Direct Potable Reuse: Industry Trends in Water Supply

Water Resources Review Committee

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Colorado State Capitol
Denver, CO | October 29, 2015
Basin Implementation Plans call for more reuse – e.g., the South Platte BIP:

- “…enhance current levels of municipal water reuse.”
- “…continue to make the most efficient use of their supplies.”
- “…water reuse and conservation is a critical component of meeting future water needs.”

“…conservation and reuse will help address Colorado’s growing demands while upholding our Water Values.”
Nonpotable Reuse in Colorado

- Reuse for >50 years
- Regulated via WQCC Reg. 84 since 2000
- Statute doesn’t allow Reg. 84 to cover potable reuse
Types of Potable Water Reuse

“Unplanned” or “De Facto” Indirect Potable Reuse

“Planned” Indirect Potable Reuse

Stream or other environmental buffer
Indirect Potable Reuse is Essentially Commonplace Across the Nation

Examples of prominent IPR projects

- San Diego: Reservoir Augmentation Demonstration
- Orange County Water District: Groundwater Replenishment
- Gilbert: Groundwater Recharge Ponds
- Aurora & Parker: Recapture of Return Flows
- Upper Occoquan: Surface Water Augmentation
- NTMWD: Surface Water Augmentation
Types of Potable Water Reuse

Direct Potable Reuse (DPR)
- Advanced Water Purification Facility
- No Environmental Buffer
- Engineered Storage Buffer Replaces Environmental Buffer
DPR is Getting “Closer to Home”

You Are Here

- Cloudcroft
- Big Spring
- Wichita Falls
Why is POTABLE Reuse Attractive Here?

- Drought-resistant
- Local
- Lower energy
- Uses existing infrastructure
- Can be cost-effective
Why Did DPR Suddenly Gain Traction in TX and NM?

<table>
<thead>
<tr>
<th>Factor</th>
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<tbody>
<tr>
<td>Drought</td>
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<tr>
<td>Technology</td>
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<td>Cost of DPR</td>
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<td>Cost of alternatives</td>
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<td>Public awareness &amp; acceptance</td>
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Perspectives are Quickly Evolving on Augmenting Potable Supplies with Purified Water

“...a solution of last resort...”

National Research Council – 1998

“...could significantly increase the nation’s total available water resources.”

AND... potable reuse projects can provide a higher quality water than conventional water supplies.

National Research Council – 2012
Three Key DPR Areas to Address

WERF / CWCB Workshop May 2015: Implementing DPR in Colorado

Regulatory

Public

Technical
Three Key DPR Areas to Address

- Regulatory
- Public
- Technical
What are our primary water quality concerns with potable reuse?

**Acute**
- Pathogens (virus, crypto, giardia, bacteria)

**Chronic**
- Trace Organic Compounds

Example treatment goal: 12-log virus reduction

99.99999999999% removal
Oregon DEQ, New Mexico Environment Dept., Texas CEQ, and NWRI National Expert Panels all agree that DPR can be implemented safely.
Path Toward National Guidelines

- No National Regulations Exist
- Many States and Considering Their Own Approaches (TX, CA, OK, NM)
Three Key DPR Areas to Address

- Regulatory
- Public
- Technical
California’s OCWD has Successfully and Consistently Addressed Public Concerns about IPR Since 1976
Educational messages delivered in a clear, straightforward way can facilitate the understanding and acceptance of direct potable reuse.
"After viewing a short animation of water supply (The Ways of Water), subscribers who support West Basin’s Water Reliability 2020 program expressed a remarkable level of support for direct potable reuse.”

*If the survey respondents were aware direct potable reuse is the lower cost option, the "low-cost" and “direct pathway” votes for Q14 ("reflecting your opinion") could arguably be combined.
Ventura, CA: Water Pure Demonstration
Ventura Water Pure Demonstration

VENTURA COMPANY MAKING WASTEWATER DRINKABLE

Three Key DPR Areas to Address

- Regulatory
- Public
- Technical
Failure response time becomes critical with potable reuse

Identify Failure

Respond

Sampling Interval

Sample TAT

System Reaction

Failure Response Time

time
Monitoring study at Big Spring is assessing new monitoring tools with potential regulatory benefits.

- Particle Counts for MF Integrity
- Trasar® for RO Integrity
- Chlorammines for UV dose

**Flowchart:**
- Secondary Effluent to Microfiltration
- Microfiltration to Reverse Osmosis
- Reverse Osmosis to UV
- UV to RO concentrate
- RO concentrate to <20% blend
- <20% blend to E.V. Spence Pipeline
- E.V. Spence Pipeline to Moss Creek Lake
- Moss Creek Lake to To drinking water plants
How is Research Advancing Potable Reuse?

$6 million pledged for research

$4.5 million on 25 projects to date

California DPR Initiative

- DPR vs. alternatives
- Economics
- Potential DPR trains
- Reliable, redundant treatment performance
- Critical control points
- Pathogens: Surrogates, credits
- Pathogens: Rapid/continuous monitoring
- Failure and Resiliency
- Public perception and acceptance
- CEC removal and risk
- Operations Training, Framework
- Source Control

Source: WateReuse Association California Direct Potable Reuse Initiative
REPORTING ON SIGNIFICANT PROGRESS
Fall 2014/Winter 2015
Proactive Steps to Prepare Colorado for Direct Potable Reuse

2016 CWCB WSRA Grant Application

- Advancing DPR to Optimize Water Supplies and Meet Future Demands
- Regulatory Framework
- Public Outreach at Local & State Level
- Leveraging DPR Planning Tools
Key Takeaways: What the Future Holds

Progress will be a function of...

- Potable reuse is a game-changer for our industry
- Regs are being driven by projects and “demand”
- DPR drives a need for new monitoring technologies and a focus on response times
- Applied research is paving the way for understanding treatment options, treatment goals, and operational guidance
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