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## Water Conservation BMPs: System Water Audits, Leak Detection and Repair



RWSPG Meeting  
May 27, 2008



# System Water Audits, Leak Detection and Repair Presentation Overview

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- Definitions
  - Water Audit
  - Prescreening Water Audit
- Unaccounted for water
- Benefits/Costs
- Leak Detection
- Examples
- Tools available
- Sample recommendation Statements



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# System Water Audits, Leak Detection and Repair

## Definitions

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- What is a Water Audit?
  - Seeks to find the difference between amount of water produced versus the amount billed
- Elements of a audit include:
  - Amount of water produced
  - Amount delivered to metered users
  - Amount delivered to unmetered users
  - Amount of water loss
  - Measures to address water loss

# Pre-Screening Water Audit

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- Determine the difference between water produced and water sold.
- If more than 10%, move on to full scale audit including measures to address the water loss
  - Leak detection and repair procedures
- Recommended on an annual basis



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# Full Scale Audit

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Goal is to reduce the amount of recoverable water loss...

- AWWA's Water Audit and Leak Detection Guidebook
- Effective water audits usually result in leak detection programs
  - Identify and correct problems in the distribution system
- Also could check for:
  - Accuracy of meters
  - Track unmetered use
  - Inventory of meters

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# Steps for Water Audits

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- Create an audit that suites and is cost effective for your utility
- Set Study Period-usually one year
- Develop a worksheet to record findings
- Compile water production and sales data
- Make adjustments as necessary

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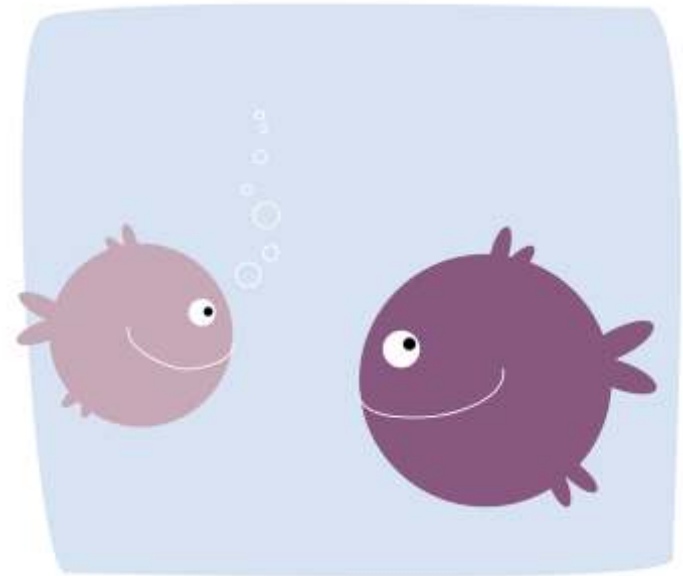


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# “Unaccounted for Water” Debate

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- Water loss
  - Real
  - Apparent
- New terminology support by:
  - AWWA
  - CUWCC



# Benefits of a Water Audit

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- Timely-one day to perform
- Improved knowledge and documentation of distribution system and value/main locations (in general/emergency)
- Baseline for conservation measures
- Leak Detection to fix problems before they turn into big problems or cause significant property damage
- Reduced water losses
- Financial improvement
- More efficient use of supply
- Safeguarding public health and property
- Improved public relations
- Reduced legal liability
- Reduced disruption to customers

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# Cost of a Water Audit

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- In 2006 California DWR for 47 utilities spent \$1,563,500 dollars, an average of \$33,300 per utility
- El Dorado Irrigation District, California \$95,000: Full system water audit and water balance performed by consultant
- Scheduled repairs versus overtime repairs

# Cost of Leak Detection and Repair Program Example

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- Westchester NY 1975-80
- \$48/AF saved
- \$239,052 or \$28 /AF = leak control program cost
- 498 leaks found
- Net benefit \$162,361



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# Cost Ranges for Common Types of Leak Detection Equipment

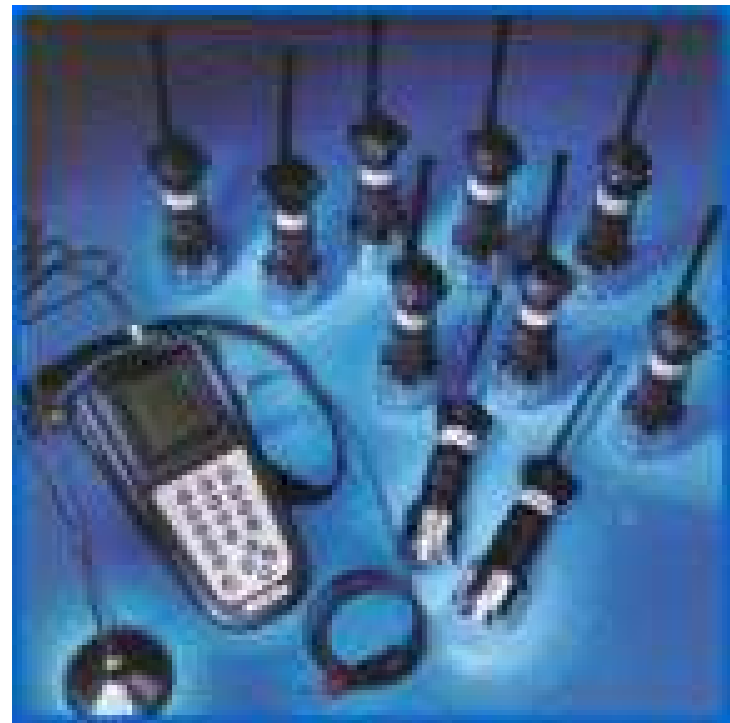
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- Water leak detector
  - \$1,900 – 4,500
- Correlator
  - \$19,900-39,000
- Correlating portable leak noise loggers
  - \$20,000
- Permanent acoustic leak noise logger
  - Cost varies with quantity from 100 units @ \$600 to 3000 or more units @ \$325.

# Hilo, Hawaii

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- Acoustic leak noise data loggers
- Identified 251 leaks
- Represented 20 % of supply
- \$30,000 per month saving in energy in 2006



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# Las Vegas Valley Water District 29

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- Launched an aggressive leakage control campaign in 2004
  - by installing 8,000 acoustic data loggers covering 3,000 miles of the distribution system.
  - 540 leaks have been discovered
  - Estimated identified leakage is 286.4 acre feet per month.
- \$957,000 savings in energy & treatment costs,
- \$278/AF leakage prevented from 2005-06

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# Water Loss Control Costs: \$ per Acre Foot

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- Combined Water Audit, Leak Detection and Repair Costs
- Average cost: \$424 per acre feet
- SFPUC-\$439
- Nashville-\$318
- LADWP-\$347
- Large Western US-\$318
- Orange County Utilities Florida-\$463
- California DWR-1988 Program-\$658

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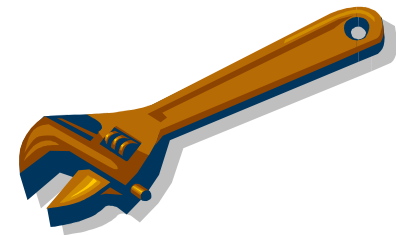


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# Many Tools Available...

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- Texas Water Development Board
  - Online worksheets
  - Audit manual
- California Urban Water Conservation Council
  - Online worksheets
  - FAQ section
  - Resource List
  - Leak Detection Equipment for member use
- American Water Works Association
  - Manual
  - Online worksheets
  - Resource List



# California Urban Water Conservation Council

## Leak Detection Programs

### Summary Report

- For 2006
- Whole Sale
  - Number of miles in system-3,641
  - Number of miles of pipe surveyed- 1,560
  - Percent of total-43%
- Retail
  - Number of miles in system 40, 535
  - Number of miles of pipe surveyed- 6,846
  - Percent of total-17%

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# Why is all this important?

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- Aging Infrastructure
  - \$250 Billion in next 20 years
- Increased shortages of water
  - Atlanta, SW United States
- Projected population growth
  - 2 million more by 2030



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## Residential Plumbing Retrofit Summary

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- Difference between a full and prescreening water audit
- Benefits and costs of audits
  - Save water
  - Help maintain infrastructure
- Leak Detection
- Easier to fix before a major problem
- Baseline for other conservation methods
- “You can’t conserve what you can’t measure!”

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# Sample Recommendation Statement

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# Sample Recommendation Statement

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Every utility should have a pre-screening water audit performed on an annual basis to assess whether an full audit is necessary.

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# Sample Recommendation Statement

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If a full scale audit is performed, a leak detection and repair plan must be calculated to include cost-effective solutions.

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# Questions?



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