

WATER SYSTEM AND WATER LOSS CONTROL WORKSHOP
April 13, 2011
Rutgers EcoComplex, Bordentown NJ

AWWA Free Water Audit Software© Application Exercise 2
Actual Small System Example
System Description (updated 041211)

Instruction:

Please read the actual water system description provided below. The description contains all the necessary information to complete and populate the AWWA Water Audit Software©, Version 4.2, to obtain actual water balance and performance indicator results. The data was provided by an actual small system that conducted an IWA/AWWA Water Audit: the Water & Wastewater Authority of Wilson County, Tennessee (WWAWC). In addition to its routine use of the IWA/AWWA water audit, WWAWC is active in implementing progressive controls for leakage management in its water distribution system.

System Description:

The Water & Wastewater Authority of Wilson County, Tennessee (WWAWC) is a small water utility located in the central area of Tennessee not far from Nashville. The WWAWC services a primarily residential population with a small number of commercial customers and some industrial users. In total, there are 6,805 active water service connections and 121 known inactive service connections. WWAWC purchases 100% of its potable drinking water supply as treated water from four different supplies through a total of 15 meters which are manually read on a daily basis. These meters are operated and maintained by the water suppliers and they are responsible for testing and calibration. The water sources for the suppliers are the Cumberland River, Center Hill Lake, Stones River, and a groundwater supply. The water purchased by WWAWC is the single largest manageable expense item budgeted by WWAWC. WWAWC pays \$2.10999 per 1,000 gallons to the suppliers for the imported water supply.

Imported water is then distributed in the eastern half of Wilson County through 321 miles of distribution piping, which is almost 100% PVC piping. System pressures vary from 25 psi to 140 psi, and the average pressure has been estimated approximately at 60 psi. Currently, the annual cost of operating and maintaining the water system runs at \$3,374,456 with costs well tracked by WWAWC's staff but not audited by an external auditor.

The system supply through the 15 wholesale meters is logged daily and reviewed each business day by WWAWC staff. Flows across the distribution system are balanced with inflow/outflow of supply at WWAWC's five ground level water storage tanks taken into account. An annual report of total water imported from the neighboring suppliers is compiled from July 1 to June 30. For the reporting period of July 1, 2008 to June 30, 2009, the total water supplied (imported) to WWAWC was recorded as 414.607 million gallons.

For the reporting period July 1, 2008 to June 30, 2009 WWAWC reported Billed Metered Consumption totaling to 329.11 million gallons. WWAWC reads customer meters on a quarterly basis by using manual meter reading. They believe that they are successful in obtaining a reliable meter reading for at least 90% of meter reading attempts. WWAWC is thinking about

moving to monthly meter reading and billing via the use of an Automatic Meter Reading (AMR) system.

WWAWC tracks the water that is used in unbilled, unmetered fashion for fire department operations, system flushing and tank cleaning. For the above this amount was determined to be 3.298 million gallons. The customer population is fully metered and a routine meter change-out program exists. Roughly 10% of the meters that are rotated out of customer properties are tested for accuracy. This test data serves as the basis for the customer meter inaccuracy volume included in the water audit, and this amount is 5.521 million gallons. However, a wide variety of meter models and types exists in the customer population so the testing program provides only an approximate accounting of customer meter inaccuracy for the entire meter population. Customer meters are located in a small meter pit in the sidewalk or at the property line of the customers. The composite customer retail cost for water has been reasonably well calculated at \$8.38 per 1,000 gallons.

Unauthorized consumption, although known to exist on occasion (hydrant theft and meter by-passing), is not tracked. It is believed to be a relatively small volume of water lost each year. Customer water meters are read and bills issued on a quarterly basis. Some billing issues are known to result in unbilled water, but WWAWC has not conducted any auditing in attempt to quantify this amount.

Hints:

Some basic conversions of units will be required during this exercise, although you won't require the use of a calculator. Please be sure to convert the appropriate values before you enter into the AWWA Free Water Audit Software© Reporting Worksheet.

Do not be afraid to ask questions to your assigned moderator, who is there to assist you in this process and has the "answer sheet" and thus will be able to assess that you have entered appropriate values!

Most important hint – learn from the process and the other workgroup participants. By sharing your experiences, you gain helpful tips in collecting the right data for your own water audits!

Have Fun and Good Luck!!!