



INDIAN HEALTH SERVICE WATER LOSS PROGRAM

AWWA M36 Workshop

Tuesday, March 15 through Friday, March 18 – 2022

Virtual Workshop -- 4-hour sessions, daily; 8:30am-12:30pm PT (9:30am-1:30pm MT)

Dear Program Participants:

We are excited you are taking this step towards effective water loss management. This workshop is designed to be a highly interactive, virtual training that focuses on the development and implementation of a water loss program. The workshops will be spread out over 4 consecutive days in 4-hour blocks. The virtual training shall include small group activities, discussions, and mock scenarios that will allow attendees to practice what they have learned.

The training shall include, at a minimum, the following elements:

1. Participant ice-breaker intended to allow attendees to get to know each other better
2. Review of benefits implementing a water loss program and completing regular audits
3. Explanation of Water Research Foundation 5057 methodology for level 1 water audits
4. Introduction and overview of the AWWA free water audit software (version 6)
5. Discussion and handout defining terminology used by the AWWA M36 free audit software
 - a. Use the definitions tab in the free audit software as part of the discussion
6. Discussion on water balance (e.g., authorized/unauthorized, apparent losses/real losses) and application in the free audit software as part of the discussion
7. Demonstration of a water audit with latest AWWA M36 methodology and software, highlighting each the purpose of each segment and information that is needed and data validity assessment

We look forward to working with you all!

The Cavanaugh Team

Workshop Format

We will meet virtually through Zoom® each day from 8:30am-12:30pm PT (9:30am-1:30pm MT). Each day will include workshop styles that promote knowledge, comprehension, and application of the AWWA M36 methodology, the AWWA Free Water Audit Software (Version 6), and identifying next steps through presentations, breakout groups, common exercises, group discussion, and question & answer. Below are some helpful links of the tools we will be using throughout the week.



One of the first tasks in this virtual program was to understand which shared meeting platform participants were most comfortable with and Zoom® was the most popular choice. If it is not your first preference or you have less experience with this application, here are a few videos to make you feel right at home.

[Joining a Zoom Meeting](#)

[Basic In-Meeting Navigation](#)

Kahoot!

Kahoot!® is a fun interactive tool that we will use to collaborate, test comprehension of subject material, and have a little fun. It is as easy as punching in a code in your web browser or on your mobile device to participate.

[How to join a game – Help and Support Center \(kahoot.com\)](#)

Recommended viewing

Often, one of the pleasant outcomes of these training and technical assistance workshops is hearing from peers from other water systems and hearing their challenges, solutions, and questions. One of our goals is to facilitate that collaborative environment as much as possible. In this virtual setting, we ask that you consider turning your camera on when no other materials are being shared on the screen to simulate a real-world training room as much as possible. Of course, it is totally up to you! Everyone by this point has likely settled into their virtual ways, but **we do encourage to have cameras on during these discussion times at the front and back end of each daily session and as you are comfortable during presentations and Breakout Rooms.**

Workshop Agenda

Day 1 – March 15

Pacific/Mountain	Duration	Topic
8:15 am/9:00am	15 min	<i>Networking opportunity – for those interested, join the session early for some networking</i>
8:30 am/9:30am	30 min	Welcome, Pre-Test, and Introduction
9:00 am/10:00am	90 min	Presentation: M36 Methodology Breakout Exercise: Water Audit Boundary
10:30am/11:30am	5 min	Break
10:35 am/11:35am	40 min	Presentation: M36 Methodology (continued)
11:15 am/12:15pm	60 min	Presentation: AWWA Free Water Audit Software – Version 6.0
12:15 pm/1:15pm	15 min	Summary Review, Day 1 Evaluation, Adjourn

Day 2 – March 16

Pacific/Mountain	Duration	Topic
8:15 am/9:00am	15 min	<i>Networking opportunity – for those interested, join the session early for some networking</i>
8:30 am/9:30am	45 min	Interactive: Day 1 Review
9:15 am/10:15am	45 min	Demonstration: AWWA Free Water Audit Software (Version 6.0)
10:00am/11:00am	30 min	Presentation: Developing the Inputs
10:30 am/11:30am	5 min	Break
10:35 am/11:35am	45 min	Common Exercise: Developing the Inputs
11:45am/12:45pm	30 min	Presentation: Data Validity
12:15pm/1:15pm	15 min	Summary Review, Day 2 Evaluation, Adjourn

Workshop Agenda - continued

Day 3 – March 17

Pacific/Mountain	Duration	Topic
8:15 am/9:00am	15 min	<i>Networking opportunity – for those interested, join the session early for some networking</i>
8:30am/9:30am	30 min	Interactive: Day 2 Review
9:00am/10:00am	90 min	Common Exercise: Data Validity Grades Presentation: Interpreting Water Audit Results
10:30am/11:30am	5 min	Break
10:35am/11:45am	30 min	Demonstration: Mock Level 1 Validation
11:05am/12:05pm	70 min	Presentation: Common Recommended Next Steps
12:15pm/1:15pm	15 min	Summary Review, Day 3 Evaluation, Adjourn

Day 4 – March 18

Pacific/Mountain	Duration	Topic
8:15 am/9:00am	15 min	<i>Networking opportunity – for those interested, join the session early for some networking</i>
8:30am/9:30am	90 min	Presentation: Workshop Review
10:00am/11:00am	30 min	Presentation: Beyond the Audit
10:30am/11:30am	5 min	Break
10:35am/11:35am	30 min	Presentation: Next Steps
11:05am/12:05pm	30 min	Presentation: Common Recommended Next Steps
11:35pm/12:35pm	55 min	Summary Review, Day 4 Evaluation, Post-Test, Adjourn

Acronyms and Abbreviations

AF Acre-Feet	Lm Length of mains
AMI Advanced Metering Infrastructure	Lp Average length of (private) customer service line
AMR Automated Meter Reading	mA Milliamp
AOP Average Operating Pressure	MG Million Gallon(s)
AWWA American Water Works Association	MMEA Master Meter and Supply Error Adjustment
AWWA Software AWWA Free Water Audit Software (Version 6)	Nc Number of service connections
BMAC Billed Metered Authorized Consumption	NRW Non-Revenue Water
BUAC Billed Unmetered Authorized Consumption	PSI pounds per square inch
CF Cubic Feet	SCADA Supervisory Control and Data Acquisition
CCF 100 Cubic Feet	SDHE Systematic Data Handling Errors
CMI Customer Metering Inaccuracies	UARL Unavoidable Annual Real Losses
CPA Certified Public Accountant	UC Unauthorized Consumption
CRUC Customer Retail Unit Charge	UMAC Unbilled Metered Authorized Consumption
CY Calendar Year	UUAC Unbilled Unmetered Authorized Consumption
DVG Data Validity Grade	VOS Volume from Own Sources
DVS Data Validity Score	VOSEA VOS Error Adjustment
FY Fiscal Year	VPC Variable Production Cost
Gal gallon(s)	WE Water Exported
GIS Geographic Information Systems	WEEA WE Error Adjustment
ILI Infrastructure Leakage Index	WI Water Imported
IDG Interactive Data Grading	WIEA WI Error Adjustment

AWWA Free Water Audit Software

The new AWWA Free Water Audit Software, version 6 was released on December 4th. The AWWA Free Water Audit Software is the industry standard tool for conducting the annual water audit, and using the results to guide a program for cost-effective water loss and revenue recovery. It first came out nearly 15 years ago, and is now used all over North America and in other countries around the world. Version 6 represents a major evolution of this tool – incorporating over 1,000 improvements from user-provided comments. Major updates include the new Interactive Data Grading feature, new Fighter Jet Dashboard, and a streamlined user experience.

Visit www.awwa.org/waterlosscontrol to download your own copy, read the official release memo, and/or watch a brief orientation video. **Please download a blank copy to use during the workshop.** We will also be able to provide a copy during the workshop.

AWWA M36 Standard Terminology

More terms and definitions provided in the AWWA M36 (4thEd.) as well as the AWWA Software

Data Validity

This is a measure of the reliability of the audit input data, and therefore the reliability of the audit output. Data Validity is quantified on a 1 – 100 scale.

Water Loss

This is simply the difference between water supplied and authorized consumption. Water loss consists of apparent loss plus real loss.

Apparent Loss

These are losses in customer consumption attributed to inaccuracies associated with customer metering, systematic data handling error and unauthorized consumption (theft). Apparent losses represent ‘paper losses’ or ‘commercial losses’ that result in uncaptured revenue for the water utility and distortion of customer consumption data. Apparent losses are valued at the retail rate.

Real Loss

These are the “physical” losses, largely leakage from the infrastructure: mains, valves, service lines, and tank overflows. Leakage occurrences are categorized as “reported” events, “unreported” events, and background leakage. Real Losses are often valued at the variable production rate, but may also be valued at the customer retail rate if the source water resources are greatly constrained, such that any water saved in leakage control could be sold to an expanding customer base.

Unbilled Consumption

This represents any authorized consumption occurring in the water system for which no bill is issued, and no revenue collected. This includes unbilled metered consumption, such as municipal buildings, and includes unbilled unmetered consumption, such as flushing and fire-suppression.

Non-Revenue Water (NRW)

NRW equals real loss plus apparent loss plus authorized unbilled consumption.

Unavoidable Annual Real Loss (UARL)

UARL is the lowest real loss technically achievable in a water utility based on its key characteristics. The derivation of the UARL calculation is based on leakage data gathered from well-maintained and well-managed systems. Equations for calculating UARL for individual systems were developed and tested by the International Water Association’s Water Loss Task Force and published in 2000. The equations take into account measured frequencies, flow rates and durations of background losses, reported leaks and unreported leaks, as well as the pressure-leakage relationship (assumed to be linear for most large systems). Note: The UARL is strictly a reference value used in calculating performance indicators; it is not an actual component of leakage.

Infrastructure Leak Index (ILI)

The ratio of the CARL to the UARL. The ILI can be an effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses once all justifiable pressure management measures have been undertaken. If rigorous leakage control existed such that the CARL was equal to the UARL, the ILI would then equal a value of “1”. However, such low leakage levels are rarely possible or economically justified for most water utilities. An ILI value less than “1” is highly unlikely and typically indicative of embedded data inaccuracies in the water audit.