21st Century Water Reuse System Optimization Tool

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July 27, 2015
Why do utilities implement water reuse?

- Water scarcity
- Drought protection
- Wastewater management
Water resources managers face complex decisions
Water resources managers face complex decisions
Blue Plan-it® creates virtual water resources futures

Water quantity
Water quality
Mass balance
All water systems
Capital and O&M costs
Water resource use summary
Blue Plan-it® enables flexible planning
Water Reuse Case Studies

City of Goodyear, AZ

Middle Plains Community
The City of Goodyear, Arizona

- Phoenix Metro, West Valley City
- Phoenix AMA
- Population 74,000
The City of Goodyear, Arizona

City Limits: 191 mi²
Planning Area: 250 mi²

Water Resources
- Groundwater
- Reclaimed Water
- Central Arizona Project (CAP) Surface Water
Key decisions impact Goodyear’s water resources future

What is the “best” way to use reclaimed water?

When is direct delivery of CAP water needed?
Alt 1: Develop groundwater and NPR
Alt 2: Prioritize CAP use and recharge

- Goodyear Groundwater
- Adaman Groundwater
- Other Groundwater
- CAP Allocation
- CAP Lease
- CAP New
- Gila River WTP
- Waterman WTP
- Estrella WTP

Potable Water Distribution System

- Brine Management
  - 157th Avenue WWTP
  - Rainbow Valley WWTP
  - Corgett WWTP
  - Other WWTP

Non-Potable Reuse

Recharge
Long term storage credits comparison indicates Alternative 2 is more sustainable.
Cost comparison indicates Alternative 2 is also more economical.
Goodyear case study take home points

• Model shows benefits of IPR and surface water use
• Not a fully developed “master plan” solution
• Establishes a framework for more detailed alternative analysis
Middle Plains Community

- Population < 20,000
- ~ 20 irrigation customers
- Reclaimed water currently disposed of through crop irrigation
Water quality drives potential reclaimed water customers
Water reuse feasibility study

- Extended period simulation
- Monthly demands for 20+ potential reclaimed water users in two water quality categories
- Dynamic CIP optimization for new wells, pipelines, and treatment plant expansion
- Cost summary and groundwater saving analysis
Scenarios compare supply options to potential customers

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>No reuse</td>
</tr>
<tr>
<td>2</td>
<td>Category 3 reuse only, main pipe</td>
</tr>
<tr>
<td>3</td>
<td>Category 3 reuse only, main pipe &amp; biodiesel plant</td>
</tr>
<tr>
<td>4</td>
<td>Category 3 reuse only, main pipe &amp; spur &amp; biodiesel plant</td>
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<tr>
<td>5</td>
<td>Category 2 and 3 reuse, main pipe &amp; spur &amp; biodiesel plant</td>
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</table>
Scenarios compare supply options to potential customers
Capital cost summary shows impacts of expanding reuse
O&M cost summary shows impacts of expanding reuse
Cost comparison shows water resources benefits

Cost Versus Water Resources Benefits

- Coagulation/Filtration Treatment
- Biodiesel Plant
- Spur Pipe
- Main Pipe
- No Reuse
Middle plains community case study take home points

- Model enables rapid scenario configuration and comparison
- Offset of potable demands via NPR is quantified
- Provides basis for cost/benefit analysis for expanding NPR
Blue Plan-it® enables a decision support environment

Arizona State University Decision Theatre
Blue Plan-it® enables collaborative decision making

Conference Room

- Water Resources
- Engineering
- Operations
- Finance
- City Management
- Economic Development
Blue Plan-it® enhances water reuse planning

• Creates a virtual road map for water resources deployment
• Compliments scenario planning approaches
• For the City of Goodyear, AZ, Blue Plan-it®
  – Demonstrated the benefits of developing surface water supplies and engaging in indirect potable reuse
  – Fostered communication between City departments in water resources decision making
• For the middle plains community, Blue Plan-it®
  – Enabled rapid scenario development and comparison
  – Incorporated wastewater treatment process alternatives in reuse planning scenarios
Questions?

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