

Joliet Alternative Water Source Study

Topic #5: What is Water Loss?

February 8, 2019

Aging and leaky water distribution system infrastructure combined with on-going water scarcity concerns are changing how water utilities manage their water systems across the world, including Illinois. To effectively manage the water within a distribution system, a utility must first quantify water consumption and losses. Modern terminology starts with classifying water as revenue or nonrevenue water. Nonrevenue water is further broken down into unbilled authorized consumption and water loss. Unbilled authorized consumption often is the water used by the utility, either in the operations of the Water Works System or within community/utility owned facilities. Water loss is then broken down into real losses and apparent losses.

Real losses are the annual volumes lost through all types of leaks, breaks, and overflows on mains, service reservoirs, and service connections, up to the point of customer metering. On the other hand, apparent losses include unauthorized consumption, all types of customer metering inaccuracies and systematic data handling errors. It is important for water utilities to inventory and minimize both real and apparent losses, because both of them have an impact on the finances of operating a water system.

In August of 2014, the American Water Works Association (AWWA) released Version 5 of their free water audit software. This smart Microsoft Excel spreadsheet offers a starting point to track water loss within the distribution system. It is a top-down, or high level, audit form. This software offers a consistent benchmarking tool to compare themselves with other utilities, as well as a way to track their own progress through time. More information on AWWA's water audit software can be found here: https://cdn.ymaws.com/www.ims-awwa.org/resource/resmgr/Water_Loss/State_of_Water_Loss_Control_.pdf

A water audit can be defined as:

An accounting practice for any water system to help

Understand water consumption and losses that occur in the distribution system and to

Determine the validity of the utility's data so that an

Implementation plan can be created for reducing non-revenue water while focusing on data validity, then

Tracking and benchmarking a utility's progress.

The AWWA audit form offers a utility a tool to begin to place their losses into the categories, or buckets of water discussed above. As part of Phase I of the Alternative Water Source Study, the City of Joliet completed a water audit for calendar years 2016 and 2017. The results of the analysis indicated the City's annual nonrevenue water amounted to 25 – 28% of the total water produced, and the City's water losses totaled 24 – 27% of the total water produced. The City will continue their water audit efforts by completing an audit for calendar year 2018. The City also will continue the efforts to reduce

water loss through leak detection and repair, water main rehabilitation, water metering improvements and data validity improvements.

As stated above, the financial implications of water loss can be considerable, but the cost of water loss needs to be balanced against the cost to a utility to reduce the loss. The AWWA water audit software helps communities develop the annual water loss costs. The cost of the apparent losses is based on the retail rate of the water because this is water that would have otherwise been billed (i.e. if a customer water meter is under-registering, then this is water that should have been billed, but was not). The cost of the real losses is based on the operational costs of the system because this is water that would not have been billed, but rather just lost (i.e. water loss during a water main break would not necessarily have been used or billed to any customer, but it did cost the utility money to pump it and possibly treat it). This article provides information on water loss financial impacts within the Lake Michigan service area: <http://graphics.chicagotribune.com/news/lake-michigan-drinking-water-rates/loss.html>

A water utility can capitalize on so many of the benefits of the water audit. Reducing water loss can lead to the following:

1. Reduction in operations cost,
2. Reduction in future capital projects and maintenance (i.e. less facilities),
3. Increased revenue to the system,
4. Demonstrating that the utility holds itself accountable to their customers, particularly when requesting rate increases.
5. Good stewardship to a limited resource

The City of Joliet has made a commitment to conduct annual water audits and continue with their water loss reduction programs. Continued investment in these programs will yield the financial, social and environmental benefits listed above.