This presentation premiered at WaterSmart Innovations

watersmartinnovations.com
Chasing Down High Water Use in Commercial Settings

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Bottling Plant

- Average consumption = 79,000 gpd
- It’s only a “trickle”
- Trickle = 8,000 gpd
Unexpected Increase

• “We have had a plumber come out”
• “No way we are using that much water”
• “There is something wrong with the water meter”
Is it the Meter?

- Positive displacement meters - Unlikely
- Turbine / Electronic meters - Possibly
Is it the Meter?

- Mis-read
  - 2527 Ccf
  - 2725 Ccf
- 150,000 gallon mistake
Is it the Meter?

- Wrong register size
  - Up to 15 times actual use
Toilets!

- 42% of surveys – malfunctioning toilet
  - Flapper…float….over flow pipe…fill valve…gaskets…design issues….
Toilet Leaks - Myth #1

- Tenants / Employees will inform you about a leak.
  - Ignore issue
  - Try to fix it themselves
The Duct Tape Fix
Plastic Bag Approach
Shoelace – Popsicle Stick
Foil Deflector
Toilet Myth #2

• Don’t leak much water
  – 10 to 100 gpd
  – 1000s gpd
• 5000 gpd (current record)
Toilet Leaks

- Refill tube creates syphon
- 400 gpd
Toilet Leaks

- Design issue
- 3,300 gpd
Toilet Leaks

- Maintenance issues and wear
- 1,800 gpd
Toilet Leaks

- Flush handle binds
- 1,000 gpd
Toilet Leaks

- Chain gets caught or kinked
- 800 gpd
Toilet Leaks

- Broken fill valve
- 5,000 gpd
Data Logging

- 24-hour water use recording
- 7 days
Intermittent Toilet Leak

• 3,200 gallons in 16 hours
Single-pass Cooling

Transferring heat to water and discharging to drain.

• 11% of surveys find failed or failing water control valve.

• 80% are found in restaurants
Single-pass Cooling

- Restaurant with 8 water-cooled condensers
  - Walk-in coolers
  - Keg coolers
Single-pass Cooling

- Expected discharge temperature
  - ≈ 100°F
- Tested discharge temperature
  - 65°F to 80°F
Single-pass Cooling

Water Use Comparison

- **2012/13 - Before…**
- **2013/14 - After…**

Gallons per Day

<table>
<thead>
<tr>
<th>Month</th>
<th>2012/13</th>
<th>2013/14</th>
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<tbody>
<tr>
<td>OCT</td>
<td>25,000</td>
<td>13,928</td>
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<tr>
<td>NOV</td>
<td>24,349</td>
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<td>AUG</td>
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<tr>
<td>SEP</td>
<td>24,102</td>
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</table>
Innovative Cooling

- Increase in use of 700 gpd
- Swamp cooler?
- Air-cooled condenser
Swamp Coolers

- Out of site out of mind
- Water loss from 400 to 1,500 gpd
Underground Leaks

• Myth
  – Water always comes to the surface

• Mostly true
  – Meter turns constantly
Underground Leaks

- Meter turns 7 minutes
- Meter stops 5 minutes
College Campus

• Clues:
  – Warm water in the toilet tank
  – A few living units had “warm” floors
College Campus

• Repaired hot water pipe.
  – Savings:
    • 17,500 gpd
    • 6.4 MGY
How Much Should I Use?

Monthly Water Use

GALLONS

Sep-03  Oct-03  Nov-03  Dec-03  Jan-04  Feb-04  Mar-04  Apr-04  May-04  Jun-04  Jul-04
How Much Should I Use?

Monthly Water Use

GALLONS

Sep-03  Oct-03  Nov-03  Dec-03  Jan-04  Feb-04  Mar-04  Apr-04  May-04  Jun-04  Jul-04

Gallons used from Sep-03 to Jul-04.
Underground Leak
How Much Should I Use?

Monthly Water Use

<table>
<thead>
<tr>
<th>Month</th>
<th>Gallons</th>
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<tbody>
<tr>
<td>Sep-03</td>
<td>240,000</td>
</tr>
<tr>
<td>Oct-03</td>
<td>230,000</td>
</tr>
<tr>
<td>Nov-03</td>
<td>220,000</td>
</tr>
<tr>
<td>Dec-03</td>
<td>190,000</td>
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<tr>
<td>Jan-04</td>
<td>400,000</td>
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<tr>
<td>Feb-04</td>
<td>300,000</td>
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<td>Mar-04</td>
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<tr>
<td>Jun-04</td>
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<tr>
<td>Jul-04</td>
<td>50,000</td>
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</tbody>
</table>
College Housing

- 43,600 gpd
College Housing

- Trap primer
- Use dropped to 30,500 gpd
  - Savings of 13,100 gpd
Behavior

- ~900 gpd
- ~1,300 gpd
Behavior

Multifamily Customer

Flow Rate (Gallons per Minute)

Measurement Date and Time

Minimum  Average  Maximum
Behavior
Water Security