



Water Balance and Water Audit Information

Introduction to Terminology

The American Water Works Association (AWWA) no longer uses the term “unaccounted for water” to describe water that enters the distribution system but is not measured or estimated. The main reasons that the term has been abandoned are inconsistencies across the industry in the interpretation of the term as well as the adoption of the approach that all water entering the distribution system can be accounted for. The volumes can be quantified, via measurement or estimate, and be broken down into components in order to understand and better manage the major types of water uses (see Table 1).

The terms in Table 1 are defined in the “Definitions” section below. As Table 1 shows, all water entering the distribution system goes to a component of either authorized consumption or water losses. By gathering data about each of the components, a water system can better understand, manage, and reduce water losses and non-revenue water. The most comprehensive way to do that is with a water audit using the methodology described in the most current version of the AWWA M36 manual.

Currently, the Water Conservation rules, Env-Wq 2101, only require the annual reporting of some of the components; however, additional reporting may be required based on the results of the initial assessment (see the “Reporting and Submittal Requirements” section below). Regardless of whether a system is subject to the Water Conservation rules, an annual water audit is recommended for all systems with customer meters.

Table 1. Components of Water Use in Water Distribution Systems

System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non-Revenue Water
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Systematic Data Handling Errors	
			Customer Metering Inaccuracies	
		Real Losses	Leakage & Overflows at Storage Tanks	
			Leakage on Water Mains	
Leakage on Service Lines				

Definitions

“Apparent losses” means the volume of water that enters the distribution system and reaches an end user but is not accurately measured and/or billed. It consists of unauthorized consumption, customer metering inaccuracies, and systematic data handling errors.

“Authorized consumption” means the volume of water that is used by registered customers, the water supplier, and others who are authorized by the water supplier to do so. It includes water consumed in public service activities including, but not limited to, firefighting and training, flushing of mains and sewers, street cleaning, watering of municipal gardens, public fountains, frost protection, bleeder valves for water quality improvement, and water used in construction. Authorized consumption is either metered or unmetered and either billed or unbilled, in any combination.

“Authorized metered consumption” means the volume of authorized consumption that is metered. It consists of billed metered consumption plus unbilled metered consumption.

“Billed authorized consumption” means the volume of authorized consumption that is billed. It consists of billed metered consumption plus billed unmetered consumption.

“Billed metered consumption” means the volume of authorized consumption that is both metered and billed.

“Billed unmetered consumption” means the volume of authorized consumption that is billed but not metered.

“Customer metering inaccuracies” means the volume of water passing through a customer meter but not accurately captured. Meter inaccuracy can occur as a result of improper sizing, improper type for the application, improper installation, wear, aggressive water quality, malfunction, or other causes.

“Non-revenue water” means the volume of the system input volume that is not billed and/or does not produce revenue. It is the sum of unbilled authorized consumption, apparent losses and real losses. It can also be derived by calculating the difference between the system input volume and billed authorized consumption.

“Real losses” means the volume of water that is physically lost from a water supplier’s water storage and distribution system due to overflows from storage tanks and all types of leaks or breaks up to the customer meter and/or point of customer consumption.

“Revenue water” means the volume of the system input volume that is billed and/or produces revenue. It consists of billed authorized consumption.

“System input volume” means the volume of water input to the water supply system corrected for known errors, which is equal to the volume of water derived from the water system’s own sources, minus water consumed by treatment processes, plus water imported or purchased, minus water exported, plus or minus the net change in water storage (where applicable and significant).

“Systematic data handling errors” means the volume of water that can be attributed to consumption data errors and/or billing data errors that occur in customer meter reading, data transfer, accounting, and/or archival functions. Specific examples include inaccurate consumption estimates, extended

periods where no meter readings are obtained, poor account adjustment protocols, and poor accountability that allows some consumers to exist without having accounts in the billing system.

“Unauthorized consumption” means the volume of water that is taken from the water supply system without the authorization of the water utility. Examples include unpermitted water withdrawals from fire hydrants, illegal connections, bypasses to customer meters, and meter or meter reading equipment tampering.

“Unbilled authorized consumption” means the volume of authorized consumption that is not billed. It consists of unbilled metered consumption plus unbilled unmetered consumption.

“Unbilled metered consumption” means the volume of authorized consumption that is metered but for which the water supplier does not bill.

“Unbilled unmetered consumption” means the volume of authorized consumption that is neither metered nor billed. The most common examples of this consumption are firefighting, flushing, and street cleaning.

“Water losses” means the difference in volume between the system input volume and authorized consumption. It consists of apparent losses plus real losses.

Reporting and Submittal Requirements

If your water system is subject to Env-Wq 2101.08 and Env-Wq 2101.09, then a water balance for the calendar year is required to be submitted to NHDES by March 1 of the following year. A link to the water balance reporting form is available on the [NHDES Water Conservation website](#). Please see the water balance calculations below.

Water Balance = System Input Volume - Authorized Metered Consumption

Percent Water Balance = (Water Balance / System Input Volume) x 100

If the water balance exceeds 15% of the system input volume, the water system is required to complete a water audit and response plan and submit both files to NHDES by March 1. The water audit must be completed using the protocols and procedures described in the latest version of the AWWA M36 manual. The response plan must be based on the findings of the water audit and should identify the measures the system intends to implement and the schedule on which such measures will be implemented in order to reduce the water balance to below 15% within 2 years.

Resources for getting started on a water audit and actions that water systems can take to reduce water losses are available on the [NHDES Water Conservation website](#).

NHDES Contact

Please contact the NHDES Water Conservation Program at waterconservation@des.nh.gov with any questions.

Last Updated: January 2022