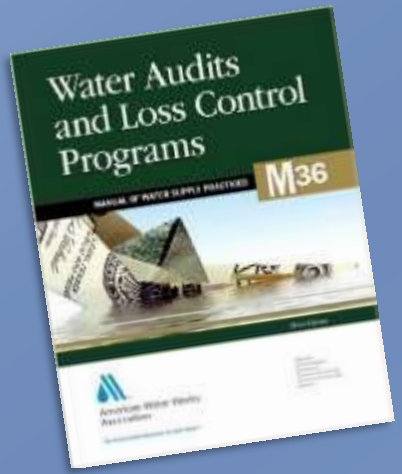
New Mexico Statewide Water Loss Control Training Program – A Brief Overview

New Mexico Rural Water Association Annual Conference

Albuquerque, NM

April 2016



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Today's Topics

1. The Team
2. Background
3. Program content
4. Program logistics
5. Next Steps

Training Program Team

New Mexico Environment Department
env.nm.gov/

Southwest Environmental Finance Center
southwestefc.unm.edu/main.php

Cavanaugh
cavanaughsolutions.com

Introduction to the New Mexico AWWA Water Loss Control Training Program

Current condition public drinking water suppliers across NM are facing:

» Aging and failing infrastructure
» Aquifer depletion & well production decreases
» Drought & watersheds impacted by wildfire

Current conditions in the state limit available drinking water sources for water systems and increase the cost to produce safe water for the long term.

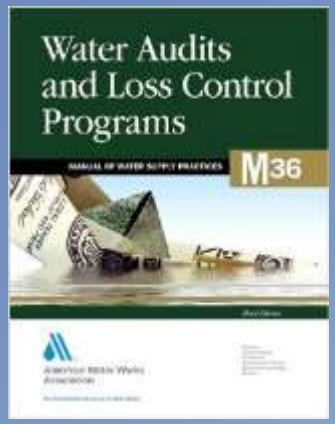
The value of safe drinking water production is very high.

» Protects public health
» Provides fire protection
» Allows economic development
» Improves the quality of life

Utilizing the AWWA Water Loss Control Program in New Mexico

Importance of quantifying and understanding water loss

- Improved asset management for repair and replacement
- More targeted and cost efficient water infrastructure projects
- Maximizing produced water served to customers
- Maximizing revenue for produced water



The AWWA method is nationally renowned, utilized by states across the country and is supported by state agencies in New Mexico.

Training all stakeholders in NM by the same AWWA method allows improved communication and coordination.

– Public water systems – State agencies – Assistance providers

Benefits to Attending the Program

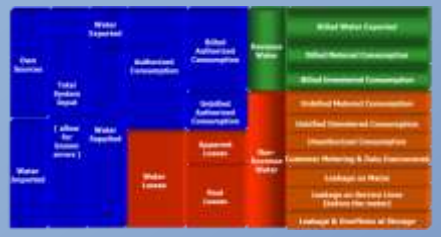
- Critical for any system seeking State funding
- Critical for any system seeking water right permitting with the State
- Using these practices improves revenue & reduces cost
- Provides additional water supply, from within
- Eligible for operator and board training CEUs
- The entire program is FREE

Targeted Attendees

Representation from these key areas:

- Operations
- Finance
- Management

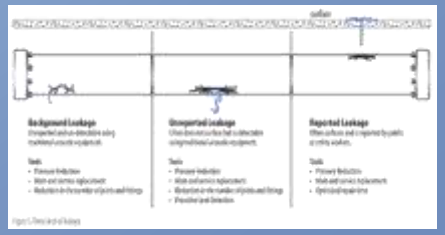
Program Highlights



Water loss auditing - foundations

Functional Focus Area	Water Audit Data Validity Level / Score				
	Level I (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations; identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditures: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (>10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in Class - the ILI is very reliable as a real loss performance indicator for best in class service

Data validation



Water loss analysis

Developing the strategy

Water Auditing Foundations - Basic Concepts

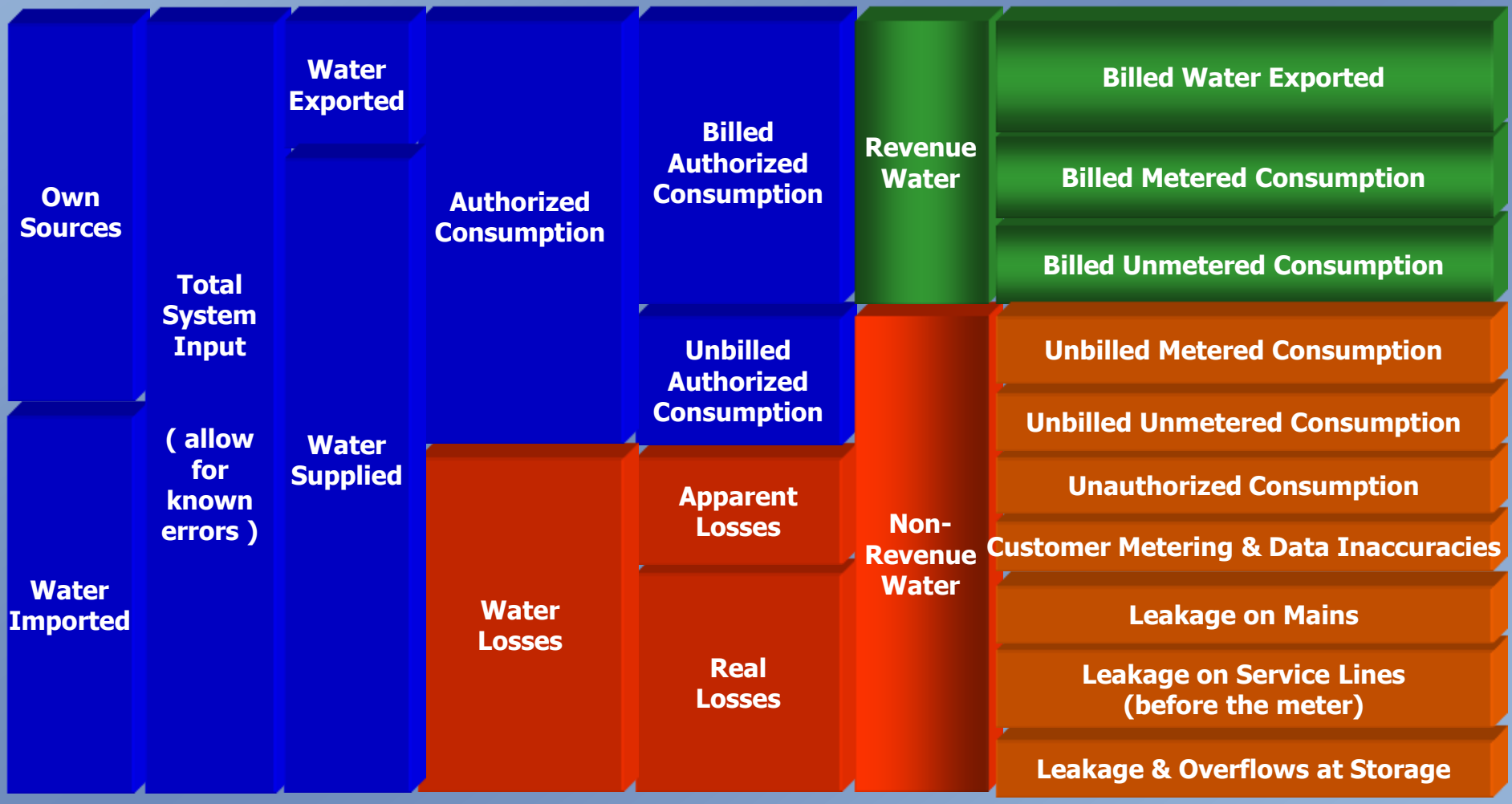
1. Utilize the Water Balance.

2. Separate Total Water Loss into Real and Apparent Loss.

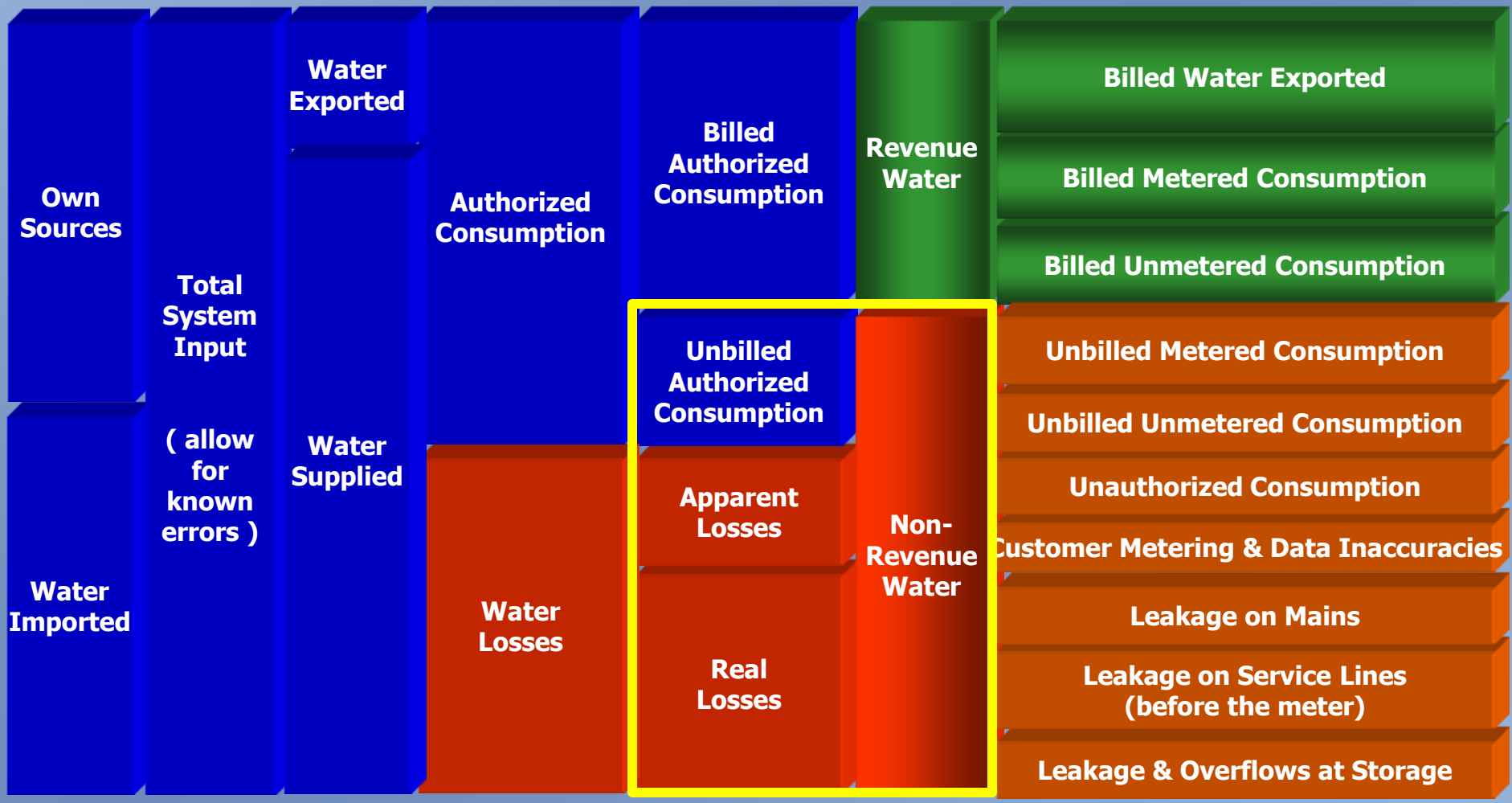
3. Separate Real and Apparent Loss into their subcomponents.

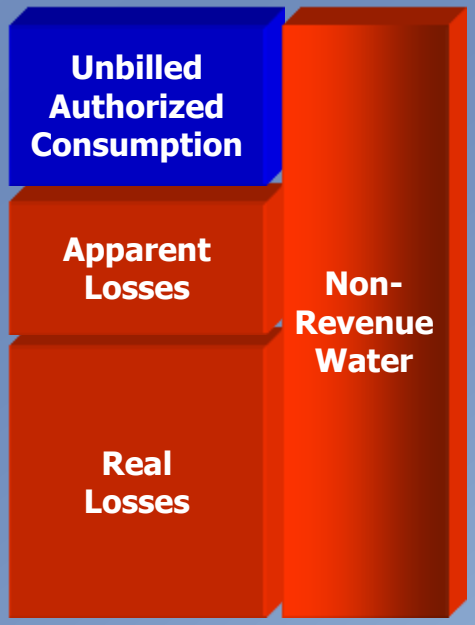
4. Use metrics in units of Volume, Value & Validity.

AWWA Standard Water Balance



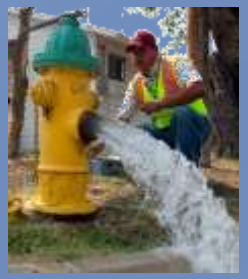
AWWA Standard Water Balance




Unbilled
Authorized
Consumption
Apparent
Losses
Real
Losses
Non-
Revenue
Water

- Fire Dept Usage
- Operational Flushing
- Tools for control include efficient flushing practices and awareness campaigns

Unbilled Authorized Consumption



- Non-physical / revenue loss - slow meters, billing issues and theft
- Cost impacts at ‘retail’ rate.
- Tools for control include data management, quality control policies/practices, & meter testing & repair

Apparent Losses

Non-Revenue Water

- Physical loss - leakage
- Cost impacts at ‘wholesale’ rate
- Tools for control include leakage and pressure management

Real Losses

AWWA Free Water Audit Software

American Water Works Association

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.
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? Click to access definition
+ Click to add a comment

Water Audit Report for: Northern San Leandro Combined Water Sewer Storm Utility District (0007900)
Reporting Year: 2013 (1/2013 - 12/2013)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter Error Adjustments

WATER SUPPLIED

			Pcnt:	Value:	
Volume from own sources:	5	1,000.000 MG/Yr		100.000	MG/Yr
Water imported:		MG/Yr			MG/Yr
Water exported:	1	100.000 MG/Yr	9	25.000	MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 825.000 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	8	700.000 MG/Yr			
Billed unmetered:	9	50.000 MG/Yr			
Unbilled metered:		MG/Yr			
Unbilled unmetered:		10.313 MG/Yr	1.25%		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 760.313 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 64.688 MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:	10	3.000 MG/Yr		3.000	MG/Yr

Unauthorized consumption volume entered is greater than the recommended default value

Customer metering inaccuracies:	5	7.071 MG/Yr	1.00%		MG/Yr
Systematic data handling errors:	4	5.000 MG/Yr		5.000	MG/Yr

Apparent Losses: 15.071 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 49.617 MG/Yr

WATER LOSSES: 64.688 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 75.000 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	7	100.0	miles
Number of active AND inactive service connections:	6	1,000	
Service connection density:		10	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 6 60.0 psi

COST DATA

Total annual cost of operating water system:	5	$1,000,000	$/Year
Customer retail unit cost (applied to Apparent Losses):	7	$3.50	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	7	$3,000.00	$/Million gallons

Use Customer Retail Unit Cost to value real losses

Industry Standard (M36)

Free

Defaults provided

~10 Volume Inputs
~7 System Data Inputs

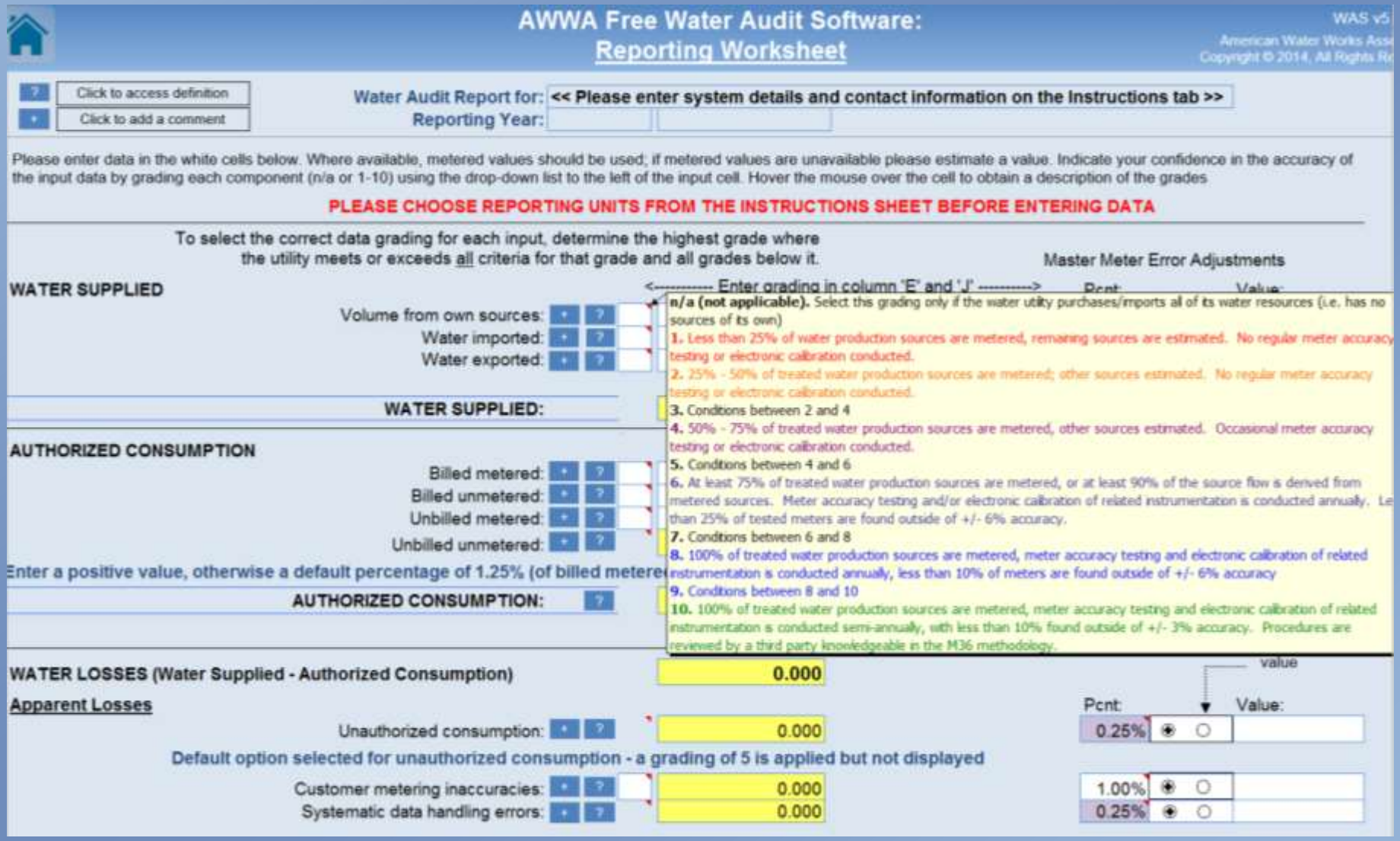
awwa.org/waterlosscontrol

AWWA M36 Water Audit
Data Validity Scoring

In computer science, **data validation** is the process of ensuring that a program operates on clean, correct and useful data.

- AWWA developed a detailed grading matrix for Water Audit inputs
- Based on the utility's policies and practices for data collection, data management, data archiving, quality control procedures, and derivation of audit inputs
- Provides a quantitative measure of the reliability

AWWA Free Water Audit Software© (V5.0)
Data Grading for each Water Audit input (excerpt)



AWWA Free Water Audit Software© (V5.0) Guidance on Use of Water Audit Data, based on Level of Data Validity

	Water Audit Data Validity Level / Score				
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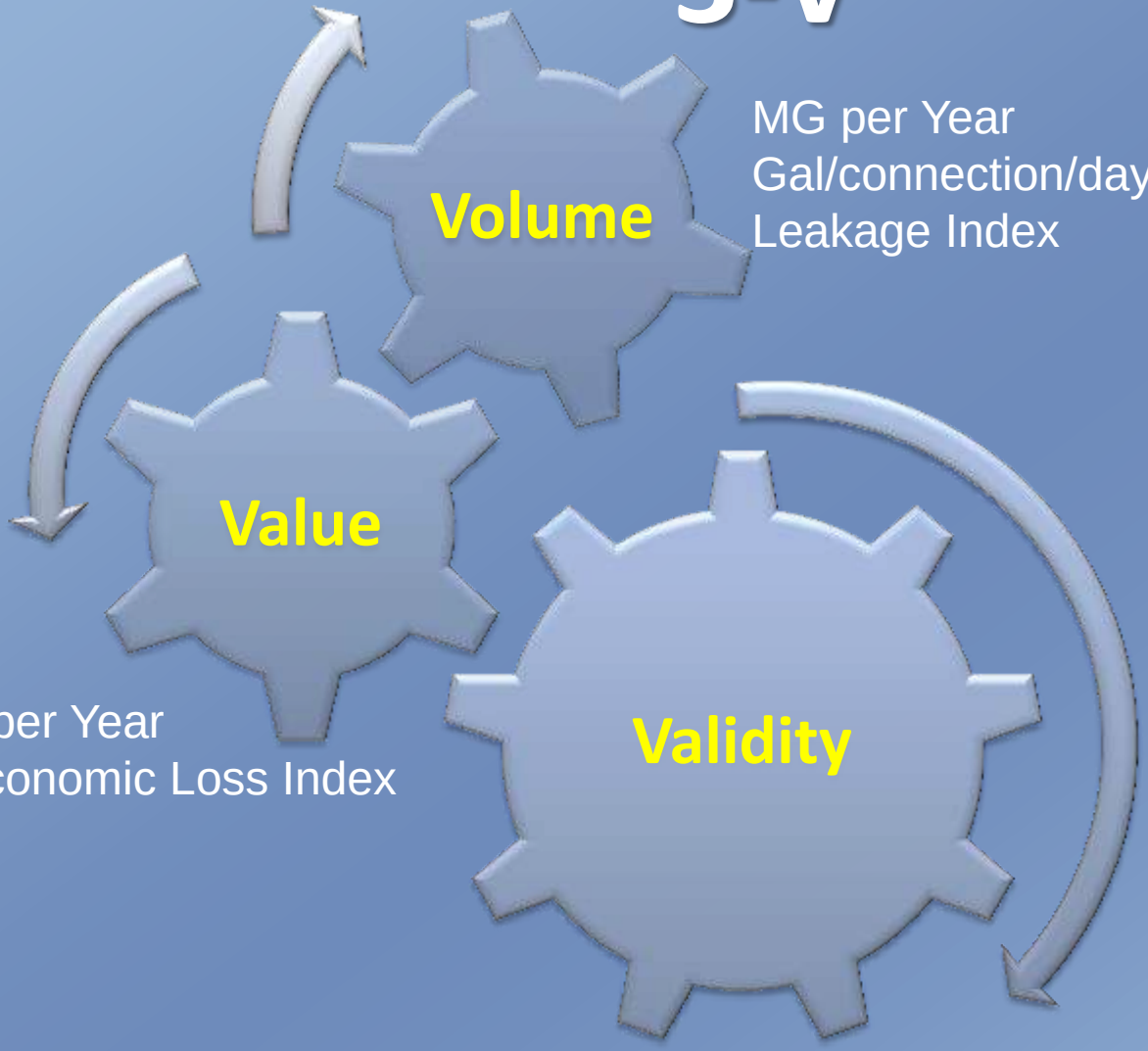
3-V

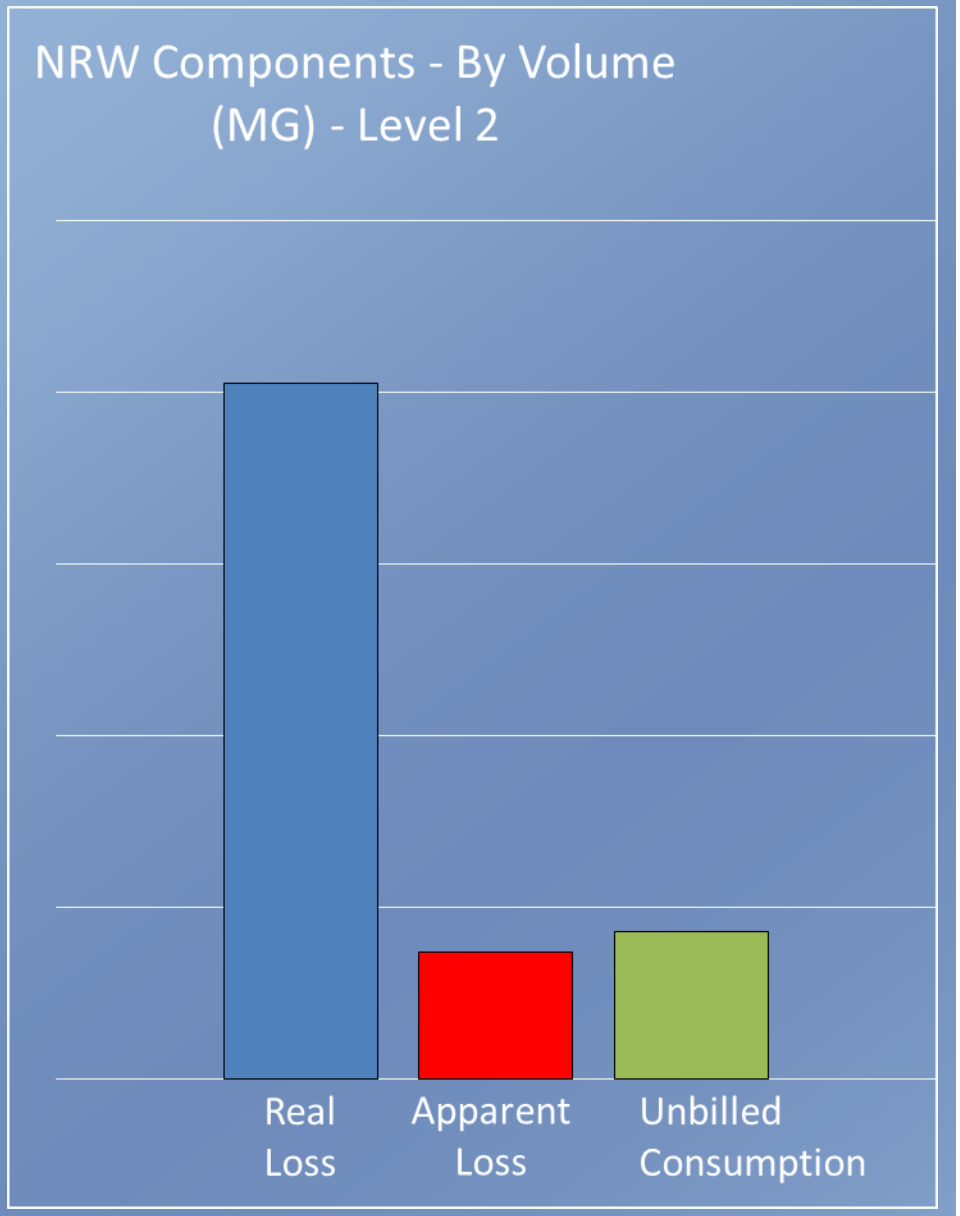


MG per Year
Gal/connection/day
Leakage Index

$ per Year
Economic Loss Index

Water Audit Data Validity Score
95% Confidence Limits
Key Data Input Grades

Volume



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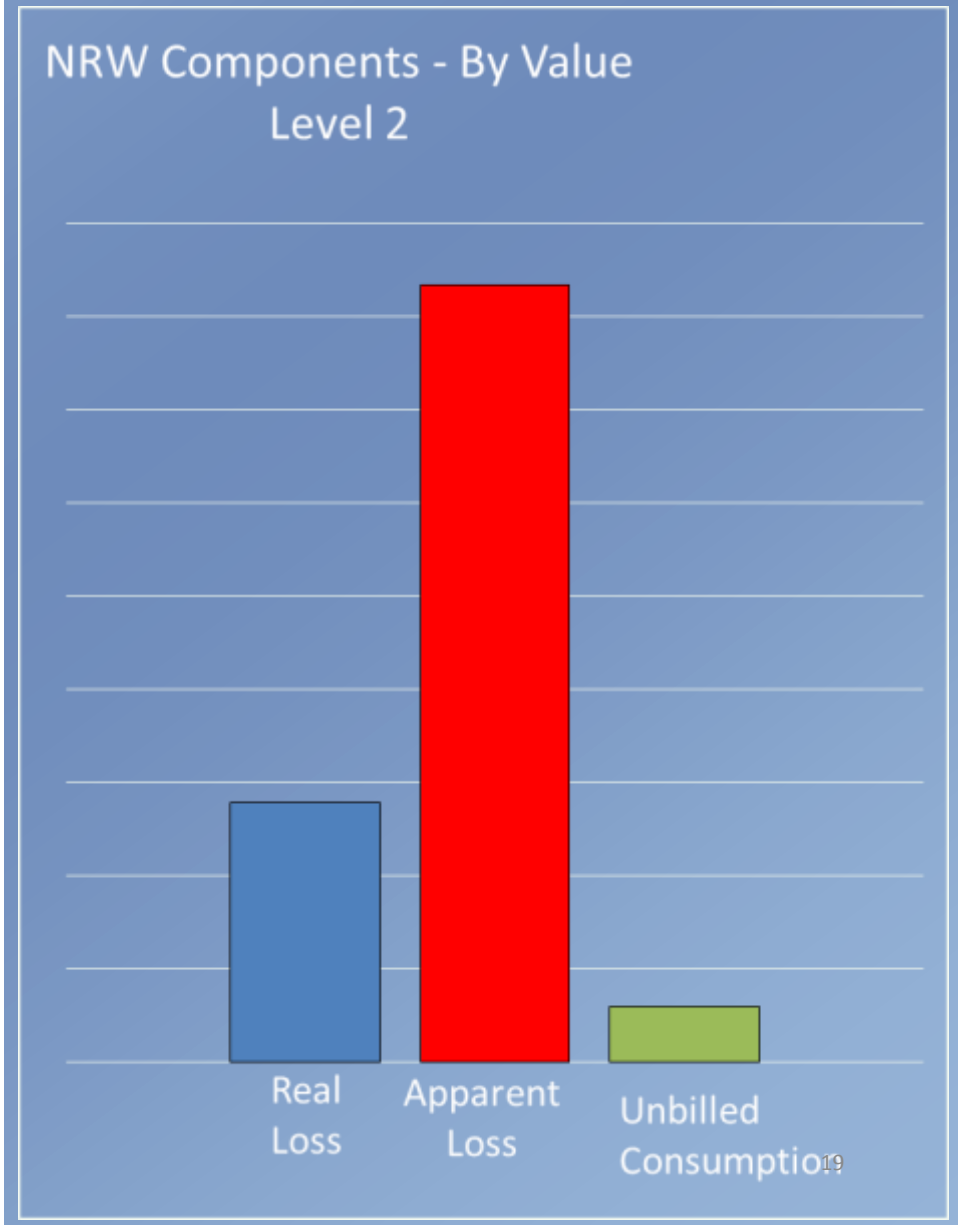
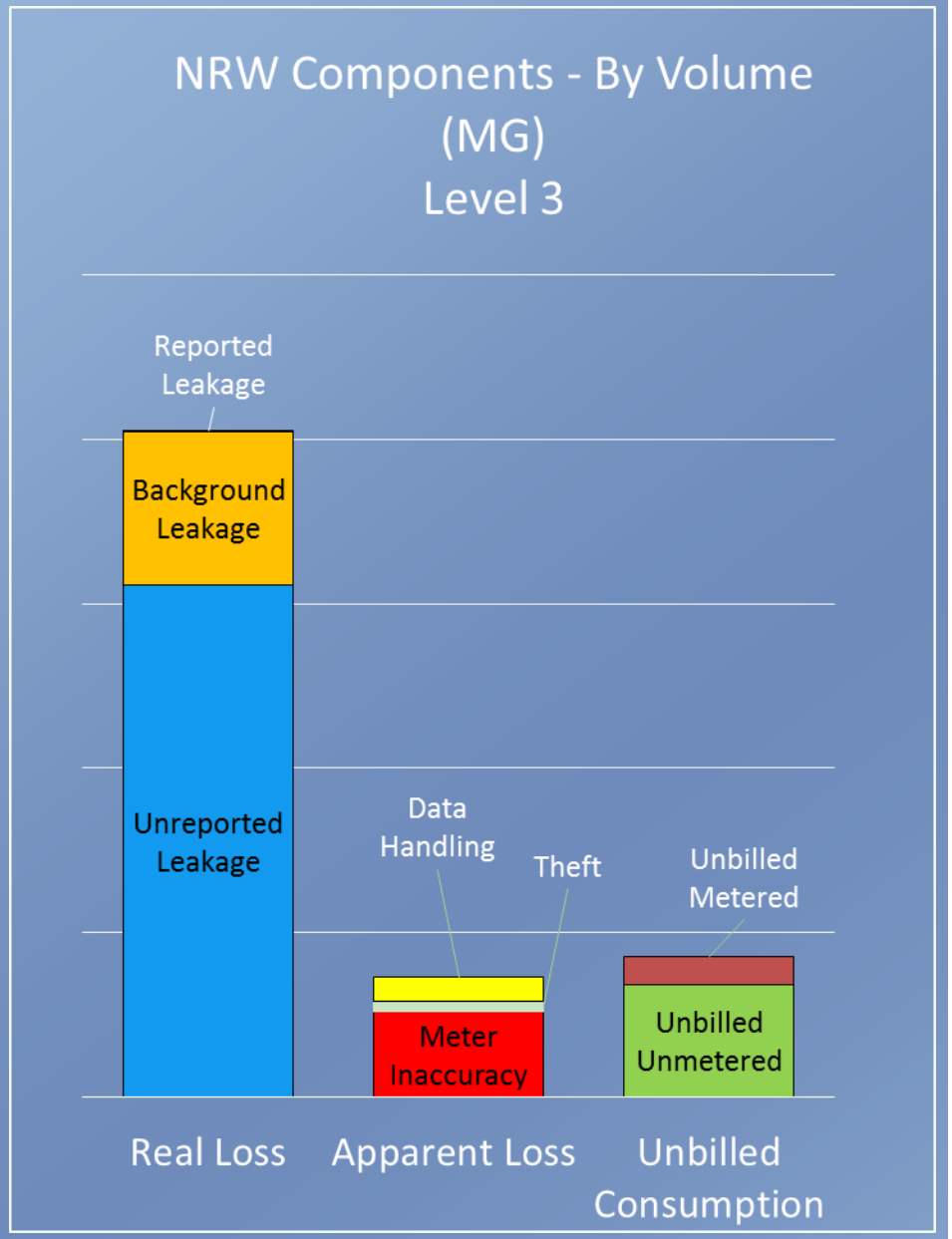


Volume



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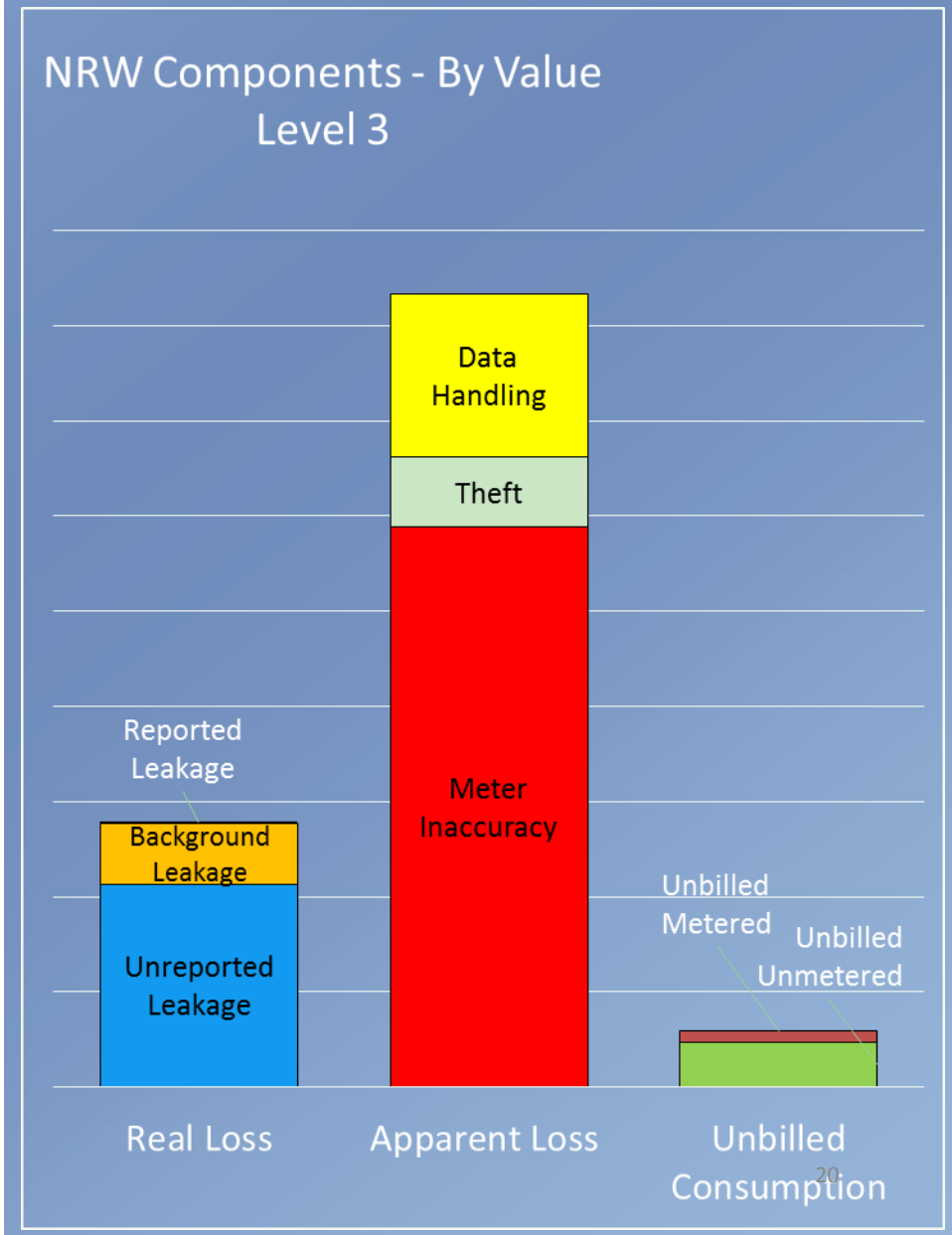


Southwest Environmental Finance Center

CAVANAUGH
Stewardship Through Innovation

Program Layout

SMALL SYSTEMS TRAINING PROGRAM

LARGE SYSTEM TRAINING PROGRAM

Small System Training Program

Introductory Webinar

Training Session 1

Training Session 2

Training Session 3

Training Session 4

Final Webinar

Meeting Topics: Small Systems

Meeting 1: Water Audit Foundations

Meeting 2: Data Validation

Meeting 3: Component and Economic Analysis

Meeting 4: Real & Apparent Loss Control Strategies

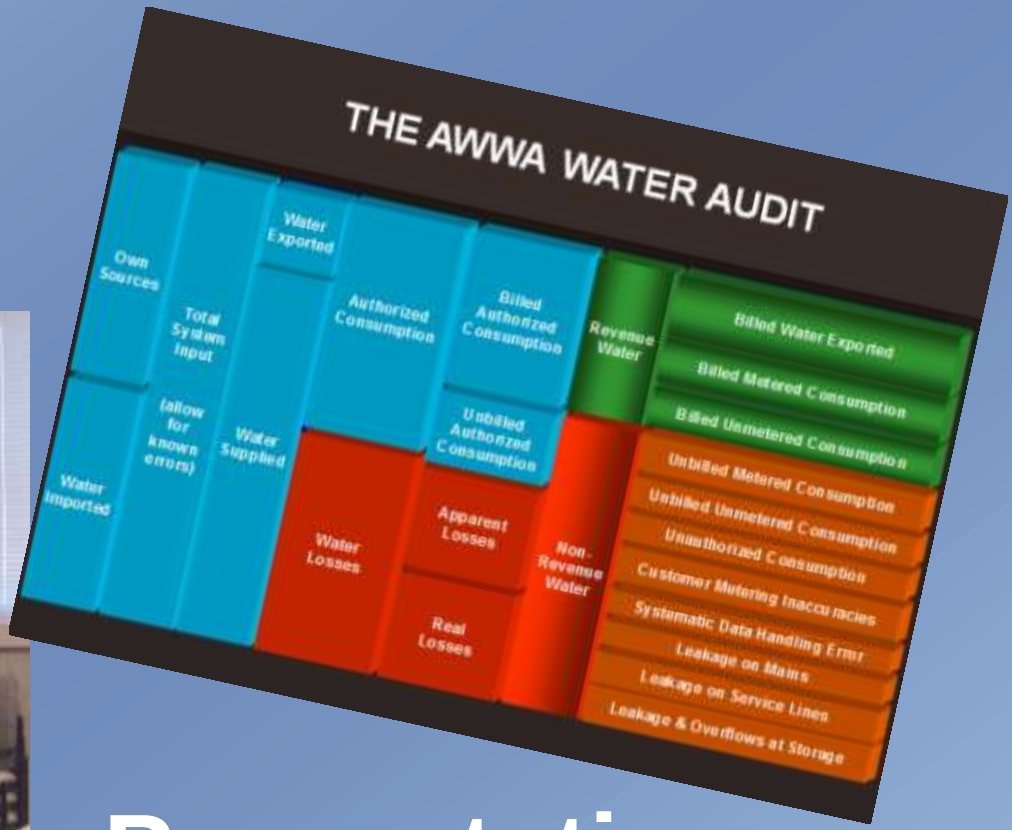
Large System Training Program

Meeting Topics: Large Systems

Meeting 1: Water Audit Foundations & Data Validation

Meeting 2: Real & Apparent Loss Control Strategies

Content of Meeting

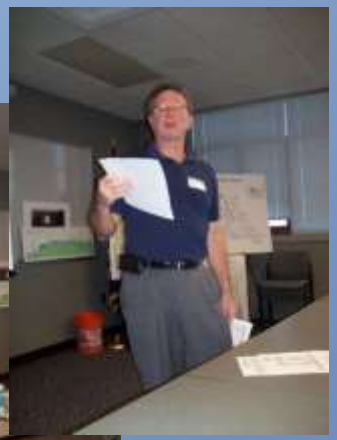


Presentations on Water Loss Topics

Content of Meeting

Activities

Content of Meeting



Presentation of Results of Activities from Previous Session

Between Sessions

Assistance to Systems via Phone or In Person (if issue can’t be resolved over the phone)

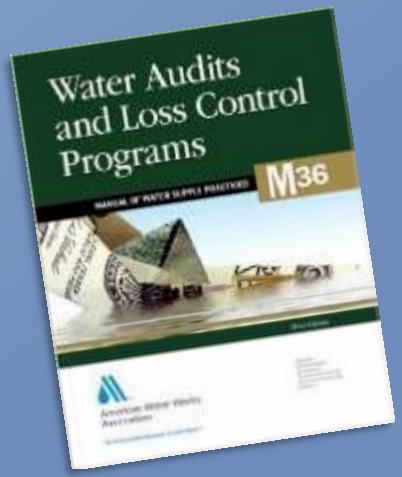
Participant Commitment

Same 1 or 2 people attend all the meetings

Willing to do the water loss applied activities

Willing to present the water loss applied activity

An open mind

A willingness to learn

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