WATER LOSS TASK FORCE
AAEES E3S Conference

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Los Angeles Department of Water and Power

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Nation’s Largest Public Utility

Bay Delta

State Water Project

Sierra Mountains

LA Aqueduct

Colorado River Aqueduct

Local Groundwater, Stormwater, Conservation & Recycling
Why are we doing Water Loss Audits?

- Fulfills California Urban Water Conservation Council (CUWCC) requirements:
  - Water loss audit due annually
  - Component analysis due every 4 years

- New regulations require water loss audits be submitted annually to State Department of Water Resources

- *Discovering and addressing system water losses saves water and money!*
Historical Tracking of Non-Revenue Water
# American Water Works Association

## Water Balance

<table>
<thead>
<tr>
<th>System Input Volume</th>
<th>Authorized Consumption</th>
<th>Billed Authorized Consumption</th>
<th>Billed Metered Consumption</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Unbilled Authorized Consumption</td>
<td>Billed Unmetered Consumption</td>
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<td>Unbilled Authorized Consumption</td>
<td>Unbilled Metered Consumption</td>
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<td>Unbilled Authorized Consumption</td>
<td>Unbilled Unmetered Consumption</td>
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<tr>
<td>Water Losses</td>
<td>Apparent Losses</td>
<td>Unauthorized Consumption</td>
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<td>Real Losses</td>
<td>Customer Meter Inaccuracies</td>
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<td>Leakage on Transmission and Distribution Mains</td>
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<td>Leakage and Overflows at Storage Tanks</td>
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<td>Leakage on Service Connections up to Point of Customer Meter</td>
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</tbody>
</table>
System Input Volume Validation

- Analysis of system input volume data and meter accuracies

![Diagram of water distribution network](image)

- LAA 1
- LAA 2
- LA-35 (MWD UNTREATED)
- WELLS
- METROPOLITAN TREATED
- LAAFP
- MICRO-FILTRATION

POTABLE DISTRIBUTION NETWORK of LOS ANGELES DEPT. of WATER & POWER

- LA COUNTY WATERWORKS DISTRICT EXPORTS
- LAS VIRGENES WATER DISTRICT
- CALLEGUAS WATER DISTRICT

* no exports during FY 2010-2011
Apparent Losses: Small Meter Testing

LOW FLOW
- Passed: 64%
- Too Low: 36%
- Too High: 0%

MEDIUM FLOW
- Passed: 77%
- Too Low: 23%
- Too High: 0%

HIGH FLOW
- Passed: 91%
- Too Low: 9%
- Too High: 0%

ALL FLOWS
- Passed 1 or 2 flow rates: 32%
- Failed all flow rates: 8%
- Passed at all 3 flow rates: 60%
Component Analysis of Real Losses for FY 2010-2011

- Background Leakage: 64%
- Reported Breaks: 23%
- Hidden Losses: 13%
- Unreported Breaks: 0%
Water Loss Task Force
1. System Input Volume

**Recommendations:**
- **Reevaluate meters used for accurate system input volume tracking**
- **Improve meter reading accuracy**
- **Install meters on two backup supply sources**

**Actions:**
- **Change supply tracking for aqueduct and groundwater meters**
- **Calibrate supply volume meters on an annual basis**
- **Install backup supply source meters**
# 2. Database Management

<table>
<thead>
<tr>
<th>Recommendations:</th>
<th>Actions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Centralize multiple meter and leak databases</td>
<td>• Evaluate feasibility of centralized operational technology system</td>
</tr>
<tr>
<td>• Improve recycled water and process water tracking</td>
<td>• Develop pilot mobile leak reporting system</td>
</tr>
<tr>
<td>• Address discrepancies between different databases</td>
<td>• Establish billing system protocol to identify recycled water and treatment process water</td>
</tr>
<tr>
<td></td>
<td>• Address remaining duplicate badge number discrepancies</td>
</tr>
</tbody>
</table>
3. Meter Testing and Replacement

**Recommendations:**

- Replace worst performing meters
- Prioritize large meter replacement and analysis

**Actions:**

- Implement meter testing of a representative sample of 1,500 operational small meters
- Analyze large meter test results
4. Leak Detection and Prevention

Recommendations:

- Implement pressure monitoring
- Reduce average time to locate and repair leaks
- Implement active leak detection programs

Actions:

- Site-specific pressure monitoring in 13 highest leak density areas and 17 high pressure zones
- Increase staff to decrease leak response time by 50%
- Perform acoustic leak detection on 10% of the entire system per year
- Install acoustic leak monitoring sensors in high leak density areas
5. Unmetered and Unauthorized Consumption

**Recommendations:**

- Implement measures to improve tracking of theft activities
- Implement measures to improve estimates of authorized unmetered uses

**Actions:**

- Add AMI/AMR to record fire service meter data on a continuous basis
- Develop estimates to track volume used for system flushing
- Collaborate with the LA Fire Department to estimate volume used in fire fighting and training activities
# Summary of Costs

<table>
<thead>
<tr>
<th>Section</th>
<th>Capital Cost</th>
<th>O&amp;M Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1: System Input Volume</strong></td>
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<tr>
<td>Section 1 Total Costs of Proposed Actions</td>
<td>$1,518,000</td>
<td>$191,600</td>
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<tr>
<td><strong>Section 2: Database Management</strong></td>
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<tr>
<td>Section 2 Total Costs of Proposed Actions</td>
<td>$83,000</td>
<td>$0</td>
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<tr>
<td><strong>Section 3: Meter Testing and Replacement</strong></td>
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<tr>
<td>Section 3 Total Costs of Proposed Actions</td>
<td>$244,000</td>
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<td><strong>Section 4: Leak Detection and Prevention</strong></td>
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<td>Section 4 Total Costs of Proposed Actions</td>
<td>$1,281,000</td>
<td>$355,000</td>
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<td><strong>Section 5: Unmetered and Unauthorized Consumption</strong></td>
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<td>Section 5 Total Costs of Proposed Actions</td>
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<td>$1,402,000</td>
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<tr>
<td><strong>Total Costs of All Proposed Actions</strong></td>
<td>$4,392,000</td>
<td>$1,948,000</td>
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</table>
The **Water Loss Task Force Action Plan** and the **Water Loss Audit and Component Analysis Study** can be found on our website:

http://www.ladwp.com/wc
KEEP SAVING WATER, L.A.!