Why perform a Water Audit

Water Accountability and Loss Control Improvements in North America: A Progress Report

• The Old ----

• The New!

Water Loss Control Committee

Growing Pressure to Manage Water More Efficiently

U.S. Drought Monitor

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AWWA Water Loss Control Committee Initiatives

- States Survey Project (2001)
- Free Water Audit Software Package (2006)
- Completed: rewrite of the AWWA M36 Publication “Water Audits and Leak Detection” 2009

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AWWA “States Survey” Project (2001) Covered Ten Practices

- Water loss policy
- Definition of water loss
- Accounting and reporting
- Standards and benchmarks
- Goals and targets
- Planning requirements
- Compilation and publication
- Technical assistance
- Performance incentives
- Auditing and enforcement

Find the report and data at:
http://www.awwa.org/Sections/committee/committee_view.cfm?hpid=30

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Why perform a Water Audit

"A better system of accounting is needed to instill better accountability in drinking water utilities"

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Who Made the Rules??

In the United States, no national regulations exist to require drinking water utilities to report annual water audit data or contain their losses to economic levels.

As water resource shortages continue to become more prevalent and severe, it is likely that many more state and regional agencies will set forth requirements to compile an annual water audit.

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Research

- 80 water supply utilities
- 10 largest in each Great Lakes states
- Serve almost 500 municipalities
- Population of about 9.8 million people
- Over 63,000 miles of pipe

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Research Findings

- 68% response rate
- Pipes average 50 years old
- Leak an estimated 66.5 billion gallons of water each year
  - Could supply water to 2.2 million Americans for a year
- 71% have no policy

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Why perform a Water Audit

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- Research Findings (Cont.)
  - Only 60% perform regular water loss audits
  - Over 50% have no goal or benchmark
  - 67% do not publicly report
  - Less than 4% receive any support from State agencies regarding water loss control

Water Loss in the Past: unstructured, reactive

- No consistent definitions for the various components of use or loss have been employed
- Worldwide, no standard definition has been found to exist for the term “unaccounted-for” water
- Percentage indicators have been found to be suspect in measuring technical performance
- Percentage indicators translate nothing about water volumes and costs
- Many water utilities have no active functions to assess or control losses

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Feedback from Your Peers

- Over 60% want to collaborate and improve water loss control
- Regulation is needed to drive change in water loss practices
- Standardization and benchmarking would be useful
- Training and assistance is necessary
- Getting public support is essential

Infrastructure Report Card = D-
**Promoting Water Efficiency in the US**

**Alliance for Water Efficiency** – creating a new national water efficiency organization  
http://www.cuwcc.org/national_cwe.lasso

**US EPA Water Sense Program**  
http://www.epa.gov/watersense/

**US EPA Infrastructure Research Initiative**  
http://www.epa.gov/ednnrml/publications/researchplans/urbaninfrastructure/index.htm

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**Promoting Water Efficiency in the US**

**State of Texas Water Audits** – data collected for 2005; analysis results by early 2007

**Delaware River Basin Commission** – assisted development of Water Audit Software; moving to revise existing water conservation resolutions

**Metropolitan North Georgia Water Planning District** – requires use of new AWWA methods for +60 regional water utilities

**Water Utilities** - Philadelphia, Nashville, American Water, Cleveland, San Antonio, Detroit, Ft. Worth, Seattle, El Dorado Irrigation District, WCSA (Abingdon VA)

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Promoting Water Efficiency in Canada

National Research Council Canada issued InfraGuide: Canadian national guide to sustainable municipal infrastructure

www.infraguide.gc.ca

Water Loss Control Initiatives

- Halifax Regional Water Commission (*North American leader in leakage control*)
- Toronto, Region of Peel Ontario
- Launching initiatives - Montreal, Calgary, Winnipeg, St. Catharines, others

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• Water Loss Control Policies Increasing

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Information to get started

Standard Water Balance Format

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Better Understanding the Occurrence and Impact of Real Losses

Most leakage losses by volume over the course of the year occur on customer service connection piping – not water mains.

Policies that place the burden on customers to repair leaks on their service connections are often inefficient.

New policies/programs to address service line leakage are needed to economically reduce this leakage.

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Water Loss Control Innovations: Advanced Leakage Control

District Metered Areas

Pressure Management Controls

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You still need to conduct fieldwork...

..and Maintain Water Loss Reduction Strategies
Why perform a Water Audit

**Water Loss Control Improvements:**
- **Controlling Apparent Losses**
  - Measurement Technology
    - Accurate production & customer meters
    - Refined datalogging capability
    - Automatic Meter Reading gaining in use
  - Improved Information Management
    - Customer Billing Systems
  - Rational Policies
    - Service provision,
    - Unauthorized consumption
    - Billing procedures
    - Use of fire hydrants

**Water Loss Control Committee**

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**AWWA Water Loss Control Committee’s Water Audit Software**

- Launched April 2006, continuously updated as more data becomes available from water utilities
- Available for **FREE** download
- Simple, user friendly: good for top-down audit
- Used by several states for accountability (FL, GA, TN, CA, TX…)
- WLC Committee provides user support for the software and plans future upgrades (Ver. 5 now available!!)

**Water Loss Control Committee**
Why perform a Water Audit

Unlock the Secrets of Water Loss Control with AWWA’s M36 Water Audits and Loss Control Programs, Third Edition

Fourth Edition due out next year.
What does M36, Third Edition provide?

- Clear steps to compile a water audit
- **Rational terms, definitions** and performance indicators that give water utilities objective ways to assess their water loss standing and reliably plan loss control activities
- **Worksheets, sample calculations**
- Structured guidance on planning the loss control program

Considerations for water utilities

- Case study accounts
  - Small
  - Medium
  - Large water utilities

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Why perform a Water Audit

**AWWA Water Loss Control Committee**
**AWWA Research Foundation Participation**

Project 2811 – Evaluating Water Loss and Planning Loss Reduction Strategies
- Assessed water audit methods, performance indicators and planning factors
- Final Report published in late 2006

Project 2928 – Leakage Management Technologies
- Constructing district metered areas in several cities
- Data collection phase complete
- Final report published in 2007

**Water Loss Control Committee**

**AWWA Water Loss Control Committee Outreach to the Industry**

International Water Association Water Loss Task Force – more than one dozen WLC Committee members are also on the WLTF

IWA WLTF held Leakage2005 in Halifax, NS, CA
http://www.leakage2005.com

AWWA National Conferences
AWWA Section Conferences
Special Programs and Workshops

**Water Loss Control Committee**
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AWWA Water Loss Control Committee
Outreach to Government Agencies

- Texas Water Development Board
- Delaware River Basin Commission
- California Urban Water Conservation Council
- State of Washington – Department of Health
- Metropolitan North Georgia Water Planning District

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Water Loss Control: A Progressive Future!

Large Scale Metering & Pressure Control Installation
Khayelitsha, South Africa
Source: WRP (PTY) Ltd.

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Newer Strategies

**Leakage Management Technologies.**

- Innovative and cost-effective leakage management technologies
- District metered areas
- Pressure management
- Precise leak detection equipment.

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Newer Strategies

**Installation, Condition Assessment and Reliability of Service Lines.**

**Need to address:**
- Service line materials
- Installation techniques
- Condition assessment

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Newer Strategies

*Installation, Condition Assessment and Reliability of Service Lines.*

Provide recommendations for:

– Installation
– Protection
– Failure determination
– Failure causes

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**In many water utilities service line leaks contribute the greatest volume of overall leakage on an annual basis.**

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AWWA Research Foundation Report. This 2007 research report presented improved methods for quantifying real water loss in distribution systems and provides water audit and loss-reduction strategies for water utilities. It includes water auditing software on CD.

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Water Efficiency Programs for Integrated Water Management.

This 2007 research study helped utilities clarify the benefits and estimate the costs and savings of water management programs. It compiles in an easily accessible form the best available information of water utility efficiency program costs and savings, and provides modeling tools which enable water utilities to evaluate the economics of conservation programs.

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**Potential Techniques for the Assessment of Joints in Water Distribution Pipelines.**

This 2006 research report identified key problems associated with joint failure and evaluates techniques for inspecting a wide variety of joint types and materials. The study also identified methods to repair joints without the expense, disruption and potential danger of open-trench excavation.

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**Reduce Apparent Water Loss**

*Opflow article*, September 2008. This article discussed a project to install a fixed-network, automated meter reading system using performance contracting at the city of Anderson, Indiana, in order to fund infrastructure improvements, reduce operations and maintenance costs, and reduce water loss.

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Pressure Zone Audits Pinpoint Water Loss

Automatic Meter Reading (AMR) with data-logging functions and hourly system comparisons allowed utilities to analyze new levels of detail in system supply and customer demand. This information helped utilities better understand water losses and whether the losses result from inaccurate meters, system leaks, or water theft.

DMA’s (metered districts)

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**Why do water utilities need to do this?**

Every day in the United States over six billion gallons of water withdrawn from rivers, lakes and wells never reaches a billed customer!

250,000 main breaks in the United States every year

Worldwide the value of lost water and revenue is $15 billion annually

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**What is a level of Acceptable Loss?**

40%? Probably not…

30% ? Try again…

20%?

15% ?

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What is a level of Acceptable Loss?

Let’s make a deal…

Take what you think is an acceptable % loss, remove it from your paycheck each week, and send it to ME!!!

…and I will leave you alone …

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Regulatory agencies have begun to focus on water utility efficiency in addition to water conservation by consumers

Customers deserve value for their money; high losses compromise service and indirectly inflate water rates

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Four Components of Managing Real Losses

- Improve response time for leak repairs
- Improve Maintenance, Replacement & Rehabilitation
- Active Leakage Control
- Pressure Management

As each component receives more or less attention, the losses will increase or decrease.

The Utility should strive to keep losses to a minimum.

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Four Components of Managing Apparent Losses

- Unauthorized Consumption (Theft and Illegal Use)
- Analysis errors between archived data and data for billing / water balance
- Meter Accuracy Error
- Transfer errors between meter readings & archived data

As each component receives more or less attention, the losses will increase or decrease.

The Utility should strive to keep losses to a minimum.

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Why perform a Water Audit

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Water Rates on the Rise in the U.S.

Available free of charge at

http://www.awwa.org

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