



BAY PLANNING COALITION

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Water Recycling – *Vital to the Bay Area and its Economy*

October 28, 2004 Seminar



This report summarized BPC's October 28, 2004 seminar on water recycling in the Bay Area. We extend many thanks to the seminar organizers, Gary Oates (President, Environmental Science Associates) and Eric Hinzl (Vice President, Kennedy/Jenks Consultants) the co-chairs of BPC's Water Quality & Water Supply Committee, This seminar was the third in a three-part series in BPC's 2004 education program for its members and the public. Participation in BPC committees is open to BPC members. We also welcome attendees who are interested in the work of the Coalition and are considering membership. Please visit our website for membership information www.bayplanningcoalition.org.

BACKGROUND

Water recycling is emerging as an imperative consideration in planning for economic sustainability in the Bay Area. By the definition of the California Code of Regulations, Title 22, recycled water is, "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource."

There are a number of important and benefits from using recycled water:

- Increases water supply reliability
- Mitigates drought impact
- Can provide environmental enhancement
- Meets landscaping needs
- Provides industrial supply

Examples of existing major Bay Area water recycling projects include:

- East Bay Municipal Utility District (8 MGD total)
- South Bay Water Recycling (5 MGD total)
- Delta Diablo Water Recycling (8 MGD total)
- Marin Municipal Water District (2 MGD total)

We expect that industry will be affected by recycling mandates in the future. As a result, this seminar was intended to provide information on important aspects of planning, development and use of recycled water supplies, including the design and implementation of systems,



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selection of recycling technology, evaluation of costs, determination of applicable regulatory requirements, and management of public perceptions of recycled water.

SEMINAR OVERVIEW

Panelists for the seminar addressed a variety of key issues, notably:

- Recycled water trends in California
- Treatment technology selection
- Accomplishments of the Bay Area Regional Water Recycling Program
- A case study: recycled water in Redwood City

Together, these topics and the panelist's responses to questions provided a relatively comprehensive overview of the benefits, progress to date and future potential for recycled water use in the Bay Area.

RECYCLED WATER TRENDS IN CALIFORNIA

Bahman Sheik presented, Recycled Water Trends in California: Where we are and where we need to go. He initially cited the factors that have created the need for recycled water:

- DWR expects large statewide water shortages
- Traditional water sources are tapped out
- Treatment technology can produce a safe recycled water for any given use
- Recycled water is a local source of water
- RW is economical—counting all of its benefits
- Recycled water is a reliable supply

California has been a pioneer in water recycling, with many unique applications and projects that were initiated in the 1970s and 1980s. However, the rate of all project adoption (potable and non-potable) declined in the 1990s. Several large, indirect potable reuse projects were cancelled or deferred.

The Water Recycling Act of 1991, Section 13577, established a statewide goal to recycle:

- 700,000 acre-feet of water per year (AFY) by the year 2000
- 1,000,000 AFY by the year 2010

We did not meet the 2000 goal. In 2002, Californians reused 532,000 AFY. But based on existing water reclamation plants, current capacity is 1,615,000 AFY (1,442 MGD). Reuse in the state constitutes approximately 19 percent of supplies. By comparison, Florida reuses 39 percent and Israel reuses 70 percent. Within the state, recycled volumes in the South Coast area are 3 gallons/person/year, compared to 1 gallon/person/year on the North Coast, where supplies are not as tight.

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There are a number of regulatory and institutional hurdles impeding greater reuse. While regulations are designed to protect public health and safety, application across the state is uneven, and there are redundant cross-connection protection requirements. The permitting process is slowed by multi-agency, multi-tier requirements (both the State Water Resources Control Board and Department of Health Services get involved), and the agencies generally adopt a “hands-off” position. In addition, benefits to implementing agencies are fragmented; costs must be shared, and regional and national subsidies sought to make the cost/benefit equation balance. Long, multi-party negotiations have sometimes been necessary to hammer out complex agreements.

Public acceptance is another challenge to implementing recycling programs. Initial perceptions are difficult to change, and significant communication and educational efforts are required. It is important to convey the concept that all water is in fact recycled water.

RECYCLED WATER TREATMENT TECHNOLOGY SELECTION

Standard wastewater treatment steps are classified as primary to tertiary, with increasing treatment effectiveness:

- Primary – remove solids
- Secondary – remove organics (most treatment plants meet this level)
- Tertiary – remove nutrients (nitrogen, phosphorous)

Compared to raw water, treated wastewater contains higher levels of nutrients such as nitrogen (20 milligrams per liter [mg/L]), as well as higher levels of dissolved solids (250 mg/L) and organics and solids. The goal of recycled water treatment is to further remove biochemical oxygen demand (BOD), total suspended solids (TSS) and pathogens. Nutrients are not removed; they serve as fertilizer for plants irrigated with the water. Dissolved solids are difficult to remove and likewise not addressed during treatment.

Use of wastewater, per Title 22, is contingent on treatment level:

- Disinfected Tertiary - unrestricted use for food crops, parks, residential
- Disinfected Secondary 2.2 MPN - food crops, with edible portion aboveground
- Disinfected Secondary 23 MPN - cemeteries, freeways, pasture
- Undisinfected Secondary - orchards, vineyards, seed crops

There are several options for siting/building recycled water treatment plants. They can be installed adjacent to an existing wastewater treatment plant, at a new central plant or a new satellite plant. There are pros and cons to each option. For example, a new central plant can be located closer to users, and can relieve overloading at an existing WWTP; but costs can be prohibitive. Satellite facilities can be smaller, possibly less costly and may be able to discharge to the sewer system.



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Selection of an appropriate treatment technology is contingent on the type of plant being developed. For effluent from an existing WWTP, options include filtration and membrane systems. For a new recycled water treatment plant, options are a sequencing batch reactor with a filter or a submerged membrane bioreactor. Disinfection is a final step. In determining whether filtration or membranes may be appropriate, the following comparisons can be made:

Filtration	Membranes
Lower costs – for now	Higher capital costs
Conventional – similar to water treatment	Very high level of treatment
May need flocculation, clarification	Can use existing tanks
Space intensive	Fits into a small space

For disinfection, chlorine is still widely used, despite concerns about trihalomethane (THM) formation as a chlorination by-product (THMs are considered potentially carcinogenic). Alternatively, ultra-violet (UV) disinfection can be used. With UV, addition of chemicals is minimized. These systems are also relatively compact.

In summary, selection of the most appropriate treatment technology is guided by determination of the source water characteristics, treatment requirements and plant location. However, these criteria must be viewed in conjunction with costs and community preferences to reach consensus on the system decisions.



BAY AREA REGIONAL WATER RECYCLING PROGRAM

The history and objectives of the Bay Area Regional Water Recycling Program (BARWRP) were introduced by Cheryl Muñoz of the San Francisco Public Utilities Commission (SFPUC). This program is a partnership of over 30 local agencies and a state agency and federal agency that have joined together to cooperatively plan for and facilitate water recycling in the San Francisco Bay Area in a manner that improves water supply reliability and/or enhances the environment.

BARWRP was originally established in the 1990's with 13 agencies. They completed a Master Plan for recycled water use in the Bay Area in 1999. In July 2003, the group reconvened to update the Plan. Current partners include:



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Alameda County Water District	City of Sunnyvale
Bay Area Water Supply and Conservation Agency	Delta Diablo Sanitation District
Central Contra Costa Sanitary District	Dublin San Ramon Services District
Delta Diablo Sanitation District	East Bay Dischargers Authority
Cities of Pinole and Hercules	- Castro Valley Sanitary District:
City of Brentwood	- City of Hayward
City of Burlingame	- City of San Leandro
City of Daly City	- Oro Loma Sanitary District
City of Discovery Bay	- Union Sanitary District
City of Gilroy	East Bay Municipal Utility District
City of Livermore	North Bay Members
City of Millbrae	San Francisco International Airport
City of Pacifica	San Francisco Public Utilities
City of Palo Alto	Commission
City of Richmond	Santa Clara Valley Water District
City of San Jose	South Bayside System Authority
City of South San Francisco	West County Wastewater District
	Zone 7 - Alameda Co. Water Agency

The 1999 Master Plan found that the major driving forces for recycling are water supply reliability and Bay-Delta water quality. They concluded that recycled water demand has the potential to reach 240,000 AFY by 2025, in the best-case scenario. In addition to improving supply reliability, recycled water could be used to help meet projected water supply deficits and reduce demands on current supplies.

The Master Plan provided recommendations to maximize reuse:

- Employ a regional approach, with prioritization of projects
- Use water exchanges to expand recycling opportunities
- Incorporate local “catalyst” projects
- Promote cost/benefit sharing to increase effectiveness
- Use the evaluation decision model (EDM)
- Implement projects in phases
- Allow connections from closest treatment plant, irrespective of agency boundaries

The Plan identified many potential challenges to recycling in the Bay Area. These can be categorized as institutional, funding, technical and outreach issues. Institutional challenges include regulatory requirements and traditional agency-specific supply/distribution models that



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need to be bridged to make recycled water use feasible. With significant capital and O&M costs, agencies are also grappling with funding costs; they may be unaware that funding assistance opportunities and procedures exist.

Pivotal technical issues identified in the Plan include salinity management (particularly on the eastside of San Francisco and within the Santa Clara Valley Water District), emerging pollutants (endocrine disruptors, pathogens) and assurance of safety.

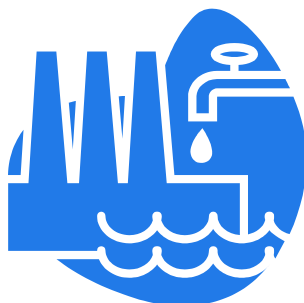
BARWRP's innovative approach to these challenges includes multiple tactics:

- Involve a broad cross-section of water and wastewater agencies
- Ignore agency boundaries
- Use watershed management concepts developed in pollutant trading
- Establish water banking/water transfers
- Define regional priorities
- Share successful outreach approaches
- Develop specialized committees

BARWRP's recent activities have included developing a scope and budget for the FY 04-05 Plan, expanding the membership in the coalition and revising previous cost allocation estimates based on flow, caps on payment, and elimination of small agencies (flow < 6 MGD) from consideration.

The revitalized BARWRP is focusing on the future of recycled water in the Bay Region. They recognize the importance of involving both water and wastewater agencies, developing specific solutions to overcome institutional barriers, and leveraging "lessons learned" from the 1999 Plan. The updated Plan is essential because it provides the written documentation necessary to pursue many funding opportunities.

Eric Rosenblum commented that in order for BARWRP to have a significant legislative influence to promote recycling and reduce regulatory hurdles, BARWRP must bring together industry, environmental groups and government leaders.



A CASE STUDY: RECYCLED WATER IN REDWOOD CITY

The challenges of gaining public acceptance for a recycled water project were chronicled by Peter Ingram, Director of the Redwood City Public Works Services Department. The City had compelling reasons to consider recycling. In a time of increasing water demand, they were relying on a single water source, the Hetch Hetchy project. Their estimated current (2003) water demand was already exceeding supply by 1,000 AFY; if no action was taken, the deficit will have



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doubled to 2000 AFY by 2020. Aggressive conservation alone would not be sufficient to balance the equation.

The City commissioned a feasibility study for use of recycled water in 2001. This was followed by an environmental review process, consisting of an Initial Study and Mitigated Negative Declaration (MND) under the California Environmental Quality Act (CEQA). The studies concluded there would be no adverse public health and safety impacts, and the Planning Commission certified the MND in August 2002. But when the project came up for City Council approval, public opposition began to emerge.

Public concerns were centered on the health and safety issues. Specifically:

- Risks from pathogens
- Pharmaceuticals and endocrine disrupters
- Carcinogenic compounds
- Exposure to children where they play
- Fear that pets would be harmed
- Safety for use in landscape irrigation

In response to these concerns, the City Council initiated a CEQA addendum process. The goals of the addendum were to deal with health, safety and emerging contaminant concerns; allow for ongoing public discussion; create a technical/legal team to assist City with critical issues; and strengthen the environmental documentation. At the conclusion of this process, the City Council had sufficient justification and support to approve the project.

The City declared that *"...recycled water for landscape irrigation is safe, is environmentally responsible, and can contribute to the health, safety, and welfare of all Redwood City residents."*

A task force was subsequently created with the goal of finding 2,000 AFY of water supply or conservation savings by 2010. Recommendations provided by the task force called for recycled water, synthetic turf fields, additional conservation and other potential measures (OPMs). Goals for recycling include customer deliveries beginning in 2006.

Key lessons learned while working for public acceptance include the following:

- If initial informational meetings are poorly attended, do not assume the community is uninterested or "okay" with a proposed project
- Debunking false information or responding to arguments taken out of context is very difficult; it puts you in a defensive rather than leadership position
- Opposition groups or individuals with time and resources require the City to respond with equal or more time and resources



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- Educating policymakers upfront can positively affect key decisions made later
- Don't underestimate the ability of a Council minority to successfully champion policy changes
- Proving that a future negative will not happen is impossible, and not being able to "guarantee" 100% safety forever is counter-intuitive to those who are looking for reassurance
- Believe that the Internet is a major factor – for better or worse
- Building community trust takes time – and requires constant nurturing
- Slow down to go fast...