Agenda

- Project Drivers for Reuse
- Examples of Reuse from Different States
  - University of Connecticut, Storrs, CT
  - Water Conserv II, Orlando, FL
  - Victorville, CA
When Does Water Reuse Make Sense?

A. Water scarcity
   - Limited water sources
   - Frequent droughts & weather variability
   - Sustainability goals limiting usage

   *But also…*

B. Economics
   - Increased potable water cost
   - Investment in development
   - Grant opportunities/funding

   *And…*

C. Regulations
   - Permitting limits on discharge
   - State reuse pathway
When Does Water Reuse Make Sense?

A. Water scarcity
   ➢ Limited water sources
   ➢ Frequent droughts & weather variability
   ➢ Sustainability goals limiting usage

But also…

B. Economics
   ➢ Increased potable water cost
   ➢ Investment in development
   ➢ Grant opportunities

D. Political Will
University of Connecticut

- 2005 drought: Uconn’s wellfield desiccated a section of Fenton River
  - State mandates UConn reduce water withdrawal rates by 1/3
- Occurred during a period of rapid campus growth and major investment by the state in their university system
No state regulations for water reuse
- No pathway

But there was political will
- The campus and the state worked together to allow reuse to move forward without regulations

No irrigation allowed
- State limited water reuse limited to indoor use in campus cooling towers
University of Connecticut

- Recycled Water Demand
  - 0.25 to 0.45 MGD
  - Up to 40% of peak season potable demand

- RW to Central Utilities Plant
  - 1.0 MGD MF/UV Treatment

- Potential to expand recycled water system to irrigation as regulations develop
Water Conserv II

- Growing population around north of Orlando
- State requirement to eliminate treated effluent discharge to Shingle Creek by 1988
- ~3,000 acres of citrus with irrigation needs
Water Conserv II

- No regulations for using recycled water on food crops for human consumption
- Agreement forged in 1983 – precipitated new State regulations
- Operations began in 1986
- First reuse project in FL to irrigate crops for human consumption
Water Conserv II

- This project is BIG!
  - 50 mgd with peak of 75 mgd
  - 90 miles of pipelines
  - 59 agricultural customers, plus golf courses, industrial users, and residential irrigation

- Excess water recharged to aquifer via rapid infiltration basins (RIBs)
Water Conserv II

- Agreement forged in 1983
- Operations began in 1986
- Recycled water used for irrigation and aquifer recharge via rapid infiltration basins (RIBs)
- First reuse project in FL to irrigate crops for human consumption

http://www.waterconservii.com/rib-anatomy/
Victorville, CA

- Average rainfall 3.2 inches per year

- City’s Economic Development Mission
  - $500M investment in infrastructure
  - Multi-modal transportation hub with ground, rail, air
  - Southern California Logistics Airport 2nd longest commercial runway in US
  - 100 miles from Ports of LA/Long Beach

- Dr. Pepper Snapple Group bottling plant wastewater need to discharge high-strength industrial wastewater
Victorville, CA

- Collection system for high-strength industrial wastewater separate from domestic wastewater
- Industrial WW pre-treatment to reduce BOD: anaerobic sludge blanket
- Domestic wastewater from:
  - Businesses
  - Residences
  - Prison
- Fast-track schedule – 23 months
Victorville, CA

- Design flow 2.45 mgd
  - 40% Industrial
  - 60% Municipal
- Existing flow 1.7 mgd
- Unused RW to percolation basins
- Potential customer: High Desert Power Plant 830 MW
Victorville, CA

- High Desert Power Plant – Conceptual Study
- Cooling Towers
  - Up to 4,000 AFY
- TDS < 450 mg/L
  - RO
  - Brine concentration
  - No brine line – brine evaporation ponds
## Project Drivers Summary

<table>
<thead>
<tr>
<th></th>
<th>UConn</th>
<th>Conserv II</th>
<th>Victorville</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Scarcity</strong></td>
<td>Reduced supply Increased demand</td>
<td>Reliable ag supply need Water source for growth</td>
<td>Limited, variable supplies Reduced quality</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Economic Conditions</strong></td>
<td>State (university) funding</td>
<td>Strong ag economics Local growth</td>
<td>Water/WW management for economic growth</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Regulations</strong></td>
<td>No reuse regulations</td>
<td>Discharge prohibition</td>
<td>No reuse regulations CA reuse regulations</td>
</tr>
<tr>
<td></td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Political Will</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>