Water Audit Process Summary

Water Audit Process Summary (by AWWA)

This BMP discussion is a short summary of the process detailed in the AWWA M-36 manual available from the AWWA. This abridged version is presented to give the reader a sense of the overall complexity and thoroughness of the process, and what the utility may except as a result of conducting the effort.

Before Starting the Water Audit

Identify system boundaries – The boundaries of the audited system must be defined identifying where water is provided into supply and where water leaves the system. The water audit can be performed for treated and/or untreated water systems, distinct treated water distribution systems, and/or sections of distribution systems.

Set a time period – A water audit is a study over time. A time period must be selected to allow for the audit to occur – noting that one month or six months is too short a period to give an overall picture of the water system.

Select the units of measure – The units of measure must also be selected and standardized such that supply and consumption are consistently measured.

Assemble records and data – One of the greatest challenges is assembling the records and data from the wide variety of sources that exist within a water utility – including production, engineering, planning, maintenance, and finance, just to name a few. Noteworthy is that the first time an audit is conducted, it is typically a substantial challenge to collect and organize the diverse data required to support the requisite analyses; however, once the audit becomes a standard annual practice, it is significantly easier to track and obtain those data needed to support the audit and related analyses.

The water audit is typically facilitated through the completion of a worksheet, or set of worksheets, that organize and summarize the data collection activities. Worksheets are available from the AWWA (see resources in the Water Loss Control portion of the BMP Tool Box).

Task 1 – Collect Distribution System Description Information

Collect information on infrastructure, financial and operational data characterizing all aspects of utility operations. These data relate to the continuous operations of the water system and include costs for utility operations as well as customer billings and water sales revenue.

Task 2 – Measure Water Supplied to the Distribution System

This task involves numerous subtasks related to compiling and adjusting water supply information including water production, diversions and imports; adjusted for changes in storage volumes, transmission and conveyance losses and master meter inaccuracies.

Task 3 – Quantify Billed Authorized Consumption

This task involves numerous subtasks related to compiling and adjusting billed authorized consumption information including water sales and customer account data; adjusted for different meter types, time lags in meter reading, and partial use of customer connections (e.g., connections that occur for only a portion of a month).

Task 4 – Calculate Non-Revenue Water

Perform calculation of non-revenue water comparing the results of Task 2 to Task 3 concurrent volumes.

Task 5 – Quantify Unbilled Authorized Consumption

This task involves numerous subtasks related to identifying, estimating and tracking unbilled authorized waster uses for uses such as fire fighting, system flushing, street cleaning, town facilities, construction water, etc.

Task 6 – Quantify Water Losses

Water losses are the combination of apparent and real water losses. For the top-down water audit (see Water Audit BMP), water losses are determined as non-revenue water from Task 4 minus the sum of unbilled, authorized consumption from Task 5.

Task 7 – Quantify Apparent Losses

Apparent losses relate to:

- Customer meter inaccuracy;
- Systematic data handling error; and
- Unauthorized consumption.

This task focuses on characterizing and quantifying each of these apparent losses through estimation and field verification techniques, including an assessment of data collection and handling procedures and policies maintained and practiced by the utility.

Task 8 – Quantify Real Losses

With apparent losses estimated and to the extent practical, quantified through task 7, real losses can be estimated via calculation since total water loss estimated in Task 6 is the sum of apparent and real losses.

Task 9 – Assign Costs of Apparent and Real Losses

This task looks at estimating the cost impact of both apparent loss components and real loss components to the utility including losses in water sales revenues; variable costs in water development, production, treatment and delivery; and other considerations (e.g., availability of replacement water).

Task 10 – Calculate the Performance Indicators

Performance indicators developed by IWA and AWWA are available to support the realistic assessment of water loss standing for audited utilities – large and small. These performance indicators take into account the maturity of the audit, the needs of the utility and the community that it serves, and the resources that are available. Performance indicators span financial and operational issues, allowing the utility to establish procedures and policies, and support economic decision making related to future water loss control.

Task 11 – Complete the Water Balance

Once the worksheets and data collection and assessment efforts are completed, quantities from key consumption and loss components can be developed to support the water balance. The water balance reflects that all of the water managed by the utility is accounted for in one of the defined categories of consumption and loss – therefore there is no unaccounted for water. For this reason, there is no such term in a properly conducted water audit.
