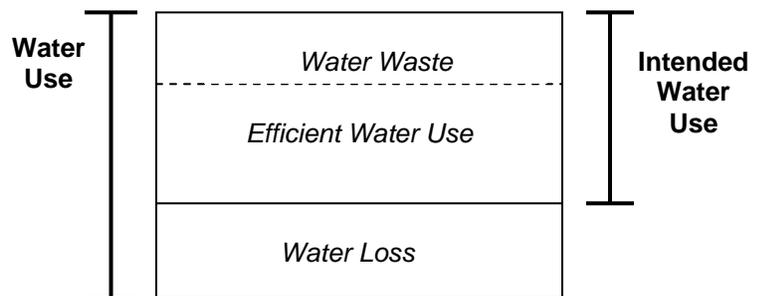


Figure 1. Water use = intended water use (efficient water use + water waste) + water loss (WCIP 2010).

BACKGROUND

This paper presents the context for state-wide efforts to standardize methods of water loss control for public water systems. This paper also provides an overview of the steps to be taken in 2011, as the Georgia Department of Natural Resources (“DNR”), Environmental Protection Division (“EPD”) works with stakeholders to develop such standard methods.

Traditionally, water providers in Georgia and throughout the country have measured system efficiency using the imprecise expression unaccounted for water (“UAW”) to deal with water loss. However, the accepted convention now is to replace the term UAW with the expression ‘non revenue water’ (“NRW”) which more accurately reflects the cost associated with the treated water. Unaccounted for water, expressed as a percent, is calculated as the difference between the amount of water pumped into the water supply system from the water treatment plant, and the amount of water actually delivered to metered water use customers (DNR R&R 391-3-6-.07 and 391-3-2-.02). UAW generally includes known and unknown system leakage and un-metered and/or unbilled water uses, such as fire fighting, flushing, broken water mains, etc. In reality, no water is unaccounted for; all water introduced into the distribution system falls into one of two categories: authorized consumption or losses.

The International Water Association (“IWA”) water audit method, which is recommended by the American Water Works Association (“AWWA”), is being adopted by water systems across the country. As a method of identifying and accounting for system leaks and un-metered uses, the IWA/AWWA method is considered more accurate than calculating UAW (AWWA 2003). The IWA/AWWA water audit method provides detailed guidance for all water providers on measuring a water system’s water treatment and delivery performance based on system-specific features. The IWA/AWWA method outlines seven major components to be assessed within each system: 1) system input volume, 2) authorized consumption, 3) water losses, 4) apparent losses, 5) real losses, 6) revenue water, and 7) non-revenue water. Measuring non-revenue water, defined as the volume of water going into a system that is not billed or producing revenue for the water provider, provides a clearer understanding of water losses in the system than prior methods that measured UAW (WCIP 2010).

State Water Management Plan and WCIP. Section 7, Policy 3 of the Georgia State-wide Water Management Plan (“SWP”) identifies water conservation as a priority water management practice (SWP 2008). The Georgia

Water Conservation Implementation Plan (“WCIP”) was developed to support this policy and to serve as a resource for the state’s water use sectors (SWP 2008 and WCIP 2010). The SWP and the WCIP identify water loss control as a critical practice for water utilities. Specifically the SWP identifies that water providers should conduct regular water system audits and adopt a water loss control program approved by the Director of EPD. Goal #2 in the WCIP for domestic and non-industrial public uses is for “Water providers to maximize the efficiency of the systems that treat and deliver water to customers,” with supporting benchmarks encouraging water providers to 1) adopt the IWA/AWWA water audit method and conduct the audits annually; 2) set system-specific reduction targets for non-revenue water and 3) implement practices to meet non-revenue water reduction targets and verify reductions (WCIP 2010).

Water Contingency Planning Task Force. Following Judge Magnuson’s July 2009 ruling related to the use of Lake Lanier (EPD Memo 2009), Georgia’s Governor convened the Water Contingency Planning Task Force (“Task Force”). The Task Force was charged with analyzing the potential water supply shortfall that may result from the ruling and recommended a set of actions related to water conservation and supply options (WCTF 2009).

In the final report released in December 2009, the Task Force recommended several policies related to leak abatement and water loss control. The recommendations were not intended to establish targets for water utilities, but to prepare local governments and water utilities for future evaluations of leak abatement programs and targets. Among the recommended policies were that, “Every water utility conduct water loss assessments to IWA/AWWA standards;” and “Every water utility develop a ‘real water loss’ reduction program such as leak abatement options to address actual leaks...” (WCTF 2009)

Water Stewardship Act of 2010. During the 2010 General Assembly, legislators overwhelmingly supported Senate Bill 370/House Bill 1094 also known as the Water Stewardship Act of 2010 (“WSA”). The WSA has been referred to as a landmark conservation act and is considered by some to be the most aggressive conservation legislation in the country (Senate Press 2010). Some provisions of the WSA were based on recommendations from the Water Contingency Task Force and many provisions are supported by the goals and practices identified in the WCIP.

The WSA states, “The General Assembly recognizes the imminent need to create a culture of water conservation in the State of Georgia,” and “The General Assembly also recognizes the imminent need to plan for water supply enhancement during future extreme drought conditions and other water emergencies.” Ten sections of the bill ad-

dress the need for enhanced water supply planning and conservation incentives. Section 3 of the bill specifically addresses the need to improve water efficiency by public water systems, by requiring annual water audits and adoption of water loss detection programs.

WATER LOSS CONTROL REQUIREMENTS

Once enacted, the water loss section of SB 370/HB 1094 (Section 3) revised O.C.G.A. § 12-5-4 will become standard operating procedure for public water systems in Georgia. Generally, the legislation now requires water systems serving over 3,300 individuals to conduct annual water audits following best practices developed by the DNR and adopted from the IWA water audit method/standard.

The WSA defines a public water system as one that that regularly serves 3,300 individuals with piped water for human consumption. After 2013, all public water systems are required to conduct standardized annual water loss audits in compliance with minimum standards and best practices adopted by the DNR Board. The WSA establishes a phased-in requirement for public water systems to comply with the new requirement:

- By January 1, 2012, public water systems serving at least 10,000 individuals shall have conducted a water loss audit, pursuant to the standards and best practices adopted by the DNR Board. These large water systems must submit those audits to the Georgia EPD by March 1, 2012, or within 60 days of completion to be posted on the EPD website.
- By January 1, 2013, all other public water systems (those serving 3,300 individuals shall have conducted a water loss audit, following the standards and practices set forth by the DNR. The smaller systems must submit their annual audits to EPD within 60 days of completion to be posted on the EPD website.

SUPPORT FOR WATER SYSTEMS

The DNR is required to adopt rules, “for the minimum standards and best practices for monitoring and improving the efficiency and effectiveness of water use by public water systems to improve water conservation,” (O.C.G.A. § 12-5-4.1(b)). The rules to support this new requirement must address issues related to:

- The establishment of an infrastructure leakage index. In a water supply distribution system, the Infrastructure Leakage Index (“ILI”) is the ratio of the current level of annual real losses (“CARL” - mostly leakage) to the Unavoidable Annual Real Losses (“UARL”).
- A phased-in approach requiring public water systems to implement water loss detection programs

- Technical assistance to assist public water systems develop water loss detection programs. The assistance must cover issues related to metering techniques, use of portable and permanent water loss detection devices and funding.

With assistance from the Georgia Association of Water Professionals (“GAWP”) and the Georgia WaterWise Council (“GWWC”), EPD is leading a stakeholder process to develop the standards and best practices required in the act. The Georgia standards will build heavily on the resources available through the AWWA and IWA, including the free Water Audit Software available through the WaterWiser Efficiency Clearinghouse (AWWA audit website) and the M36 Manual on conducting water loss audits and implementing water loss control programs (AWWA 2009).

The process to develop the rules and guidance is designed to engage stakeholders involved in water management and conservation. EPD is utilizing the expertise and network of the GAWP section, Georgia WaterWise Council (“GWWC”) to help develop educational material for water system staff and the general public. The technical assistance program will also include regional informational meetings and training workshops for public water systems facing the new requirements.

CONCLUSION

Public water systems provide a great benefit to the citizens of Georgia. Every day, 7.5 million citizens (92% of the state population) are provided safe drinking water by the public water system services. The new mandate to conduct annual water audits will help water systems become more efficient throughout the entire supply process. Furthermore, by employing improved methods of water auditing (like the IWA/AWWA method) and loss control, water providers have the potential to reduce the large volumes of treated water that are lost to leaks and faulty equipment, leading to more cost-effective production, recovered revenue and sustainable use of Georgia’s valuable water resources.

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