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

RWSPG Meeting
May 27, 2008
System Water Audits, Leak Detection and Repair

Presentation Overview

- Definitions
  - Water Audit
  - Prescreening Water Audit
- Unaccounted for water
- Benefits/Costs
- Leak Detection
- Examples
- Tools available
- Sample recommendation Statements
System Water Audits, Leak Detection and Repair

Definitions

• 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

- 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
Full Scale Audit

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
Steps for Water Audits

• 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
“Unaccounted for Water” Debate

• Water loss
  – Real
  – Apparent

• New terminology support by:
  – AWWA
  – CUWCC
Benefits of a Water Audit

• 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
Cost of a Water Audit

• 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

- Westchester NY 1975-80
- $48/AF saved
- $239,052 or $28 /AF = leak control program cost
- 498 leaks found
- Net benefit $162,361
Cost Ranges for Common Types of Leak Detection Equipment

- 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

- Acoustic leak noise data loggers
- Identified 251 leaks
- Represented 20% of supply
- $30,000 per month saving in energy in 2006
Las Vegas Valley Water District 29

• 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
Water Loss Control Costs:
$ per Acre Foot

- 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
Many Tools Available…

- 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%

6/5/2008
Why is all this important?

- Aging Infrastructure
  - $250 Billion in next 20 years

- Increased shortages of water
  - Atlanta, SW United States

- Projected population growth
  - 2 million more by 2030
Residential Plumbing Retrofit

Summary

• 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!”

6/5/2008

Chicago Metropolitan Agency for Planning
System Water Audits, Leak Detection and Repair

Sample Recommendation Statement

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

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

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