Arizona Water Reuse Symposium

The City of Scottsdale’s Water Reuse Program
30 Years of Success

Flagstaff, AZ
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Presented by
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Presentation Overview

- History & Background of Water Reuse in Scottsdale
- Early Water Reuse Applications
- Water Campus Concept & Development
- Water Campus Initial Operation
- Water Campus Expansions – Capacity & Technology
- The Future of Water Reuse in Scottsdale
History & Background

- 1970’s - Discussion Surrounding Groundwater Pumping in AZ
- June 1980 - Historic Signing of Groundwater Management Act
- Establishes Active Management Areas (AMA’s)
- Stringent Laws & Regulations on Groundwater Pumping within the AMA’s

Active Management Areas
Impact to Scottsdale

- Largely Dependent on Groundwater
- Development & Growth – Tourism and Golf
- 100% of Generated Wastewater Conveyed out of the City
Scottsdale Preparation

- Realized the Concern & Potential Impact in the 1970’s
- Initiated our own Discussion & Planning
- 1980 City Requirement - New Golf Course Development to provide it’s own Water Resources other than Groundwater or Potable Water for Irrigation
Gainey Ranch WRP

- Markland Property and City of Scottsdale sign agreement – 11/30/81
  - 27 hole Gainey Ranch Golf Course
  - 1.7 mgd WRP
  - Deeded to City
  - Take or Pay Agreement
  - 399 mg per year
Gainey Ranch WRP

- December 1984
- Two Upgrades
- Original Agreement
- Effluent Sales Cover all O&M Expenses
- Met Irrigation Needs for over 30 years
Scottsdale’s Tremendous Growth

- 1980’s – plans for growth into the 1990’s
- Concern with sewer conveyance system capacity
- Golf industry leading the way
Master Planning Efforts

- Capture our own water resource – wastewater
- Partnership with developers
- Establish a plan to reuse our effluent and replenish the aquifer
- Reuse and Recharge Concept
- Water Campus Concept - Born in the late 1980’s
Water Campus Concept

- **Reclaimed Water Distribution System**
  - City builds a non-potable distribution system
  - Developers purchase capacity
  - Rate structure keeps City whole

- **Water Reclamation Plant & Advanced Water Treatment Facility**
  - Construct treatment works capable of meeting golf course irrigation demand
  - Construct advanced treatment works capable of meeting groundwater quality requirements for recharge
Reclaimed Water Distribution System (RWDS)

- Developer purchased CAP Water Rights - turning them over to the City in exchange for RWDS capacity
- Establish a rate structure covering O&M cost and replacement and reserve fund
- Design a 20 mgd system – expected to meet demand for 20 golf courses
- Desert Mountain signs initial Agreement in 1991
- Expectations are 10 year’s to sell 100% capacity
- Capacity sold in 18 months
RWDS System

- 14 miles of pipe
- 5 pump stations
- Irrigation for
  - 23 golf courses
  - City owned sports complex (soccer fields)
- Delivery of raw CAP begins in 1993
- Delivery of effluent begins in 1998
Water Campus Requirement

- Design a facility to meet two primary needs
  - Irrigation demand – varying from 0 to 20 mgd
  - Ground water recharge – when not providing water for irrigation
- System to convey wastewater to the site
- Water Reclamation Plant (WRP)
- Advanced Water Treatment Plant (AWT)
Pumpback System

- Roughly 15 miles of force main
- 5 large pump stations
Design Concept

- **Water Reclamation Plant**
  - Phased approach to 20 mgd
  - State Regulatory Parameters – somewhat in flux
  - California Title 22
  - NDeN / Tertiary Treatment
  - Odor control
  - Aesthetically pleasing

- **Advance Water Treatment Plant (AWT)**
  - Meet Water Quality Requirements
  - State Regulatory Parameters – somewhat in flux
  - Implement Technology that supports public acceptance
  - Best available technology and processes
Water Reclamation Plant Design

- 8 MGD Initial Capacity
- 2.5 Peaking Factor – Day
- Site Planning - 24 mgd
- Conventional treatment processes
  - Preliminary
  - Primary
  - Secondary - NDeN
  - Tertiary – deep bed monomedia
  - Disinfection – gaseous cl2
  - 8 mg Storage
  - No solids handling
AWT Plant Design

- Research & Piloting Effort
- 6 MGD Initial Capacity
- Site Planning 20 MGD
- Microfiltration
- Reverse Osmosis
- Permeate Stabilization
- Vadose Zone Recharge Wells
Water Campus Overview

- Initial Design – 8 mgd WRP & 6 mgd AWT
- Construction started April 1997
- C/O adding additional 4 mgd capacity before completion of phase I
Initial Construction

- 3 Largest CIP Projects
- Accelerated Project
- 300+ Contractors onsite
- 18 months from start of construction to treating wastewater
Start Up - WRP & AWT

- WRP Start Up
  - 10/14/1998 @ 2:34 a.m.
  - Low flow challenges
  - Low ww strength
  - Temporary piping
  - 100% compliant

- AWT Start Up
  - May 1999
  - Uniqueness of MF/RO
  - Vadose Zone Well challenges
    - Orifice plates
Expansions

Capacity and Technology

- WRP & AWT Phase II
- AWT Phase III
- WRP Phase III
- Onsite Influent Pump Station
- Filter Complex Upgrade
- AWT Phase IV
  - OSHG
  - Ozone
Water Campus 2015

- 23.6 mgd WRP
- 20.0 mgd AWT
- Center of Scottsdale Water Resources
- Leader in Water Reuse
- Implementing latest in Technology
Partnerships

- **RWDS Users**
  - 23 golf courses & 13 ownerships
  - Primary customers

- **Concern over salinity**
  - Water Quality Study
  - Amended agreements
  - Purchased AWT capacity
  - Three levels of water quality
  - New Rate Structure

- **Eff/RO/CAP blend**
  - Since April 1, 2012
  - <125 mg/l sodium continuously
Supporting Research

- Advanced treatment technologies on one site
  - Extremely rare
  - Varying water qualities
  - Participate in numerous research projects
    - in-kind services
    - SCADA & water quality lab data
    - pilot location
    - providing real world experience

- Supporting technology advancement with universities to local elementary schools
Public Outreach

- Public information firm
- Initial 3-day Open House
  - Officials & Dignitaries
  - Media
  - Public – 500+
- Regulatory agency workshop – March 2000
  - ADEQ, ADWR, Maricopa County (5 permits)
- Numerous Tours
  - Provided cameras

- 9/11/2001 – Impact
  - Limited sharing of information
  - Tightened security
  - Restructured Tours
    - Documented
    - Approval process
    - Restricted areas
- Recent years increased outreach
  - Water Resources PIO
  - Tours increased substantially
  - New Marketing effort
  - Increased visibility
Challenges

- **New Technology & Processes**
  - Not much history
  - Procurement issues
    - Sole source
    - Tied to manufacturer
    - Service agreements
  - Beta version
    - New developments and versions

- **Staffing**
  - Experience
  - Training
  - Retaining staff
    - Become very marketable
17 Years of Successful Operation

- Achieved Safe Yield
- Reduced Reliance on Groundwater for Potable Uses
- Met Regulatory Requirements
- Recharged in Excess of 46,000 AF effluent
- Recharged in Excess of 25,000 AF of surface water
- Met irrigation needs of 23 golf courses
- Implemented the latest in new treatment technologies
Future

- New or Modified Reuse Opportunities
  - Master Planning Efforts
  - Capturing additional wastewater resources
  - New customers or recharge application for Gainey WRP

- Optimizing existing systems
  - RO Concentrate reduction
  - Sodium reduction in wastewater – positive impact to operation

- Effective Utility Management
  - Address challenges – staffing
  - Assist with optimizing
  - Clarify procurement challenges
Conclusion

City of Scottsdale a leader in water reuse in 1985 -30 years later-

The City of Scottsdale is still at the forefront of water reuse and considered one of the leaders in the industry not only nationally but around the world.