

# Reclaimed Water in Arizona: The Past, The Present... Opportunities for the Future

by

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## *Arizona is a Leader*

- 90% of reuse occurs in just four states, Arizona being one



Source: Western Water, July/August 2008

### Why Arizona?

- Driven by need
- Supportive legal framework

## *Driven by Need for Water*

- Arizona was one of first states to reuse treated wastewater
- Grand Canyon Village – 1926
    - Toilet flushing
    - Boiler feed for power generation
    - Makeup water for steam locomotives
  - Phoenix 23<sup>rd</sup> Avenue WWTP – 1932
    - Agriculture
  - Phoenix 91st Avenue WWTP – 1983
    - Palo Verde Nuclear Generating Station
  - First full-scale engineered recharge project involving reclaimed water in 1988 or 89?
    - Gilbert Neeley?
    - Mesa NW?
    - Prescott Sundog?

## *Supportive Regulatory Framework*

- Clear legislative authority granted to ADEQ in 1999
  - Reclaimed water quality standards
  - Permit program for the direct reuse of reclaimed water
  - Technical standards for open channel and pipeline conveyances
- ADEQ completely transformed reclaimed water rules in 2001
  - Fosters reuse while protecting water quality and human health:
    - Aquifer Protection Permit (APP) controls reclaimed water quality
    - Reclaimed Water Permit (RWP) manages use and application

## ***Components of Arizona's Reclaimed Water Program***

1. BADCT for new WWTPs is established in APP rule
  - Effluent total nitrogen: less than 10 mg/l
  - *E. coli* for WWTPs  $\geq$  250,000 gpd: Essentially none
  - *E. coli* for WWTPs  $<$  250,000 gpd: Less than 126 cfu/100 ml
  
2. Reclaimed water quality standards (five classes)
  - A+ Class incorporates the BADCT requirements above for large WWTPs
  - Adds requirement for filtration to a turbidity of 2 NTU

## *Components of Arizona's Reclaimed Water Program*

3. For WWTPs that wish to distribute water for reuse, the applicable RWQS class is indicated in their APP
  - WWTP must monitor to ensure that the indicated RWQS are met
4. Allowed uses are listed for each RWQS class
5. Reclaimed Water Permits are issued to end users
  - Simple O&M requirements
6. Technical standards for open channel and pipeline conveyances

## *How Has It Worked?*

- 58% of WWTPs in AZ distribute water for reuse
- 79% of WWTPs in AZ distribute for reuse and/or recharge
- 315 end user permits have been issued to date
  - 12% are “agent” permits, representing several thousand end users
- End user permits by reclaimed water class
  - A+ 72%
  - A 2%
  - B+ 13%
  - B 9%
  - C 3%

## *How Has It Worked?*

- Of the 12 largest WWTPs in AZ, 10 distribute reclaimed water for reuse
- 6 of the 12 produce A+ water



Photo: Southwest Hydrology, Jan/Feb 2010

## *How Has It Worked?*

<u>Area</u>	<u>Percent of Treated Wastewater Reused or Recharged</u>
Pinal AMA	58%
Prescott AMA	55%
Phoenix AMA	49%
Upper Colorado River	43%
Southeast Arizona	35%
Tucson AMA	15%
Central Highlands	13%
Lower Colorado River	4%

Preliminary data, U of A

## *Gray Water in Arizona*

- Considered a part of the reclaimed water program
- Simple homeowner requirements for use (relies on common sense guidelines)
- No application requirement for homeowners
- Estimated 100,000+ homeowner gray water users
- Non-resident gray water use subject to other reclaimed water permits



## *Opportunities for Change?*

- Impediments to overcome?
- More “carrots” for greater reuse?
- Ambiguities to clarify, inconsistencies to fix?
- Program elements to simplify?
- Gaps to fill?

## *Opportunities for Change*

- Better data capture and data management on reclaimed water generation and use
- Review for consistency and simplicity
  - BADCT treatment requirements for WWTPs
  - WQ standards for each reclaimed water quality class
  - Monitoring requirements (constituents and monitoring frequency)
    - Changes must be no less protective of human health
- Create a new, even higher quality class...A++?

## *Opportunities for Change*

- Add new end uses to list of allowed uses, as needed
- Add procedures for amending Reclaimed Water Permits
- Better accommodate reclaimed water utilities into permitting scheme
- Create a code of practice for reclaimed water distribution systems
  - Design
  - Construction
  - Maintenance



## *Opportunities for Change*

- Resolve jurisdictional/duplication issues (Legislation?)
  - ADWR and ADEQ administer reclaimed water programs authorized by state law
  - Confusingly, some counties and municipalities also have independent requirements
- Legislation to clarify that ADEQ has primary authority on reclaimed water and gray water over UPC in the case of conflict?
- Establish dual-piping requirements for new subdivision developments?
- Determine the linkages between reclaimed water and gray water that make the most sense and modify the rules for either or both accordingly

## *Opportunities for Change*

- Consider guidelines for indirect potable reuse (recharged treated wastewater later withdrawn for potable use)
- Develop an approach to deal with public perception concerns
  - Acceptance of reclaimed water for beneficial use
  - Strategy for addressing unregulated contaminants of concern
- Explore incentives for encouraging salinity reductions in produced reclaimed water

***The next steps are up to  
the Working Groups!***