This presentation premiered at WaterSmart Innovations

watersmartinnovations.com
California’s Largest Private Water Agency Tackles Water Loss Control

October 2, 2019
Water Smart Innovations Conference
Agenda

- Introductions
- Why Water Loss?
- Work to Date (policy, planning, baseline analysis)
- Work Ahead (data improvement, water loss recovery)
California Water Service Group

- Largest Water Utility in the West
- 3rd largest in U.S.
- Serves 2 million+ people
- Investor Owned; CWT Ticker
- Contract Operations
- Assets:
  - 6,000+ miles of main
  - 1,130 wells
  - 662 storage tanks
  - 155,000+ valves
  - 50,000+ hydrants
  - 2,010+ sampling stations
  - 6 surface water treatment plants
  - 10 wastewater treatment plants
Urban Retail Water Suppliers Subset

- California Water Service (Cal Water) has 21 systems that qualify as Urban Retail Water Suppliers and serve as the Water Loss Auditing and Control program focus.

- Hired Water Systems Optimization, Inc (WSO) in 2018 for data analysis and program design guidance.
Why Water Loss?

**California Water Loss Activity**
- **SB555** requires annual reporting and Level 1 validation
- Long-term leakage **performance targets** currently under consideration by State Board
- Key component of Making Conservation a Way of Life

**Cal Water Specific Motivations**
- Coordination between systems, across departments, between Corporate and District level staff
- Goals (featured in policy):
  - effectively collect and manage data
  - reduce water loss to promote affordability
  - improve system efficiency
  - enhance environmental stewardship
Water Loss Background

- Water Supplied
- Authorized Consumption
- Billed Consumption
- Unbilled Consumption
- Apparent Loss
- Water Losses
- Real Loss
- Revenue Water
- Non-Revenue Water
**Goals:**

- Satisfy current and future state requirements
- Refine and standardize water audits and data validity scores, where reasonable
- Develop a Water Loss Control Optimization Plan and Water Loss Control Policy
- Implement water loss control activities to reduce real and apparent water losses

<table>
<thead>
<tr>
<th>Component</th>
<th>2018 Water Audit Validations</th>
<th>2018 Water Audit Validations</th>
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<td>Policy</td>
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<th>Handbook</th>
<th>Production Data</th>
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<td>Analysis</td>
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Water Loss Control
Program Infrastructure

**Policy**

Articulates Cal Water’s commitment to proactively assess and manage water loss. Details goals, governance, and principles of Cal Water’s approach.

**Teams**

Convene staff responsible for water loss related projects and progress.

- **Steering Committee**
- **Project Team**
- **Audit Team**
- **Control Team**

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**1.0 Goals**

Cal Water promotes a culture of accountability, stewardship, and transparency as it applies to the operation, maintenance, and replacement of its water systems. As such, Cal Water seeks to effectively collect and manage data and reduce water loss to promote affordability, improve system efficiency, and enhance environmental stewardship. Cal Water also seeks to reduce apparent losses for revenue recovery.

**2.0 Governance**

2.1 Cal Water will regularly convene a Water Loss Control Steering Committee responsible for overseeing water loss control efforts.
Water Loss Control Program
Baseline & Analysis

For each water audit input:

- What is the most accurate data source?
- What are the processes of review and/or maintenance?
- Who’s responsible for the meter/data point/process?
- Are practices consistent across systems?
Water Loss Control Program
Baseline & Analysis

Handbook specifies Water Audit compilation protocols

Current Status Workbook specifies characteristics and practices for each system

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* Occasionally = within the last five years

California Water Service
Water Audit Handbook

Final Report
January 2019

Water Systems Optimization, Inc.
Example of Process Map Elements

- **Own Source Meters**
  - treatment plant effluent meters & well meters

- **Export Meters**
  - intakes for sold volumes

- **Import Meters**
  - intakes for purchased volumes

**Meter Data Collection**
- Collection Method: Manual
- Read Frequency: Varies
- Review Frequency: Varies

**DROP**

**D1 Schedule**

**Meter Accuracy Testing**
- Frequency: Varies
- Test Method: Varies
- Test Documentation: Handwritten

**Meter Calibration**
- Frequency: Varies
- Test Documentation: Varies, not digitized

**Water Supplied**
- Own Sources
- Water Import
- Water Export

**Data Validity Grade**

**Data Collection Practices**

**Maintenance Practices**

**Data Source**

**Water Audit**

**Assets**
Water Loss Background

Water Supplied

- Authorized Consumption
- Unbilled Consumption
- Water Losses

- Billed Consumption
- Apparent Loss
- Real Loss

- Revenue Water
- Non-Revenue Water
Water Loss Control Program
Baseline & Analysis

**Water Audit Results, 2017**

**Water Audit Results, 2018**

wide range of performance across systems

how do we balance uncertainty and decisions to intervene/invest?
## Water Audit Performance Indicators

<table>
<thead>
<tr>
<th>Key Audit Metrics*</th>
<th>2018 Cal Water Median</th>
<th>2017 Cal Water Median</th>
<th>2017 State Median</th>
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<tr>
<td>Data Validity Score</td>
<td>63</td>
<td>62</td>
<td>64</td>
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<td>Infrastructure Leakage Index</td>
<td>1.2</td>
<td>1.6</td>
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<td>Real Loss (gal/connection/day)**</td>
<td>19.5</td>
<td>20.5</td>
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<td>Non-Revenue Water as Percent of Cost of Operating System</td>
<td>3.2%</td>
<td>3.9%</td>
<td>3.7%</td>
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Water Loss Control Program
Plans & Priorities

Real Loss Components

Response Duration

Component: Background, Reported, Hidden
Water Loss Control Program
Plans & Priorities

1) Act
- candidates for water loss recovery

2) Hold
- uncertainty calls for a focus on data improvement

3) Monitor
- performance does not justify intervention yet

Outcomes: systems sorted into these readiness groups and next steps for each group

Water Losses
- get better data!
- pilot water loss recovery and get better data!

Certainty*
- pursue water loss recovery (and keep collecting data)
- monitor water losses (and keep collecting data)
Water Loss Control Program Plans & Priorities

Prioritizing Systems
for leak detection (hidden loss recovery)

21 systems
- Two water audit results
- Hidden loss volume
- Hidden loss cost

1. Audit results feasibility review
   - Hold audit data concerns

2. Hidden loss cost assessment
   - High Leakage Costs
   - Low Leakage Costs

3. Sensitivity assessment
   - Stable Results
   - Sensitive Results

Leakage Recovery Work
Refine and Monitor
Water Loss Control Program Implementation

Areas of focus for the remainder of 2019

- Production Meter Inventories & Testing Protocols
- Small Meter Accuracy Testing
- District Workshops
- Leakage Recovery Pilot Planning
Thank You!

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Regulatory Background

SB-555 – water loss objectives to be published by July 2020
• Urban Retail Water Suppliers must submit a Level 1 validated water audit by Oct 1, annually
• State Water Resources Control Board must adopt water loss standards by July 1, 2020.

EO B-37-16 – water budgets framework, includes a water loss component

Takeaway: URWSs must meet leakage goals

Proposed Timeline

- Customized water loss target designated for each agency
- Phased approach
- Emphasis on component analysis
- Aligned timing with Conservation EO
Water Loss Program Tools

Program Tools

• **Policy** (2.5)
• Taskforce Roster (1.2)
• Roadmap (1.5)
• Plan (2.4)

Assessment Tools

• Validated Water Audits (2.1, 3.1)
• Water Audit Handbook (1.4)
• Current Status Worksheet (1.4, 2.4)
• Leakage Component Analysis (2.2)
• Process Maps (2.3)
• Detailed Investigation of Audit Inputs (3.2)