



Best Practice in Water Loss Control: Improved Concepts for 21st Century Water Management

In 2003 the American Water Works Association (AWWA) adopted improved best practice methods for defining and measuring water loss in water distribution systems. This transition into a new era of effective water management marked a departure from previous terms and practices no longer useful to the industry. The following explains this departure from obsolete practices and articulates key points and best practices in water loss control today.

Improved Terminology: Non-revenue Water

In 2003 AWWA abandoned use of the term “unaccounted-for” water (UFW) because all volumes of water supplied within a distribution system go toward either beneficial consumption or wasteful loss. *All water sent into the distribution system can be accounted for.* Today, the industry term favored by AWWA and its Water Loss Control Committee when quantifying water loss is “non-revenue” water (NRW).

NRW is specifically defined to include the sum of specific types of water loss and any authorized, unbilled consumption that occurs within water distribution systems.

Enhanced Performance Indicators to Measure Progress

Although percentage indicators—typically the ratio of authorized customer consumption to distribution system input—still exist in the industry, AWWA discourages use of percentage indicators, such as the “unaccounted-for” water percentage. Using percentage indicators to assess water loss in distribution systems gives a misleading and unreliable measure of utility performance because a percentage indicator

- › is greatly affected by changing levels of customer consumption
- › cannot distinguish among the specific components of non-revenue water occurring in a distribution system
- › reveals nothing about water volumes and associated costs (the two most important factors in assessing water waste within a distribution system).

Today, the industry best practice for water loss auditing created by the International Water Association (IWA) and AWWA now quantifies **several key performance indicators, which provide vastly superior means for assessing water loss performance in distribution systems, while recognizing that contributing factors and potential corrective measures are specific to each water utility.**



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The following table provides a guide to the most up-to-date industry best practices and water loss control terminology.

Editorial Guide for Use of Up-to-Date Water Loss Control Terminology		
INCORRECT	CORRECT	WHY
Unaccounted-for water (UFW)	Non-revenue water (NRW)	All water entering a distribution system can be defined as a component of either authorized consumption or water loss
% of system input volume to measure water loss performance	Suite of key performance indicators for water loss as outlined in IWA/AWWA audit method (As an example: gal/service connection/day)	A %-based expression obscures the underlying causes of water loss and impedes realistic solutions based on system specifics

It is important to understand that all water utility distribution systems incur leakage (real losses). Similarly, all water utilities fail to recover revenue from all of the water that is (or should be) billed to customers (apparent losses). Although every system is unique, all water utilities should employ leakage control and revenue recovery programs that strive to keep losses contained to appropriate, economically justified levels. AWWA's Manual: *Water Audits and Loss Control Programs* (M36) and the [AWWA FREE Water Audit Software](#) provide a robust pathway for utilities to develop data-driven programs to cost-effectively manage all water loss components (apparent and real) in distribution systems, as shown below in the IWA/AWWA Water Balance.

The IWA/AWWA Water Balance							
Volume From Own Sources (corrected for known errors)	System Input Volume	Water Exported (corrected for known errors)	Billed Water Exported			Revenue Water	
		Water Supplied	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water	
Water Losses	Real Losses			Unbilled Authorized Consumption	Billed Unmetered Consumption		
		Water Losses	Real Losses	Apparent Losses	Unbilled Metered Consumption	Non-revenue Water	
Unbilled Unmetered Consumption							
Customer Metering Inaccuracies							
Water Imported (corrected for known errors)	System Input Volume	Water Supplied	Water Losses	Real Losses	Apparent Losses		Unauthorized Consumption
							Systematic Data Handling Errors
							Leakage on Transmission and Distribution Mains
Water Imported (corrected for known errors)	System Input Volume	Water Supplied	Water Losses	Real Losses	Apparent Losses	Leakage and Overflows at Utility's Storage Tanks	
						Leakage on Service Connections up to the Point of Customer Metering	

NOTE: All data in volume for the period of reference, typically one year.