Water Recycling 2030

Recommendations of California's Recycled Water Task Force

JUNE 2003

Cover photo: Village Green in El Dorado Hills,
California utilizes recycled water for this constructed
lake and landscape irrigation.
Photo taken by Dale Kolke (DWR)

Copies of Water Recycling 2030 may be obtained from:
Department of Water Resources
P.O. Box 942836
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STATE OF CALIFORNIA -- THE RESOURCES AGENCY

GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
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JUL 0 3 2003

Mr. E. Dotson Wilson
Chief Clerk of the Assembly
State Capitol, Room 3196
Sacramento, California 95814

Dear Mr. Wilson:

On behalf of the Recycled Water Task Force, we are pleased to present to you the report entitled, *Water Recycling 2030: Recommendations of California's Recycled Water Task Force*. This report addresses the mission established in Assembly Bill 331, Chapter 590, Statues of 2001, to evaluate the current framework of State and local rules, regulations, ordinances, and permits to identify the opportunities for and obstacles or disincentives to increasing the safe use of recycled water. This report's recommendations represent the members' commitment to public safety and the need for efficient use of the State's water resources.

The task force estimated that by year 2030, California has the potential to recycle up to 1.5 million acre-feet per year of, yielding about 1.2 million af of new water. This could free up fresh water supplies to meet approximately 30 percent of the household water needs associated with projected population growth. However, to achieve that potential, Californians will have to invest nearly $11 billion (approximately $400 million annually) for additional infrastructure to produce and deliver the recycled water. It should be noted that average unit costs have been estimated to be about $600 per af. These costs are generally comparable to other water supply options, for example, new dams and reservoirs or desalination.

The task force's membership of 40 people represented federal, State, local government, public health professionals, private sector entities, environmental organizations, University of California, internationally recognized researchers, public interest groups, and is a cooperative effort of the Department of Water Resources, State Water Resources Control Board, and Department of Health Services. This report is the culmination of over 12 months of intensive study and consultation by task force members, other interested participants and staff.

The recommendations are not restricted to legislative actions or statutory changes. Many can be implemented by State or local agencies without further legislative authorization or mandate. Some recommendations draw upon the experience of many agencies and provide advice that can be used as a toolbox for communities to improve their planning for recycled water projects.

The task force membership included a diversity of viewpoints. One issue where this diversity was most evident was the topic of indirect potable reuse; therefore, the report includes a specific recommendation for an independent review panel on indirect potable reuse to ensure adequate health and safety assurance for California residents.

The recommendations addressing the priority issues emphasized by the task force are included in Chapter 4, Issue Areas and Key Recommendations, of the enclosed report. In addition to the key recommendations, the task force has adopted additional recommendations that will also enhance our ability to implement water recycling projects. These additional important recommendations are included in Chapter 5 of the enclosed report.

This report includes specific actions for implementation of the recommendations. Where legislative action is needed, the task force will request the Legislature to consider its recommendations.

In addition to input from industry and government, these recommendations benefited tremendously from the input of the general public. This input helped inform the task force's thinking and the report as a whole. We thank all who so generously contributed their time and expertise to this report.

The task force believes that the recommendations in this report will improve the status of recycled water in the State. The task force is convinced that it is possible to substantially advance the safe use of recycled water, and it looks forward to helping implement the recommendations.

On behalf of the Recycled Water Task Force and the Department of Water Resources, we appreciate the opportunity to transmit this report to you.

If you have any questions or require additional information, please contact Fawzi Karajeh of DWR's Office of Water Use Efficiency at (916) 651-9669, or by e-mail at: fkarajeh@water.ca.gov.

Sincerely,

Michael Spear
Interim Director
Department of Water Resources

Date 7/3/03

Richard Katz, Task Force Chair
Board Member
State Water Resources Control Board

Date 7/3/03

Enclosure

Letter of Transmittal by Task Force to Department

Thomas Hannigan, Director
California Department of Water Resources
1416 9th Street, 11th Floor
Sacramento, California 95814

Dear Director Hannigan:

We, the Recycled Water Task Force (Task Force), are pleased to present to you our report entitled "Water Recycling 2030: Recommendations of California's Recycled Water Task Force." This report addresses the mission established in Assembly Bill 331 (Goldberg 2001): to evaluate the current framework of State and local rules, regulations, ordinances, and permits to identify the opportunities for and obstacles or disincentives to increasing the safe use of recycled water. The report's recommendations were arrived at through consensus and represent the members' commitment to public safety and the need for efficient use of the State's water resources.

As the Director of the California Department of Water Resources, you understand the need to consider all viable options for augmenting the State's water supplies. Although we acknowledge that there are additional approaches to meet California's water requirements, the Task Force was formed to specifically address recycled water issues. We consider recycled water as one important facet of the total solution.

The Task Force, pursuant to your appointments, included 40 members representing federal, State, and local governmental and private sector entities, environmental organizations, and public interest groups, and is a cooperative effort of the California Department of Water Resources, the State Water Resources Control Board, and the Department of Health Services. This report is the culmination of over twelve months of intensive study and consultation by Task Force members, other interested participants, and staff. The Task Force met eight times in four cities in Northern and Southern California. In addition, it sponsored three public discussion sessions and 22 workgroup meetings for further deliberation and public input.

While the Task Force findings are to be presented in a report to the Legislature, the recommendations are not restricted to legislative actions or statutory changes. Many can be implemented by State or local agencies without further legislative authorization or mandate. Some recommendations draw upon the experience of many agencies and provide advice that can be used as a toolbox for communities to improve their planning for recycled water projects.

We give our sincerest thanks for the assistance of the Department of Water Resources, the State Water Resources Control Board, and the Department of Health Services.

In addition to input from industry and government, these recommendations benefited tremendously from the input of the public. Their input helped inform the Task Force's thinking and the report as a whole. We thank all those who so generously contributed their time and expertise to our report.

We, the Recycled Water Task Force, appreciate the opportunity to transmit this report to you.

SIGNATORIES

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California State Water Resources Control Board

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California Department of Water Resources

Recycled Water Task Force

Water Recycling 2030:

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June 2003

Table Of Contents

LIST OF TABLES

LIST OF FIGURES

Recycled Water Task Force Membership List

TASK FORCE CHAIR	**Richard Katz**, State Water Resources Control Board
TASK FORCE CO-VICE CHAIR	**Jonas Minton**, California Department of Water Resources
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[1] *Replaced Laura Johnson of East Bay Municipal Utility District starting July 2002.*

Recycled Water Task Force Staff

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Acknowledgments:
Thanks are due to all members of the Task Force and its workgroups for their hard work to fulfill the Task Force objectives. The efforts of DWR, SWRCB, and DHS support staff and their organizational and administrative assistance to the Task Force are greatly appreciated. Special thanks are extended to Dr. Eric Schockman for facilitating the Task Force meetings and to Ms. Luana Kiger, former Chief of DWR Office of Water Use Efficiency, for her input and effort in forming and launching this Task Force.

Recycled Water Task Force
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Martha Davis	Inland Empire Utilities Agency
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Richard A. Mills	California State Water Resources Control Board
Mark Tettemer	Central and West Basin Municipal Water Districts
David R. Williams	East Bay Municipal Utility District

Executive Summary

To meet the needs of California's projected population of 52 million in the year 2030, the State's water supply must be augmented and made more efficient. Water conservation, recycling, desalination, trading and storage of surface and groundwater are the components that will successfully manage the State's overall water supply.

Since the 1890s, Californians have been reusing municipal wastewater for agriculture and farm irrigation. By the early 1900s, communities began using recycled water (treated wastewater) for landscape irrigation. Currently, California is recycling approximately 500,000 acre-feet of water per year for various uses.

California has the potential to recycle up to 1.5 million acre-feet per year of water by the year 2030. This could free up freshwater supplies to meet approximately 30 percent of the household water needs associated with projected population growth. However, to achieve that potential, Californians will have to invest nearly $11 billion (approximately $400 million annually) for additional infrastructure to produce and deliver the recycled water.

The most common recycled water uses include: (1) landscape irrigation of highway medians, golf courses, parks, and schoolyards; (2) industrial uses such as power station cooling towers, oil refinery boiler feed water, carpet dyeing, recycled newspaper processing, and laundries; and (3) agricultural uses such as irrigation of produce, pastures for animal feed, and nursery plant products. Recently, recycled water use has expanded to office buildings for toilet flushing.

In coastal areas, excessive groundwater pumping results in seawater intrusion, which contaminates the aquifers with salt water. Recycled water is used to recharge the aquifers along the coast. This creates a hydraulic barrier to the inflow of seawater, thus protecting the quality and replenishing the supply of the inland groundwater.

Groundwater aquifers have been recharged with recycled water in California since the 1960s. Because groundwater aquifers serve as potable water supply basins, groundwater recharge, including seawater intrusion barriers, is considered an indirect potable reuse. The Department of Health Services (DHS) requires advanced treatment of recycled water before it is used to recharge groundwater aquifers. These treatment requirements are more restrictive than the typical requirements for discharges to inland surface or coastal waters.

Serrano Country Club, irrigated with recycled water in El Dorado Hills, CA. Over 125 golf courses use recycled water in California.

Recycled water is used for toilet and urinal flushing in the recently constructed Smith Barney building in Irvine, CA.

At the final meeting of the Recycled Water Task Force, Thomas Hannigan (l.), Director of DWR, listens to Assemblymember Jackie Goldberg, author of AB 331, which mandated creation of the Task Force.

Assembly Bill No. 331 was passed by the California Legislature, and signed into law by Governor Gray Davis on October 7, 2001. The bill required the creation of the 2002 Recycled Water Task Force (Task Force) to identify constraints, impediments, and opportunities for the increased use of recycled water and report to the Legislature by July 1, 2003. Although water recycling includes treatment of a broad range of wastewater sources, the Task Force decided to focus on the planned reuse of treated municipal wastewater; specifically, the financial/economic, regulatory, and social issues that typically arise in water recycling projects.

Representatives of federal, State, and local agencies, private entities, environmental organizations, universities, concerned individuals and public-interest groups were appointed to the 40-member Task Force in April 2002. The Task Force includes experts in the field of water recycling, including those involved in the production and use of recycled water, public health officials, world-renowned researchers, environmental organizations, and the public. The Task Force established committees (workgroups) to focus on specific topics of concern and produce reports that served as a basis of Task Force decision-making. The Department of Water Resources (DWR), the State Water Resources Control Board (SWRCB), and the DHS provided technical assistance to the Task Force and its workgroups.

DHS' regulations prescribe the level of treatment necessary for the various uses of recycled water. In general, the public has accepted these regulations as being adequate for protection of public health. There are successful indirect potable reuse projects involving groundwater recharge in California and new projects continue to be proposed. However, in some instances, the public has not been receptive to the concept of using recycled water to recharge groundwater basins that serve as drinking water supply sources. Some indirect potable reuse proposals have been mischaracterized by images of recycled water being fed directly into drinking water pipeline systems. The Task Force found the need to involve the public much earlier in the decision-making process for projects, to make the process much more transparent and to provide facts early on in project planning. Therefore, the Task Force devoted considerable attention to issues surrounding public health and the need for increased education and outreach related to the facts and scientific research about recycled water.

Displaying interagency cooperation, the Task Force was led by (from left) David Spath (DHS), Eric Schockman (facilitator), Richard Katz (SWRCB), and Jonas Minton (DWR), Fawzi Karajeh (DWR).

Other critical issues include the lack of local funding for (1) water recycling infrastructure, (2) research on emerging contaminants, and (3) public health concerns. These have also been identified as impediments to increased water recycling statewide. A financial incentive for the local development of water recycling projects is an effective tool for the construction of water recycling facilities and infrastructure, as evidenced by the SWRCB's Propositions 13 and 50 loan and grant programs. Therefore, the need for additional State funding to provide local water recycling funding assistance is also reflected in the recommendations.

The Task Force identified and adopted 26 issues with respective recommendations to address obstacles, impediments, and opportunities for California to increase its recycled

water usage. Recommendations associated with thirteen of these issues were adopted as key recommendations deserving of more immediate attention. The 26 issues and a summary of the recommendations follow. The issues have been numbered as shown in parentheses to correspond to their numbers assigned in Chapters 4, 5, and 6 of the report.

Key Issues and Recommendations Summary:

***Funding for Water Recycling Projects (1.1)** - State funding for water reuse/recycling facilities and infrastructure should be increased beyond Proposition 50 and other current sources.*

***Community value-based Decision-making Model for Project Planning (2.1)** - Local agencies should engage the public in an active dialogue and participation using a community value-based decision-making model in planning water recycling projects. Public participation activities should go beyond the minimum requirements of State and federal environmental laws, perhaps being reinforced by State funding agencies requiring a comprehensive public participation process as a condition for receiving State funds.*

***Leadership support for water recycling (2.2) -** State government should take a leadership role in encouraging recycled water use and improve consistency of policy within branches of State government. Local agencies should create well-defined recycled water ordinances. Local regulatory agencies should effectively enforce these ordinances. The State should convene an independent statewide review panel on indirect potable reuse to ensure adequate health and safety assurance for California residents.*

***Educational Curriculum (2.3)** - The State should develop comprehensive education curricula for public schools; and institutions of higher education should incorporate recycled water education into their curricula. Governmental and nongovernmental organizations should enhance their existing public education programs.*

***State-sponsored media campaign (2.4) -** The State should develop a water issues information program, including water recycling, for radio, television, print, and other media.*

***Uniform Plumbing Code Appendix J (3.1) -** The State should revise Appendix J of the Uniform Plumbing Code, which addresses plumbing within buildings with both potable and recycled water systems, and adopt a California version that will be enforceable in this State.*

***DHS Guidance on Cross-connection Control (3.2)** - The Department of Health Services should prepare guidance that would clarify the intent and applicability of Title 22, Article 5 of the California Code of Regulations pertaining to dual plumbed systems and amend this article to be consistent with requirements included in a California version of Appendix J that the Task Force is recommending to be adopted.*

Health and Safety Regulation (4.1) - *The Department of Health Services should involve stakeholders in a review of various factors to identify any needs for enhancing existing local and State health regulation associated with the use of recycled water.*

Incidental Runoff (4.2) - *The State should investigate, within the current legal framework, alternative approaches to achieve more consistent and less burdensome regulatory mechanisms affecting incidental runoff of recycled water from use sites.*

Uniform Interpretation of State Standards (4.3) - *The State should create uniform interpretation of State standards in State and local regulatory programs by taking specific steps recommended by the Task Force, for example, appointing an ombudsman in the State Water Resources Control Board to oversee uniformity within the SWRCB and the Regional Water Quality Control Boards.*

Water Softeners (4.4) *- The Legislature should amend the Health and Safety Code Sections 116775 through 116795 to reduce the restrictions on local ability to impose bans on, or more stringent standards for, residential water softeners. Within the current legal provisions on water softeners, local agencies should consider publicity campaigns to educate consumers regarding the impact of self-regenerative water softeners.*

Uniform Analytical Method for Economic Analyses (5.1) - *A uniform and economically valid procedural framework should be developed to determine the economic benefits and costs of water recycling projects for use by local, State, and federal agencies. Guidance should be developed to conduct economic feasibility analyses, incorporating nonmarket values to the extent possible. Appropriate benchmarks for comparing incremental costs of developing recycled water with the cost of developing an equivalent amount through alternative measures. An advisory team should be created by the Department of Water Resources, the State Water Resources Control Board, and the Department of Health Services to assist these tasks.*

Research Funding (6.1) - *The State should expand funding sources to include sustainable State funding for research on recycled water issues.*

University Academic Program for Water Recycling (6.2) *- The State should encourage an integrated academic program on one or more campuses for water recycling research and education, such as through State research funding.*

Additional Important Issues and Recommendations Summary:

Funding Coordination (1.2) *- A revised funding procedure should be developed to provide local agencies with assistance in potential State and federal funding opportunities. A Water Recycling Coordination Committee should be established to work with funding agencies, streamlining project selection within individual agencies while ensuring an open process, peer review, and public review.*

Regional Planning Criterion (1.3) - *State funding agencies should make better use of existing regional planning studies to determine the funding priority of projects. This process would not exclude projects from funding where regional plans do not exist.*

Funding Information Outreach (1.4) - *Funding agencies should publicize funding availability through workshops, conferences, and the Internet.*

Department of Water Resources Technical Assistance (1.5) - *Funding sources should be expanded to include sustainable State funding for DWR's technical assistance and research, including flexibility to work on local and regional planning, emerging issues, and new technology.*

Project Performance Analysis (1.6) - *Resources should be provided to funding agencies to perform comprehensive analysis of the performance of existing recycled water projects in terms of costs and benefits and recycled water deliveries. An estimate should be performed of future benefits potentially resulting from future investments.*

Recycled Water Symbol Code Change (3.3) - *The Department of Housing and Community Development should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code.*

Stakeholder Review of Proposed Cross-connection Control Regulations (3.4) - *Stakeholders are encouraged to review Department of Health Services draft changes to Title 17 of the Code of Regulations pertaining to cross-connections between potable and nonpotable water systems.*

Cross-connection Risk Assessment (3.5) - *The Department of Health Services should support a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water.*

Permitting Procedures (4.5) - *Various measures should be conducted to improve the administration and compliance with local and State permits, including providing Department of Health Services guidance, dissemination of information by the Association of California Water Agencies and the California Association of Sanitation Agencies, and State and local tax incentives to offset costs of compliance with regulations.*

Source Control (4.6) *- Local agencies should maintain strong source control programs and increase public awareness of their importance in reducing pollution and ensuring a safe recycled water supply.*

Economic Analyses (5.2) - *Local agencies are encouraged to perform economic analyses in addition to financial analyses for water recycling projects to provide transparency regarding the true costs and benefits of projects. State and federal agencies should require economic and financial feasibility as two funding criteria in their funding programs.*

Kirk Bone signs the Task Force report, witnessed by Fawzi Karajeh (l.) and Al Vargas (r.).

Statewide Science-based Panel on Indirect Potable Reuse (6.3) - *As required by AB 331, the Task Force reviewed the 1996 report of the California Indirect Potable Reuse Committee and other related advisory panel reports and concluded that reconvening this committee would not be worthwhile at this time.*

Details concerning the recommendations are contained in the report.

The Task Force intends for this report to be used as a working tool to guide the Legislature, State government, public agencies, the public and all water recycling stakeholders towards the safe and successful expansion of recycled water use to help meet the State's future water supply needs.

CHAPTER 1

Introduction

Richard Katz (r.), Chair of the Task Force, conducts the final meeting of the Task Force, assisted by Jonas Minton, Co-Vice Chair (center).

Adequate water resources are essential not only for basic human sustenance but also for a thriving economy that supports a high standard of living and amenities that make California a great place to live. Many areas of California are arid to semi-arid, requiring careful use of water and expensive water projects to maintain adequate supplies. Reusing treated municipal wastewater has long been practiced as one way to make efficient use of our water resources.

There are a variety of technical, health, and social issues that arise in the planning, development, regulation, and operation of water recycling projects. Through access to adequate information, sound planning and engineering practices, and appropriate regulatory standards and practices, there may be improved ability to implement successful projects that will contribute to the State's water supply and protect public health. The Recycled Water Task Force was created with the general mission of identifying ways to improve our ability to cope with these issues and making recommendations for specific actions that can be taken. This report is the product of the Task Force.

This chapter includes an overview of the Task Force and the process used to arrive at its recommendations. Chapter 2 includes an estimate of the potential for additional recycled water use in California, how it can complement our water supply, and the potential cost. The legal and regulatory framework for water recycling in California is presented in Chapter 3. The issues that have been identified by the Task Force are described in Chapter 4, and the highest priority recommendations to address these issues are presented. The remaining recommendations of the Task Force are included in Chapter 5. Implementation of the recommendations is addressed in Chapter 6.

Appendices are added as reference material, including a copy of Assembly Bill No. 331, a glossary, and abbreviations used in this report. White papers were prepared by six Task Force workgroups to provide a detailed analysis of the issues to assist the Task Force in developing its recommendations. While these white papers have not been adopted by the Task Force, they will be published separately as background information.

It will be helpful if some key terms are defined. "Recycled water" is defined in the California Water Code to mean *"water which, as a result of treatment of waste, is suitable for*

Water Recycling *- This is the process of treating wastewater for beneficial use, storing and distributing recycled water, and the actual use of recycled water. It is also the reuse of water through the same series of processes, pipes, or vessels more than once by one user, wherein the effluent from one use is captured and redirected back into the same use or directed to another use within the same facility of the user. This form of recycling, often without treatment between uses, is common in industrial facilities, such as cooling towers.*

Recycled Water or Reclaimed Water *This is wastewater that is suitable for a beneficial use as a result of treatment. The degree of treatment provided for recycled water depends on the quality of water needed for the specific beneficial use and for public health protection and may include effluent from Primary Wastewater Treatment, Secondary Wastewater Treatment, Tertiary Wastewater Treatment, or Advanced Treatment.*

a direct beneficial use or a controlled use that would not otherwise occur." For the present purposes we can simplify this to mean wastewater that has been treated to a quality that is suitable to use the water again. This could include both agricultural return waters and municipal wastewater; however, it appears that the legislative intent of the Task Force is to focus on the reuse of treated municipal wastewater. "Reclaimed water" and "reclaimed wastewater" are other terms in common use equivalent to recycled water.

In recent years "water recycling" has come to be an umbrella term encompassing the process of treating wastewater, storing and distributing the recycled water, and the actual use of the recycled water. "Water reclamation" and "wastewater reclamation and reuse" are other equivalent terms. In 1995, provisions of the Water Code, Fish and Game Code, Health and Safety Code, and other statutes were amended to replace terms such as wastewater "reclamation" and "reclaimed water" with "water recycling" and "recycled water." This legislation was intended to enhance public acceptance of recycled water supplies.

RECYCLED WATER TASK FORCE

The creation of the Recycled Water Task Force was called for in Assembly Bill No. 331 (Goldberg), which was passed by the California Legislature and approved by Governor Davis on October 7, 2001 (Water Code Section 13578). The text of the bill is in Appendix A. As directed in the bill, the Task Force was convened by the California Department of Water Resources (DWR). However, the Task Force has functioned as a cooperative effort of the three State agencies primarily responsible for planning and regulating water supply, including the State Water Resources Control Board (SWRCB) and the Department of Health Services (DHS). The Task Force is chaired by the SWRCB Member Richard Katz. The general objective of the Task Force is to advise DWR and report to the Legislature by identifying the opportunities for increasing the use of recycled water and identifying the constraints and impediments to increasing the use of recycled water. The Task Force must report to the Legislature no later than July 1, 2003.

The Task Force is composed of 40 members representing federal, State, and local governmental and private sector entities, environmental organizations, University of California, and public interest groups. The Task Force is composed of experts on the safe and beneficial uses of recycled water, including producers, suppliers, and users of recycled water, regulators, and representatives from environmental organizations, industry, and the public. The composition of the Task Force includes categories specified in AB 331 as well as additional members included to represent a broad range of viewpoints and expertise. The numbers of members representing various categories are listed below:

- 12 - State and federal government
- 2 - County health officials
- 14 - Local public agencies (water, wastewater, water recycling)
- 3 - Agency and industry associations

- 1 - University of California
- 4 - Public interest organizations and the public
- 2 - Private industry
- 2 - Investor-owned water utilities

In addition, over 40 people assisted the Task Force as staff and members of various workgroups of the Task Force. The names of the Task Force and workgroup members and staff are listed at the beginning of the report.

The first meeting of the Task Force was held on April 3, 2002. Its eighth and final meeting was held on May 13, 2003.

To accomplish the Task Force mission, six workgroups were created to address specific issue areas in depth and to report back to the Task Force. Twenty-two meetings were held by these workgroups.

A Web site was created for the Task Force to provide public access to its work and schedule. All meetings of the Task Force and workgroups were publicly noticed and open for public participation. In addition, three public discussion sessions were held.

FOCUS OF TASK FORCE

As a rationale for the work of the Task Force, AB 331 cites two goals set forth in other documents. The first is a statewide goal to recycle a total of 700,000 acre-feet of water per year by the year 2000 and 1,000,000 acre-feet of water per year by the year 2010 (Section 13577, Water Code). The second is a recommendation of Governor Davis' Advisory Drought Planning Panel (Panel) Critical Water Shortage Contingency Plan. That recommendation is, "In the interest of implementing the CALFED water use efficiency program (water conservation and water recycling actions) as quickly as possible, the Panel recommends that DWR maximize use of grants, rather than capitalization loans, to bring local agencies up to the base level of efficiency contemplated in the CALFED Record of Decision. The Panel recognizes that this recommendation would correspondingly accelerate the need for an additional source of State financial assistance for the water use efficiency program."

To address these goals, the Task Force is required by AB 331 to identify and report to the Legislature on opportunities for increasing the use of recycled water. It also must identify constraints and impediments, including the level of State financial assistance available for project construction. The bill further specified six areas for investigation:

1. How to further the use of recycled water in industrial and commercial applications, including the applicability of various requirements for prevention of cross-connections between potable and nonpotable water systems.
2. Changes in the Uniform Plumbing Code that are appropriate to facilitate the use of recycled water in industrial and commercial settings and recommendations to the California Building Standards Commission to effect those changes.

Chair of the Task Force, Richard Katz (r.), assisted by facilitator Eric Schockman (center) and David Spath, Co-Vice Chair.

Kevin Reilly (Deputy Director DHS Prevention Services), Kathy Fletcher (Deputy Secretary for External Affairs, Cal/EPA), Art Baggett (Chair, SWRCB) participating in final Task Force meeting.

3. Changes in State statutes or the current regulatory framework at the State and local level that are appropriate to increase the use of recycled water for commercial laundries and toilet and urinal flushing in structures and financial incentives to help offset the cost of retrofitting structures.
4. The need to reconvene the California Potable Reuse Committee established by DWR in 1993 or to convene a successor committee to update the committee's finding that planned indirect potable reuse of recycled water by augmentation of surface water supplies would not adversely affect drinking water quality if certain conditions were met.
5. The need to augment State water supplies using water use efficiency strategies identified in the CALFED Bay-Delta Program, including ways to coordinate with CALFED to assist local communities in educating the public with regard to the statewide water supply benefits of local recycling projects and the level of public health protection ensured by compliance with State health standards.
6. Impediments or constraints, other than water rights, related to increasing the use of recycled water in applications for agricultural, environmental, or irrigation uses.

While the report is to be delivered to the Legislature, the Task Force is not confined to recommendations requiring legislative action. The Task Force has investigated actions that can be taken at all levels of government, as well as by nongovernmental organizations.

Suzanne Arena, Bob Reed, and Muriel Watson discuss Task Force priorities.

WORKGROUPS

Early in the deliberations of the Task Force over 85 issues were suggested for investigation. It was necessary to create workgroups to be able to do the fact-finding and deliberate on potential alternative recommendations to bring to the Task Force for its consideration. The workgroups provided an opportunity for focused discussion not only by interested Task Force members but also by persons outside of the Task Force having special interests and expertise.

Six issue areas were established for focus by workgroups:

1. Funding / CALFED coordination
2. Public information, education, and outreach
3. Plumbing code / cross-connection control
4. Regulations and permitting
5. Economics of water recycling
6. Science and health / indirect potable reuse

Accompanied by fellow Task Force members Ane Deister (l.) and William VanWagoner (r.), the Public Information, Education, and Outreach Workgroup Co-chair Herman Collins addresses the Task Force.

Each workgroup was given a charge by the Task Force related to its issue area. The workgroups were intended to review all of the issues raised within their issue areas, select priority issues for in-depth analysis, and make recommendations to address the priority issues. The workgroups narrowed the list of potential issues to a few that appeared to be of highest priority so that within the limited time frame of the Task Force sufficient background information could be gathered to develop meaningful recommendations. The workgroups drafted "white papers," which contain the background information, issue analysis, and workgroup recommendations to the Task Force. The white papers were the foundation for further deliberation by the Task Force members but were not adopted by the Task Force. In addition, the workgroups provided expert presentations to the Task Force. The white papers will be published separately and will be available to the public.

CHAPTER 2

Role & Potential of Water Recycling

The Golden Gate of San Francisco Bay, home of several water recycling projects to meet water needs and protect the water quality of the bay.

California's current population of 35 million is expected to grow by roughly 17 million by 2030, a 50 percent increase. To meet the water demands associated with this growth, it will be necessary to develop a balanced portfolio of water resources, not only the traditional storage projects, but also an array of other types of facilities and management techniques, such as water transfers, water conservation, desalination, and, most certainly, water recycling. Based on the potential for additional recycled water use developed later in this chapter, recycled water could free up enough fresh water to meet the household water demands of 30 to 50 percent of the additional 17 million Californians. To achieve this potential, an investment of $11 billion would be needed.

RECYCLED WATER USE IN CALIFORNIA

Water recycling has been taking place in California as early as 1890 for agriculture, although it is likely that the wastewater was untreated at that time. By 1910 at least 35 communities were using wastewater for farm irrigation, 11 without wastewater treatment and 24 after septic tank treatment. Landscape irrigation in Golden Gate Park in San Francisco began with raw sewage, but due to complaints, minimal treatment was added in 1912. Since then wastewater treatment standards have been greatly improved to protect public health.

By 1952 there were 107 communities using recycled water for agricultural and landscape irrigation. The first comprehensive statewide estimate of water reuse of municipal wastewater was made in 1970, when 175 thousand acre-feet of recycled water were used. In 2000, this amount had increased to 402 thousand acre-feet. The recycled water was supplied by 234 wastewater treatment plants and delivered to over 4,800 sites. Currently recycled water use is estimated to be within a range of 450 to 580 thousand acre-feet per year. The trend in use is illustrated in Figure 1.

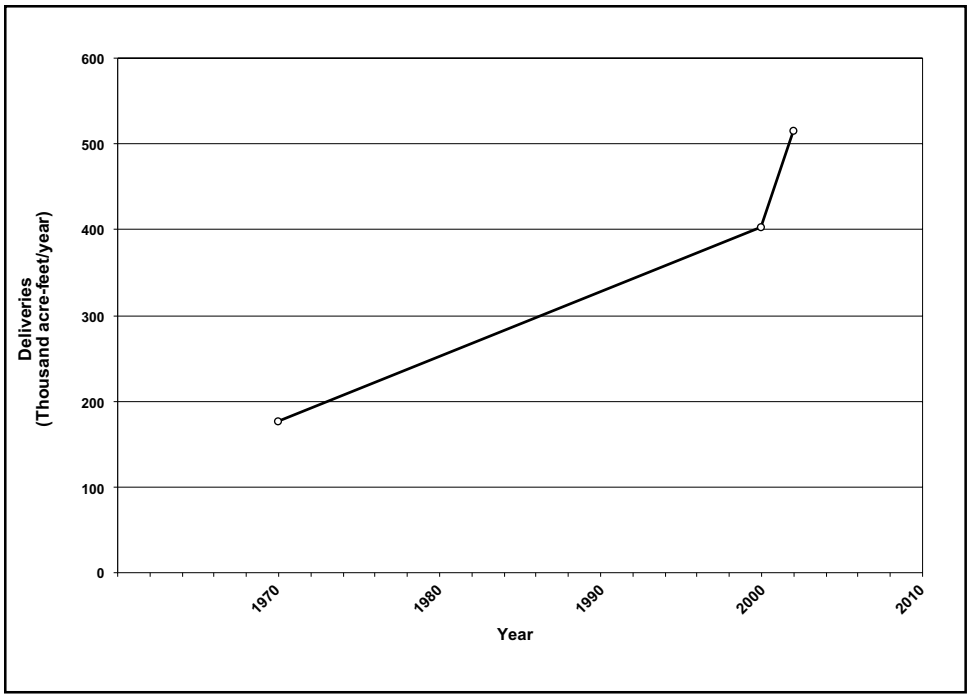


Figure 1. Recycled Water Use in California for 1970 to 2002.

Artichokes grown in Castroville with recycled water are now in markets after a 5-year study to demonstrate the safety of recycled water for food crops.

Recycled water is being used in a variety of ways, as illustrated in Figure 2. At least 20 varieties of food crops are grown with recycled water, including vegetables eaten raw, such as lettuce and celery. Eleven non-food crops, especially pasture and feed for animals, as well as nursery products, are irrigated with recycled water. Landscape irrigation is primarily for turf, including over 125 golf courses and many parks, schoolyards and freeway landscaping. Industrial and commercial uses include cooling towers in power stations, boiler feed water in oil refineries, carpet dyeing, recycled newspaper processing, and laundries. Recycled water is being used in office buildings for toilet and urinal flushing.

In many groundwater basins in California, the rate of pumping exceeds the rate of natural replenishment. Artificial recharge of groundwater is practiced in some areas by percolating either stormwater captured from streams, imported water, or recycled water into aquifers. The most notable use of recycled water for this purpose is recharge in the Montebello Forebay Groundwater Project in the vicinity of Whittier, which has occurred since 1962. In coastal areas where excessive groundwater pumping has taken place, the groundwater levels have fallen to the extent that seawater has been drawn inland, contaminating aquifers. Recycled water has been injected into the aquifers along the coast to create barriers to the seawater, thus protecting the groundwater while, in part, also replenishing the aquifer. Highly treated recycled water has been injected into a seawater barrier in Orange County since 1976 and a newer project operates along the coast in Los Angeles County.

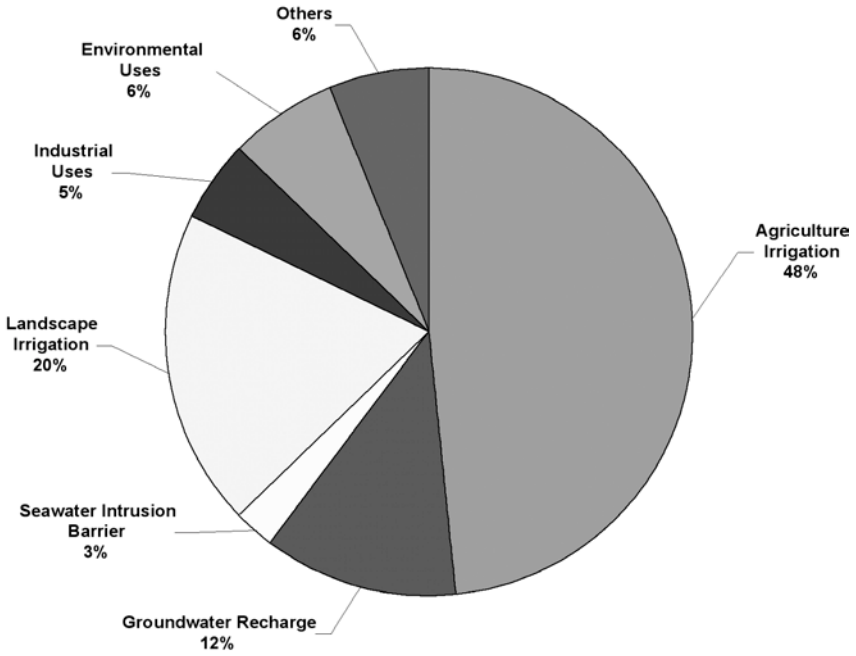


Figure 2. Types of Recycled Water Use in California (SWRCB, 2000).

WATER RECYCLING FUNDAMENTALS

Projects are initiated to serve particular objectives. Use of recycled water is motivated with a particular objective in mind and is often evaluated as one of several alternatives before determining that recycled water use is the most cost-effective means of meeting one or more objectives. There are several objectives that have led to the use of recycled water in California:

1. An incidental secondary benefit to the disposal of wastewater, primarily crop production by irrigation with effluent,
2. A water supply to displace the need for other sources of water,
3. A cost-effective means of environmentally sound treatment and disposal of wastewater,
4. A water supply for environmental enhancement.

Recycled water is used on vineyards in Fresno, San Diego, and Sonoma Counties.

Historically, agricultural use of recycled water predominated in California and occurred mostly in the Central Valley, where farm land was located adjacent to wastewater treatment facilities. The farm land offered a convenient place for disposal of effluent, and sometimes the sale of recycled water to nearby farmers offered a source of income to reduce costs to sewer users even when facilities were available for discharge to surface waters. As treatment standards were raised to protect the environment, land application was looked at more seriously as a cost-effective means of treatment and disposal of wastewater as opposed to discharge into streams. However, in recent decades, the emphasis in promoting water reuse has been more on the water supply benefits to meet demands in water-short areas. Water recycling is evaluated in comparison with other means of enhancing water supplies. Most projects now occur in urban areas, and uses have shifted more toward urban uses, such as landscape irriga-

Surface water reservoirs are a major source of water in California, but during droughts, as shown here at Lake Oroville, recycled water can be a more reliable supply.

tion and industrial use. Environmental enhancement, such as wetlands restoration, can be another, but certainly less prevalent, motivation.

Aside from meeting one or more of the major project objectives described above, there can be potential secondary benefits:

1. Provide additional reliable local sources of water, nutrients, and organic matter for agricultural soil conditioning and reduction in fertilizer use,
2. Reduce the discharge of pollutants to water bodies, beyond levels prescribed by regulations, and allow more natural treatment by land application,
3. Provide a more secure water supply during drought periods,
4. Provide economic benefits resulting from a more secure water supply.

The degree and type of wastewater treatment that is provided to make recycled water suitable for use depends on the types of use, the potential exposure of humans to recycled water and the public health implications, and the water quality required beyond health considerations. The basic levels of treatment include primary, secondary, and tertiary. Not all wastewater receives all three levels of treatment. Secondary treatment is commonly the minimum level of treatment for discharge to surface waters and for many uses of recycled water. Tertiary treatment is sometimes required for discharge to surface waters to protect fisheries or protect some uses of the waters. Tertiary treatment is often required for recycled water where there is a high degree of human contact. Disinfection is usually required for either discharge or recycled water use to kill viruses and bacteria that can cause illness.

The Department of Health Services specifies the levels of treatment for recycled water and publishes the standards in Title 22 of the California Code of Regulations. Examples of types of use and the prescribed levels of treatment are shown in Table 1. Beyond the treatment required for health protection, certain uses have specific water quality needs. High sodium or boron in water can be harmful to crops. Water hardness can cause scaling in industrial boilers. Nitrogen and phosphorus can stimulate algal growth in ponds or cooling towers. Sometimes specialized forms of tertiary treatment are needed to remove specific chemicals that would make recycled water unusable.

Most recycled water projects are designed to provide one level of water quality to all customers connected to the recycled water distribution system. If only a few potential customers need a special quality of water, it may not be economical to treat all of the recycled water to meet these special quality requirements. In recent years a more innovative approach is being practiced. Some customers with special quality needs may be served by their own pipeline from the wastewater treatment plant, and the recycled water producer provides two or more qualities of recycled water. If a single customer has special needs, the standard quality of recycled water is delivered to the customer's site and a customized treatment facility at the site provides the added treatment to bring the quality up to the standards of the customer. West Basin Municipal Water District in Southern

Table 1. Examples of Minimum Treatment Levels to Protect Public Health.

Types of Use	*Treatment Level*		
	Disinfected Tertiary	Disinfected Secondary	Undisinfected Secondary
Urban Uses and Landscape Irrigation			
Fire protection	√		
Toilet & Urinal Flushing	√		
Irrigation of Parks, Schoolyards, Residential Landscaping	√		
Irrigation of Cemeteries, Highway Landscaping		√	
Irrigation of Nurseries		√	
Landscape Impoundment	√	√*	
Agricultural Irrigation			
Pasture for milch animals		√	
Fodder and Fiber Crops			√
Orchards (no contact between fruit and recycled water)			√
Vineyards (no contact between fruit and recycled water)	√		√
Non-Food Bearing Trees			√
Food Crops Eaten After Processing		√	
Food Crops Eaten Raw	√		
Commercial/Industrial			
Cooling & Air Conditioning - w/cooling towers	√	√*	
Structural Fire Fighting	√		
Commercial Car Washes	√		
Commercial Laundries	√		
Artificial Snow Making	√		
Soil Compaction, Concrete Mixing		√	
Environmental and other Uses			
Recreational Ponds with Body Contact (Swimming)	√		
Wildlife Habitat/Wetland		√	
Aquaculture	√	√*	
Groundwater Recharge			
Seawater intrusion Barrier	√*		
Replenishment of potable aquifers	√*		

** Restrictions may apply*

Primary Wastewater Treatment *-The removal of particulate materials from domestic wastewater, usually done by allowing the solid materials to settle as a result of gravity, typically, the first major stage of treatment encountered by domestic wastewater as it enters a treatment facility. The wastewater is allowed to stand in large tanks, termed Clarifiers or Primary Settling Tanks. Primary treatment plants generally remove 25 to 35 percent of the Biological Oxygen Demand (BOD) and 45 to 65 percent of the total suspended matter. The water from which solids have been removed is then subjected to Secondary Wastewater Treatment and possibly Tertiary Wastewater Treatment.*

Secondary Wastewater Treatment *- Treatment (following Primary Wastewater Treatment) involving the biological process of reducing suspended, colloidal, and dissolved organic matter in effluent from primary treatment systems and which generally removes 80 to 95 percent of the Biochemical Oxygen Demand (BOD) and suspended matter. Secondary wastewater treatment may be accomplished by biological or chemical-physical methods. Activated sludge and trickling filters are two of the most common means of secondary treatment. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. Disinfection is usually the final stage of secondary treatment.*

Tertiary Wastewater Treatment *- Biological, physical, and chemical treatment processes that follow Secondary Wastewater Treatment. The most common Tertiary Wastewater Treatment process consists of flocculation basins, clarifiers, filters, and disinfection processes. The term Tertiary (Wastewater) Treatment is also used to include Advanced Treatment beyond filters.*

California has been a leader in this concept, serving several oil refineries and a seawater barrier with five qualities of water in addition to disinfected tertiary recycled water suitable for landscape irrigation. Customized treatment either at the central wastewater treatment plant or at customer sites is one possibility to add flexibility to add more customers at an acceptable cost.

Treated wastewater is reused in many areas of the State even when no projects have been constructed with this intent. For example, about 90 percent of municipal wastewater discharged in the San Joaquin Valley is reused. A discharge into a river becomes part of the river flow that may be diverted downstream for farms or other cities. This indirect reuse, that is, reuse after treated wastewater has passed through a natural body of water, is illustrated in Figure 3. A groundwater aquifer can also be the natural body for indirect reuse. Recycled water can be injected in wells or percolated from ponds and become a part of the groundwater supply that is later pumped out for use. Water that is retained in streams and wetlands maintains aquatic environments and scenic values. This "environmental water" is another unplanned benefit of indirect reuse of treated wastewater that is discharged into water bodies.

Most indirect reuse is unplanned, that is, there was no prearranged agreement or intention that the producer of the treated wastewater would maintain control of the effluent after discharge so that it would be reused downstream. The downstream reuse is an incidental result of effluent disposal by discharge and withdrawal downstream of river water. When such indirect reuse could occur, the wastewater discharge is regulated to protect the public health for the downstream beneficial use. Planned reuse typically involves direct reuse by delivering recycled water directly through pipes to the users of the water. Examples of direct reuse are also illustrated in Figure 3.

These concepts of direct and indirect reuse and planned and unplanned reuse are important in understanding the discussion of public health issues and public acceptance concerns regarding water recycling. They are also important in interpreting data on water reuse, which are not consistent in indicating whether they include only planned or only direct reuse.

Reverse osmosis is an advanced treatment technology that is used in certain situations where a high degree of pathogens or chemicals must be removed, especially in indirect potable reuse and industrial applications.

Furthermore, unplanned indirect reuse already makes a vital contribution to the State's water supply. In terms of making the greatest impact on augmenting the State's water supply, emphasis should be placed on reusing recycled water that has no opportunity to be reused downstream, for example, discharges directly to the ocean. This understanding may affect the priority of the State's efforts in encouraging new water recycling projects. In terms of statewide water resources planning, DWR recognizes this distinction by classifying water recycling projects in coastal and some other areas as "new water supplies" because they offset the need for other new supplies rather than offsetting downstream reuse that already may occur.

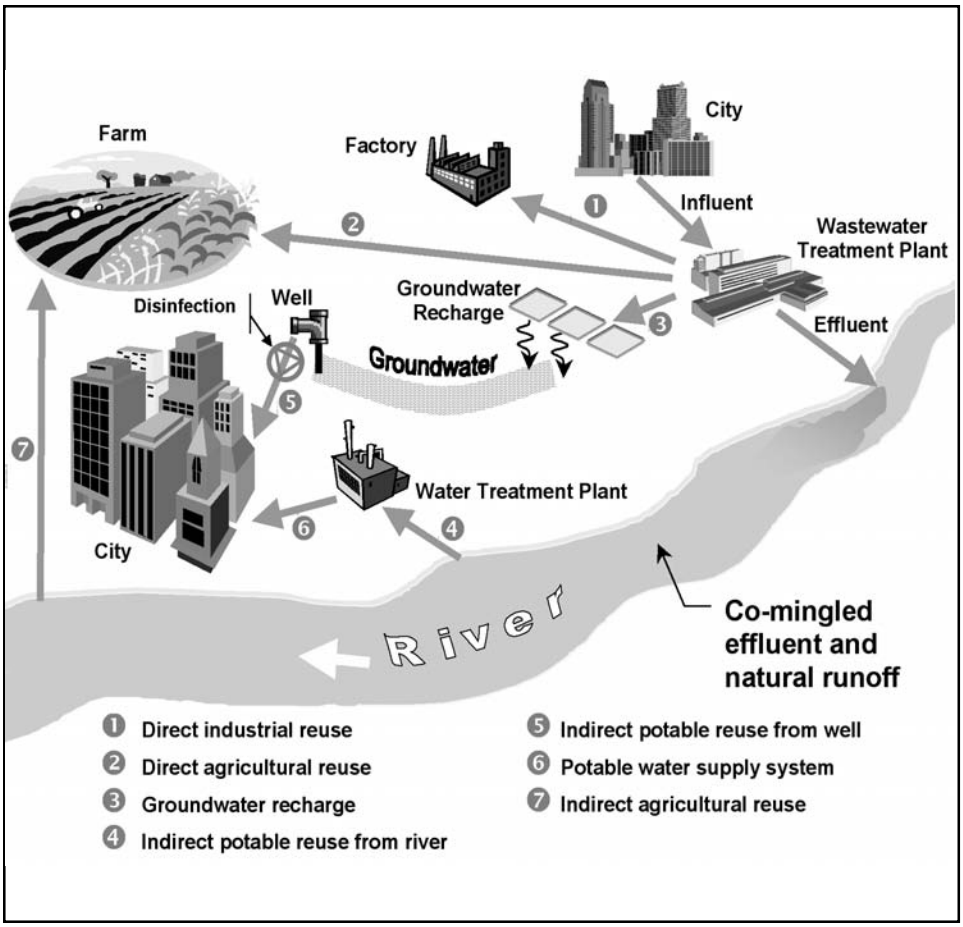


Figure 3. Direct and Indirect Recycled Water Use.

Research surveys conducted to evaluate public acceptance of recycled water have confirmed the intuitive expectation-the more direct and frequent the human contact with the recycled water, the more concern of the public, mainly related to public safety perceptions. While direct human ingestion has been proposed and researched, recycled water even with highly sophisticated treatment technologies has never been publicly accepted for direct potable use in the United States. With few exceptions nonpotable uses, including some uses with high potential for human contact, such as golf courses or schoolyards, have potential for infection or other disease to indiscernible background levels.

While direct potable reuse is not practiced, forms of indirect potable reuse have taken place in California and have been proposed. The Task Force did find a widely divergent acceptance of these indirect potable reuse concepts. Groundwater recharge by replenish-

ing groundwater aquifers with recycled water has been practiced in California since 1962 in the form of percolation from ponds through soil before reaching the groundwater and since the 1970s in the form of direct injection of advanced treated recycled water into aquifers. Because the aquifers serve as a potable water supply through wells, recharge is a form of indirect potable reuse. Various forms of tertiary wastewater treatment are provided before the recycled water is allowed to reach the aquifer. These levels of treatment are higher than would generally be required for discharges to a typical stream or the ocean. There are also natural mechanisms in the soil that provide treatment of any water that percolates down. As with all uses of recycled water, a strong governmental structure regulates the types of treatment necessary to protect public health, and generally the public has accepted the judgment of the public health authorities. However, in some communities public concern has halted the implementation of indirect potable reuse projects. The Task Force focused considerable attention to public acceptance and health issues and made recommendations to address these.

WATER RECYCLING POTENTIAL

Estimating the future potential of recycled water use is an uncertain task. Water planners will be continually evaluating a variety of alternative water sources to determine the most cost-effective and feasible options at the time. While there are increasing public health concerns not only with respect to recycled water but also with all of our sources of water, technology is becoming more effective to cope with some chemicals of concern. Technology is evolving that will make recycled water treatment, as well as alternative sources, such as desalination, more economical. As with conventional water sources, most of the cheapest opportunities to exploit recycled water have already been undertaken. It is difficult to predict exactly how recycled water will compare with alternative supply options in the long term.

Recycled water, river water, and imported water feed the Rio Hondo Spreading Grounds to replenish groundwater in Los Angeles County. This indirect potable reuse has been practiced by the County Sanitation Districts of Los Angeles County since 1962.

Nevertheless, some studies have been conducted to estimate future potential. The most comprehensive were two regional studies covering the metropolitan areas of the Southern California coastal region and the San Francisco Bay Area. In addition, surveys have been conducted to poll agencies regarding the potential projects within their service areas. Another point of reference is the total amount of municipal wastewater that is produced or projected to occur. The amount of treated municipal wastewater produced currently in California is estimated to be about 5 million acre-feet per year. With recycled water use currently at a level of approximately 500 thousand acre-feet per year, about 10 percent of available treated effluent was reused in planned water recycling projects. California's

current population of 35 million is expected to increase by 3.5 million by 2007 to 38.5 million. By 2030, the population is projected to reach 52 million, a 17 million (50 percent) increase over current population. By 2030, the amount of wastewater available for water recycling projects is estimated to increase to about 6.5 million acre-feet per year.

Serrano's championship golf course is irrigated with recycled water in El Dorado Hills, California.

With these studies and projections of available wastewater as a foundation and the caveats of uncertainty, projections for recycled water use are presented in Table 2 and shown in Figure 4 in the form of ranges. In 2030, the midrange amount of projected increase in recycled water use is about 1.5 million acre-feet per year, which would be about 23 percent of the available municipal wastewater. Because of the special public health concerns that have been raised regarding indirect potable reuse, nonpotable and planned indirect potable uses have been separated in the table. Planned indirect potable uses include groundwater recharge, a portion of seawater intrusion barriers and surface reservoir augmentation for potable supply.

As was discussed earlier, many inland discharges of treated wastewater are indirectly used downstream. Thus, not all of the projected additional recycled water use is considered new water that augments the State's water supply. However, with most of the urban demand occurring in coastal areas where discharges pass through to the ocean or saline bays, it is estimated that 1.2 million acre-feet of new water will be yielded with recycled water use by 2030. When compared to the household use of the additional 17 million Californians, this new water could substitute for enough fresh water to meet the household water demands of 30 to 50 percent of the household water demand.

As with many water supply options facing California to maintain adequate future water supplies, considerable capital investment will be required for water recycling facilities. As with surface water storage, conjunctive use and ocean desalination projects, for example, funds for design and construction of recycled water projects must be raised at the outset of a project even though revenue to pay the debt will become available over many years of project operation.

Table 2. Estimated Existing and Projected Potential Use of Recycled Water in California (taf/year).

Year	***2002***	***2007***	***2010***	***2030***
Planned non-potable use	400-510	520-740	770-1,000	1,520-1,850
Planned indirect potable use	50-70	80-120	120-170	330-400
Total	**450-580**	**600-860**	**890-1,170**	**1,850-2,250**
Increase beyond 2002		***150-280***	***440-590***	***1,400-1,670***

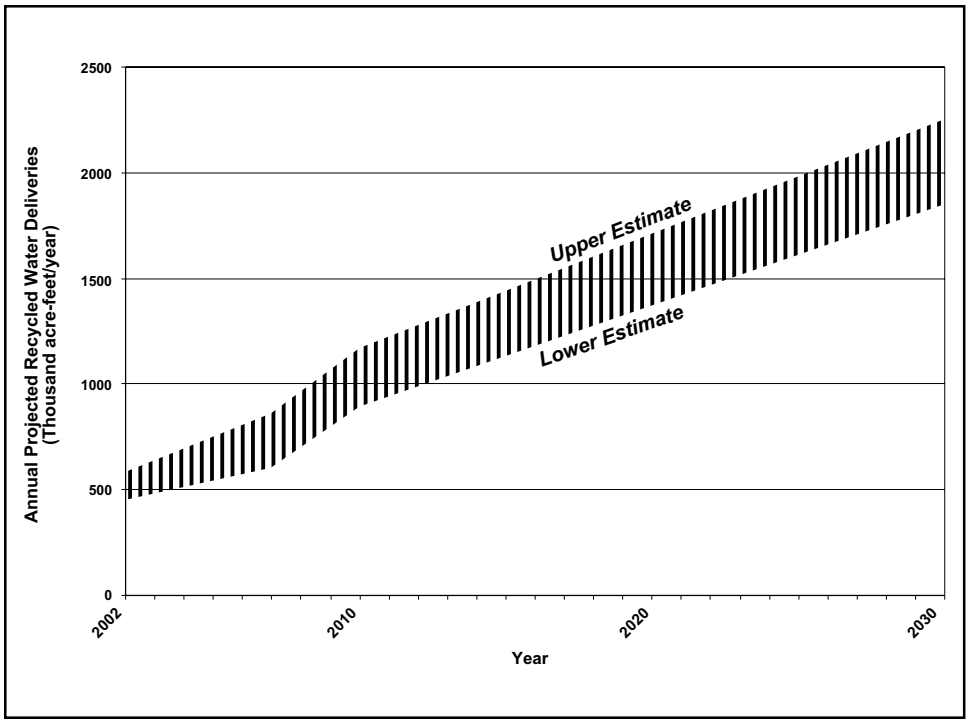


Figure 4. Projection of Recycled Water Deliveries in California through 2030.

A variety of factors can affect costs of recycled water projects, including types of use, the degree of wastewater treatment required, and the distance to deliver the recycled water. The cost to build the capacity to treat and deliver one acre-foot of recycled water annually can vary significantly. When capital costs and other factors are annualized over the life of a project, individual projects can vary from practically no extra cost to treat and deliver recycled water to over $2,000 per acre-foot of delivered water, including capital and operational costs. It should be noted that average unit costs have been estimated to be about $600 per acre-foot. These costs are generally comparable to other water supply options, for example, new dams and reservoirs or desalination.

Fortunately, most projects will cost well below the upper limit. Utilizing the studies referred to above, an average cost to build the capacity to yield one acre-foot per year was assumed to be $6,500 for nonpotable reuse projects and $6,800 for indirect potable reuse projects. The increased cost for indirect potable reuse may be due to higher levels of treatment and reliability features. Applying these unit costs to the projections in Table 1, the ranges of aggregate capital costs were estimated, as shown in Table 2.

To add 1.40 to 1.67 million acre-feet per year of recycled water by 2030, an estimated capital investment of between $9 billion to $11 billion will be required between now and 2030, as shown in Table 3. The cumulative investment over time is shown in Figure 5. A State bond issue, Proposition 50, was passed by voters in 2002, which included funds for water recycling projects. These funds are anticipated to take until 2005 to allocate. The average additional funds that will be needed after 2005 until 2030 are between $360 to 430 million per year. (Note that all costs are expressed in year 2000 dollars.)

It is important to note that water recycling projects can meet water quality needs by reducing wastewater flows into the environment, increasing water that can be available to endangered species habitat, conserving energy, or achieving other needs or goals. Thus, the investment in water recycling may yield benefits beyond just meeting water supply needs.

Table 3. Total Capital Cost Estimates to Augment Recycled Water Supplies, Million dollars.

Years	*2003-2007*		*2008-2010*		*2011-2030*	
Range	**Low**	**High**	**Low**	**High**	**Low**	**High**
Non-potable use	780	1,495	1,625	1,690	4,875	5,525
Indirect planned potable use	205	344	273	341	1,433	1,570
Cumulative cost beyond 2002	**985**	**1,839**	**2,883**	**3,870**	**9,191**	**10,965**

Note: Calculations based on USBR, Southern California Comprehensive Water Reclamation and Reuse Study, September 2000 draft. (Dollars expressed in year 2000 values)

Water recycling projects are generally constructed and operated by local agencies. Operation and maintenance costs are incurred after the projects are constructed. These costs also vary widely. One sampling of proposed projects had estimated operation and maintenance costs in the range of $70 to 490 per acre-foot, with an average of $300 per acre-foot.

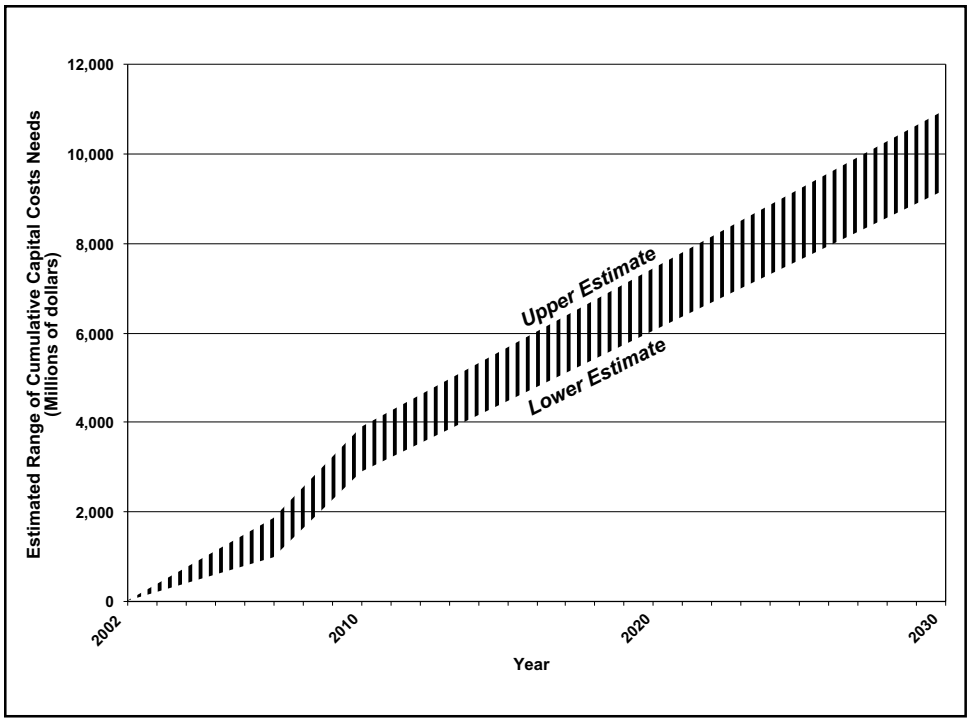


Figure 5. Cumulative Capital Investment in Water Recycling through 2030 in California.

The 12.8 mgd Recycled Water Facility of Delta Diablo Sanitation District treats recycled water for landscape irrigation and for cooling towers at electrical power stations in Pittsburg, CA.

The capital and operation and maintenance costs are recovered mainly through revenues from discharges into sewers, users of recycled water, and potable water customers who share the benefits of the added local supply of water. Freshwater projects are generally self-sustaining, but there is precedent for State or federal subsidy of water projects when particular projects have financial difficulty and there are social, economic, or environmental goals transcending a local project. Because water recycling projects are often more expensive than other local water supplies, the State and federal government have been providing subsidies for capital costs. In addition, some regional water agencies have provided annual subsidies to local agencies based on recycled water deliveries. The State funding has been in the form of low interest loans or partial grants for planning, design, and construction of projects. The sources of these funds have been bond issues, the last of which was Proposition 50 in 2002. The federal funds have been appropriations for partial grants to local agencies for design and construction. The Task Force has recommendations in Chapter 4 regarding additional funding.

CHAPTER 3

Legal & Regulatory Framework for Water Recycling

Signs complying with State regulations help ensure the safe use of recycled water.

Water recycling is accomplished in California with the involvement of many entities at all levels of government and in some cases investor-owned utilities. Water supply and wastewater districts are primarily responsible for the planning, design, and implementation of the over 200 projects operating in the State. The SWRCB and the U.S. Bureau of Reclamation have played major roles in providing capital funding for local projects. Several large regional wholesale water agencies, for example, the Metropolitan Water District of Southern California and the San Diego County Water Authority, have also provided significant financial assistance to local agencies. DWR and CALFED have incorporated water recycling in the water supply planning for the State. DWR has provided planning assistance in regional studies and a coordination and promotional role in facilitating water recycling.

Regulation of water recycling is vested by State law in SWRCB and Department of Health Services (DHS). Permits are issued to each water recycling project by one of the nine Regional Water Quality Control Boards (RWQCB) that are part of the SWRCB. These permits include water quality protections as well as public health protections by incorporating criteria established by DHS. The criteria issued by DHS are found in Title 22 of the California Code of Regulations. DHS does not have enforcement authority for the Title 22 criteria; the RWQCBs enforce them through enforcement of their permits containing the applicable criteria. To protect public drinking water supplies, DHS also has regulations to prevent cross connections between recycled water systems and potable water systems. Local health departments and DHS have enforcement authority over the DHS cross connection prevention regulations.

The applicability of the California Plumbing Code (California Code of Regulations, Title 24, Part 5) to various types of buildings and types of plumbing depends on the authorities of various State agencies that govern State-owned buildings, residential occupancies, medical facilities, schools and other occupancies. For example, the Department of Housing and Community Development (HCD) makes adoptions in the California Plumbing Code, which is based on the Uniform Plumbing Code with California amendments, for applicability to

multi- and single-family residential occupancies. The California Building Standards Commission reviews proposed amendments to the California Building Standards Code (California Code of Regulations, Title 24), such as HCD's, and approves them for publication.

There are lesser roles for other agencies and other applicable laws that become important in specific instances. The 1996 "Memorandum of Agreement between the Department of Health Services and the State Water Resources Control Board on Use of Reclaimed Water" provides a good description of the regulatory roles and joint responsibilities of these two agencies. This document is in Appendix B. It should be noted that since 1996, a change in regulations allows operators of recycled water treatment plants consisting of only tertiary or advanced treatment processes to be certified as water treatment plant operators in lieu of wastewater treatment plant operators. Also, the authority of local health agencies to impose requirements is addressed in section II.C. The Task Force has raised this as an issue and has made Recommendation 4.3.3 to resolve it.

The most pertinent laws and regulations applicable to recycled water are found in California State codes and the California Code of Regulations. Most of these are provided in Appendix C.

CHAPTER 4

Issue Areas & Key Recommendations

The issues, potential constraints, and impediments regarding water recycling were grouped by the Task Force into six issue areas. The six workgroups investigating the issues within each area brought recommendations to the Task Force for further deliberation and revision. Within the issue areas, 26 separate issues were identified, 13 of which were deemed to be of highest priority. The Task Force adopted recommendations for all 26 issues, in some cases adopting more than one recommendation for an issue. The six issue areas and the scope of problems included within them are described in this chapter. Also, the highest priority issues and their key recommendations are presented here. In the following chapter the remaining issues and associated recommendations are presented. The six issue areas are as follows:

1. Funding for water recycling,
2. Public dialogue / Public outreach,
3. Plumbing code / Cross-connection control,
4. Regulations and permitting,
5. Economics of water recycling,
6. Science and health / Indirect potable reuse.

At the outset the Task Force emphasizes that while it has investigated ways to promote and increase the use of recycled water, the recommendations presented in this report are not intended to compromise in any way the health and safety of the public. California has a strong record of safe use of recycled water. It is only by continuing this foundation can we maintain public confidence and support and move forward.

The recommendations are given unique numbers for reference, for example, 2.1.3. The first number relates to the issue area, the second to the issue, and the third to the recommendation itself.

1. Funding for Water Recycling

Various State and federal agencies within California administer funding programs to provide financial assistance for public water recycling projects. Typically, local agencies apply for funding for such projects from programs administered by the SWRCB, the DWR, and the USBR. The SWRCB and DWR funding programs operate within the State CALFED funding umbrella.

Each State and federal funding program has a different application process and no requirements exist for the agencies to coordinate their funding efforts. Having such variation in funding is beneficial if it results in more funding for water recycling, thereby serving the different water recycling projects statewide. However, the varying processes can be cumbersome to local applicants seeking funding from multiple sources. Greater water recycling benefits can be achieved with coordination among agencies that serve as funding sources for water recycling research, studies, and projects.

1.1. FUNDING FOR WATER RECYCLING PROJECTS

Issue

The current level of allocated funding for water recycling projects falls short of fulfilling the water recycling potential described in Chapter 2. A total of about $11 billion for capital costs will be needed by 2030 to add an additional 1.5 million acre-feet per year of recycled water capacity in California.

Recommendation 1.1.1.

State funding for reuse/recycling should be increased beyond Proposition 50 and other current sources. Funding for construction of recycled water projects should be included in future water bonds. Under the existing cost share, the State needs to include in new bonds on the order of $300 million annually for grants and low interest loans to achieve the 1.5 million acre feet of additional recycling by the year 2030.

Approach and Implementation:

A bond issue should be passed by the Legislature to allocate additional funding for water recycling projects. Funds for planning, design, and construction of projects should be administered by the SWRCB. Time frame: July-December 2003.

Previous State bond issues have provided funds for the planning, design, and construction of water recycling projects and for research. Under the current rules, planning grants are provided up to $75,000 per study with a 50 percent local match requirement. For design and construction funding, both grants and loans are available. Grants are provided for 25 percent of capital cost up to a maximum of $5 million per project. The remainder of capital costs can be funded with State loans at a subsidized interest rate of one half of the interest rate of State bonds. The combined grant and loan for a project provide an equivalent subsidy of about 40 to 45 percent

of capital costs. Federal funding can be used by a project to the extent that the combined State and federal funding does not exceed 45 percent, thus ensuring a significant local investment. It is recommended to continue this State funding framework with additional funds.

Recommendation 1.1.2.

The California Water Commission, in cooperation with DWR and SWRCB, is strongly encouraged to seek federal cost sharing legislation to support the development of water recycling projects in California to achieve the 1.5 million acre-feet goal by the year 2030.

Approach and Implementation:

The U.S. Congress should be requested to continue to support federal funding and activities for water recycling. The federal government has provided significant capital funding for water recycling projects in California under the Reclamation Wastewater and Groundwater Study and Facilities Act (Title XVI of Public Law 102-575). The U.S. Bureau of Reclamation has also conducted the Southern California Comprehensive Water Reclamation and Reuse Study and assisted in the San Francisco Bay Area Regional Water Recycling Program master plan, regional studies identifying opportunities for water recycling in Southern and Northern California and evaluating potential projects to expand water reuse.

2. Public Dialogue / Public Outreach

While the direct participants in water recycling are the water and wastewater agencies that plan, design, construct and operate recycled water facilities and the users of the recycled water, the impacts of water recycling projects extend to the public at large. The public bears part or all of the financial burden, experiences possible exposure to recycled water, and may experience aesthetic or other impacts of projects. Public concerns over cost and public health have been the most prominent, but underlying issues of environmental justice or growth and land development have been evident.

Participants at the January 2003 Task Force meeting debating issues posted on the wall. Exemplifying the consensus-building process essential for successful advancement of water recycling, a diversity of viewpoints were represented on the Task Force.

Public support for water recycling has generally been very strong and many projects have been implemented without the apparent need for significant public participation. However, perhaps due to a more astute public awareness of public works projects or more concern over public health issues, several water recycling projects in recent years have experienced enough public opposition to halt their implementation. Controversy has focused mainly on indirect potable reuse projects, where the end product of the recycled water becomes part of drinking water sources, either groundwater basins or surface water reservoirs. One major conclusion of the Task Force is that the decision to undertake indirect potable reuse needs to be a local decision based on community values, complete and accurate information, and an assessment of the water supply options. While these factors are desirable for all projects, they are critical for indirect potable reuse. At this point there is not sufficient public consensus that any State mandate for indirect potable reuse would be appropriate.

Community *- Public at large including, but not limited to, local ethnic groups, political/social/economic groups, environmental justice advocates and environmentalists.*

The Task Force analyzed project experiences, listened to experts in public involvement, and reviewed some key literature. The following general public participation principles emerged.

1. The public needs to be involved in all phases of project planning with opportunities for involvement in developing and selecting alternatives, not just to be informed of final decisions.
2. Members of the public need to be listened to and responded to with respect. Their values and needs should be incorporated into the decision criteria. Their fears and concerns should be considered real and valid and mitigated with accurate information and, if necessary, changes in project design. Interaction should follow common courtesies of appropriate language, body gestures, and cordiality to keep focus on project issues.
3. Adequate and understandable information needs to be disseminated in many forums on proposed projects and water supply issues in general.
4. Recycled water projects need to be justified on fundamental needs or community desires, such as an adequate and safe water supply or prevention of water pollution.
5. Principles of environmental justice need to be incorporated. The public expects that costs and benefits of projects should be equitably shared.
6. The public needs a broad understanding of water supply issues to have a context in which to evaluate recycled water.

The Task Force has developed recommendations for a value-based decision-making model to improve public participation at the local level, especially during project development. It has identified areas where State and local leadership can be improved to increase general public support for water recycling and better policy decisions. It also recommends changes in the State's educational curricula and a State-sponsored media campaign to engender an underlying public understanding of water issues and water recycling and a climate of public support for water recycling.

2.1. COMMUNITY VALUE-BASED DECISION-MAKING MODEL FOR PROJECT PLANNING

Issue

Public participation and representation is founded on the idea that those who are affected by decisions or policies should participate or be represented in the policy making processes, because the public is capable of making wise and prudent decisions. The public should be involved throughout all project phases—the planning, deliberation, decision, design, and implementation. Such public involvement is not currently required by State law. Public access to information on proposed projects is commonly through the environmental review processes required by the California Environmental Quality Act (CEQA) and the federal National Environmental Policy Act (NEPA). Under these acts, the minimum public notification requirements are inadequate to engage the public. Furthermore, agencies typically attempt to involve the public when deciding on implementing a project. The public is often forced to decide on support or opposition to a project without background knowledge of local water issues and alternative water resources options.

Early public involvement can assist the project proponent in identifying and responding to the concerns of the public. Public participation creates empowerment and empowerment yields a sense of collaboration. With the need to supply additional water in the State and the potential use of recycled water projects to meet that need, water utilities and the decision-makers should make an investment in the public arena, so that their decisions will pay off in the long run for their customers and their communities.

Determining what a community values, then making decisions based on that information is the foundation of a community value-based decision-making model. This model encourages participants to recognize that most people believe in a unified set of fundamental values, then takes them further, into the realization that these values can be the basis for consistent and improved decision making. A values-based decision-making model should embody the general public participation principles listed in the introduction to this section. Recommendations 2.1.1 through 2.1.6 are components of an effective community value-based decision-making model.

Recommendation 2.1.1.

Public participation should be increased through vigorous outreach, augmenting the notification requirements stipulated by CEQA and NEPA.

Approach and Implementation:

NEPA and CEQA both establish requirements for public notification and opportunity to comment on environmental impact documents. However, these procedures are not adequate to fully engage the public. Neither law requires public participation in project formulation and alternatives development. There is no requirement for a public hearing under CEQA and a requirement for only one hearing under NEPA. While the perception is that these environmental laws are vehicles for public participation, they are mainly oriented toward full analysis and public disclosure of environmental impacts. These laws have become wedges to force project proponents to hear public concerns, but they were not designed as effective public participation tools. Considering the time and cost of developing recycled water projects, from project formulation through construction and implementation, there should be more opportunities for the public to participate. Early public involvement develops community support, while providing an opportunity to identify and address public concerns. This in turn assists the agency to design a project that meets the needs of the community. Therefore a more concerted public outreach process is considered necessary. Effective public participation can be encouraged and implemented at the State and local levels.

1. State Level

a. To the extent that State funding agencies have existing statutory authority, they should require public information and outreach during project planning for recycled water projects in order to receive State loans and grants. In

order to determine the existing statutory authority with respect to State loans and grants for water projects, the funding agencies, DWR and SWRCB, should conduct a legal review. This review should commence on 1 July 2003 with results obtained no later then 1 November 2003.

b. If additional statutory authority is needed, then in future bond laws the Legislature should specify a funding criterion that project planning include a public participation program. However, if the legal review reveals that no additional statutory authority is needed, the funding agencies should include public information and outreach requirements during project planning for recycled water projects to receive State loans and grants. Where statutory authority is adequate, the agencies should proceed with the recommendation at the conclusion of the legal review, or no later then 1 July 2004 and ongoing thereafter.

c. State guidelines should be developed for effective public participation actions that project proponents can take. An appropriate State entity to develop these guidelines would be the California Bay-Delta Public Advisory Committee (BDPAC) or its successor, which is administered by the California Bay-Delta Authority. The BDPAC should utilize its subcommittees, such as the Environmental Justice Subcommittee. The BDPAC should provide advice and guidance to assess current requirements and determine procedures to incorporate community value-based decision-making into State funded loans and grants. The improvements should incorporate the general public participation principles listed in the introduction to this section and the components of the other parts of this recommendation and Recommendations 2.1.2 through 2.1.6. Time frame: January 2004 to January 2005.

2. Local Level

In addition to regulatory changes, project sponsors should act on their own in good faith with the community, and implement an effective value-based decision-making model incorporating the general public participation principles listed above and the components described in Recommendations 2.1.2 through 2.1.6. Local agencies should carry out this recommendation beginning July 2003 and ongoing thereafter.

Recommendation 2.1.2.

Project planners should hold more public meetings to gather and supply information at appropriate venues.

Approach and Implementation:

A key element of value-based decision-making is identification of common values and interests of a group, a community, or communities within a community (such as neighborhoods, ethnic groups, political groups). Public meetings can be effective and efficient tools in reaching all interested and affected parties, to have meaningful dialogue with community members and to determine community interests and concerns. To make contact with the community members, public notices and other outreach materials should be available in the languages spoken locally; these should be placed in familiar community venues

(e.g. civic organizations, libraries) and distributed at local stores in the project area. Community leaders should identify appropriate venues, and meetings should be held at times and locations that are convenient for the communities affected by the project. These meetings should provide information and resources (scientists, technical assistance) to the public so they understand the issues involved with a project. This recommendation should be carried out by local agencies beginning July 2003 and ongoing thereafter.

Stakeholders *- Individuals and organizations who are involved in or may be affected by water recycling activities.*

Recommendation 2.1.3.

Project developers should make project decisions that respect and incorporate the community's values and concerns (considering public health, growth, coordination with local planning, environmental justice issues, et cetera):

a. Develop the project considering the values and ameliorating the concerns gathered at public forums,

b. Recruit potential recycled water users and community representatives for a stakeholder group to assist in the review of the project, alternatives considered, and selection,

c. Meet with policy makers in the early stages and on a regular basis to obtain support to ameliorate challenges that could affect the project.

Approach and Implementation:

After gathering the issues and concerns of a community through public meetings and other feedback systems like questionnaires, project planners should develop project alternatives that address the needs of the community. Specifically, project objectives should include those issues and concerns of the public. The project alternatives, which may include a water recycling option, are to be determined which might address those concerns. By developing and presenting a range of options designed to meet those interests, the public can select a project alternative or suggest changes that address those values.

The development of a stakeholder process that includes representation from as many groups and interests as possible is highly advisable. A stakeholder process should allow individuals, groups, and organizations whose interests are affected by the proposed project to effectively present their views within the process and to work with other community interests to develop a consensus on the direction an agency should take. Stakeholders should be provided access to technical analysis (science, economics, and environmental and social impacts) that enables informed participation. Although an alternative recommended through a stakeholder process may not be the most economical or desirable from an engineering standpoint, it may be the alternative most likely to achieve public support and successful implementation. Most importantly, a stakeholder process will help build trust between local agencies and the communities that they serve, which is essential to the success of potentially controversial projects.

The political scene is dynamic and changeable. Vocal opposition groups can inhibit political support for recycled water projects. In order for politicians to support a project they

need to know the facts about a project, as well as be assured that the project has voter approval. Meeting with policy makers on a regular basis can help to inform politicians of the status of the project. Including representatives of communities and stakeholders who are not agency officials and support a project in meetings with politicians helps political leaders to understand the breadth of public support and to place any opposition in perspective. To be effective, the group should have sufficiently broad and diverse memberships who understand and support the project selected. This recommendation should be carried out by local agencies beginning July 2003 and ongoing thereafter.

Recommendation 2.1.4.

Project planners should convene an independent advisory committee composed of experts in the field and consumers from a variety of viewpoints, who have no vested interest, to review the proposed project alternatives, including implementation and operation issues, where needed.

Approach and Implementation:

For those projects likely to cause controversy, an independent advisory committee, selected in consultation with the public, should be convened to review a proposed project and its alternatives in the context of other water resource planning decisions. To engender credibility, the advisory committee should be composed of experts in the field from a variety of viewpoints who are "above the fray" without a vested interest. Even with public meetings and stakeholder groups, there may still be individuals who did not have the ability to participate in the process. For those individuals, an independent advisory committee can provide quality assurance. This recommendation would be carried out by local agencies beginning July 2003 and ongoing thereafter.

Recommendation 2.1.5.

Water recycling should be presented to the public with other alternatives for locally achieving water supply goals.

a. Evaluate all water resource alternatives using consistent criteria before proceeding with a water recycling project as part of an integrated water resources approach.

b. Evaluate water resource project alternatives based on assessment of all health, costs, environmental, social and relative risk factors, and degree of multiple benefits.

c. Provide on-going updates with all the current information, work progress, and decisions to the community to facilitate an educated choice.

Approach and Implementation:

In order for a community to participate fully, the public needs to know the alternatives available to meet their objectives. After consensus is reached on the issues and objectives for a project, local agencies can provide the public with information on technologies (such as water treatment options) and practices (such as conservation). This information can be used

for development of a complete palette of possible alternatives for achieving water quality and supply objectives. This procedure is part of integrated water resources planning - a comprehensive, interdisciplinary approach to water resource planning that encompasses water resource assessment, demand considerations, analysis of alternatives, risk management, resource diversity, environmental considerations, least-cost analysis, multidimensional modeling, and participatory decision-making and public input, among other factors.

Chlorination contact basin at Delta Diablo Sanitation District Recycled Water Facility in Antioch, CA, ensures a recycled water that is essentially free of pathogens.

Water conservation, water transfers, seawater desalination, and local storage may be other options to be evaluated. Water recycling itself may present several options in terms of geographic area to be served, certain types of uses and associated levels of recycled water treatment. Construction of dual distribution systems for delivery of recycled water for nonpotable uses may be an option when indirect potable reuse is being considered. Local agencies should supply sufficient information on all alternatives to the public, including the extent of infrastructure, relative risks, costs, energy needs, and potential environmental impacts so that meaningful fact-based dialogue can occur. Local agencies should study alternatives in sufficient detail to determine positive and negative aspects of each. During discussions of potential health concerns or unknowns associated with indirect potable reuse, health concerns and unknowns associated with other sources of supply must be included with the reminder that most natural sources of water are not necessarily free of contaminants. Specific examples of where various potential technologies have been implemented elsewhere should be provided including data on how well they perform. Providing tours of water supply and treatment facilities can be very effective at this point, and will provide participants with a first hand view of these processes in action.

Local agencies should update the community with the current status of the project to facilitate an educated choice. Fact-based dialogue with the public may generate agreement as to the best alternative for the community. However, this choice may not match the agency's preferred alternative, which is often based on engineering and economic considerations alone. For example, in the case of newer communities, a dual piping option - where recycled water distribution pipelines can be installed during development - may prove to be the best option for utilizing recycled water. On the other hand, older and established cities with streets already jammed with other substructures would have a much more difficult task in implementing a dual piping option. By providing the public with accurate information on all possible alternatives, informed decision-making can take place to select solutions that will be supported by the public. This recommendation should be carried out by local agencies beginning July 2003 and ongoing thereafter.

Recommendation 2.1.6.

Local agencies should cultivate and utilize media opportunities for their projects:

a. Inform media personnel (editors, reporters, anchors, etc) about recycled water and the project through media kits, fact sheets, websites, etc,

Marin Municipal Water District provides recycled water for car washes in Marin County, CA.

b. Prepare question and answer/fact sheets and press releases to address every issue raised,

c. Submit articles and opinion pieces to local media for publication,

d. Provide timely responses and corrections to any misinformation,

e. Continually disseminate accurate and complete information on water issues to the public utilizing:

   (i) utility bill inserts,

   (ii) regular public workshops,

   (iii) community meetings,

   (iv) Internet.

Approach and Implementation:

The media plays an important role in the broadcasting of information to the public. The media can help inform the public about potential projects and opportunities for public input and participation. In order for the media to accurately and fully inform the public, project planners need to provide the media with accurate information.

Information regarding recycled water should provide the necessary background for understanding all water projects, not sell or persuade the media and thus the public to use recycled water. The information provided should include appropriate questions to ask of all water projects to level the playing field for evaluation of all water sources: groundwater, surface water, desalination, and reclamation, et cetera. This information should describe the advantages and disadvantages of each source in terms of planning, reliability, environmental impacts, and safety. Risk exists in every single source of water, even mountain spring water composed of glacial melt, and thus should be recognized and described. The benefits of recycled water should be communicated in terms of broader community desires, such as less environmental impacts than alternatives or improved supply reliability during droughts.

There is a need for on-going education to build a long-term public understanding of water issues and water recycling in particular. This can be done through direct agency communication to consumers, such as through bill inserts or Web sites, or through the media by channeling information and articles to newspapers, television stations, and other media.

2.2. LEADERSHIP SUPPORT FOR WATER RECYCLING.

Issue

State support for water recycling is not well known, even though the Legislature has been clear in its support for water recycling. The State Legislature enacted the Water Reuse Law of 1974 (Water Code sections 460-465) with the stated mission that "the primary interest of the people of the State in the conservation of all available water resources requires the maximum reuse of reclaimed water in the satisfaction of requirements for beneficial uses of water." Furthermore, State law declares that use of recycled water by communities will contrib-

ute to the peace, health, safety, and welfare of the people of the State (Water Code section 13511). Despite this legislation, some health and regulatory agencies at the local level lack a common mission when it comes to recycled water. Some local health offices are not familiar with recycled water applications, guidelines, rules and regulations. Variations in procedures and requirements cause confusion, uncertainty, and unnecessarily raise the unit cost of production and distribution of recycled water. Additionally, innovative uses for recycled water such as toilet flushing in office buildings or landscape irrigation for private homes may be dealt with differently by local health departments. The approval process necessary for such programs can be complex and can differ from county to county.

State leadership is needed to communicate its mission of encouraging recycled water use as stated in the Water Code throughout all government levels, to facilitate projects, and to communicate the rules clearly to local health offices and regional quality control boards. Additionally, mandated State agencies should take the lead in ensuring that local offices are consistent in their application of State policy.

Recycled water lacks unified definitions for discussing the various treatment levels available. Additionally, signs announcing the presence of recycled water have sent the public mixed messages about the water quality. Therefore, a statewide system of codification that refers to the various treatment levels and uses for recycled water would help to develop a common language that is more easily understood during public discussions of proposed projects. This new language can be appropriately applied to the signs to avoid mixed messages.

In addition to State responsibilities, local governments should be providing guidance on recycled water by adopting strong local ordinances that are adequately implemented and enforced. Many local jurisdictions have approved ordinances that require dual plumbing where recycled water is available. However, local regulatory agencies (building inspectors, code enforcement officers) are not requiring dual plumbing in many new developments. Many planning and/or public works departments do not have the staff or resources available to audit effective implementation of these ordinances.

Finally, public agencies should take a leadership role to encourage recycled water use by using, where feasible, recycled water in public agency buildings to flush toilets, and/or to irrigate landscapes and city parks.

West Basin Municipal Water District delivers recycled water to Chevron Oil Refinery in El Segundo, CA., for use in cooling towers.

STATE SUPPORT

Recommendation 2.2.1.

The State should take a leadership role on water recycling:

a. Develop an easily understood common language for describing various recycled water treatment levels and uses to improve public discussions of proposed projects,

b. Set a standard signage for regulatory use that increases the public's understanding of recycled water,

Value-Based Decision-Making *- Determining what a community values, then making decisions based on that information is the foundation of a community value-based decision-making model.*

Some general public participation principles include the following:

1. *The public needs to be involved in all phases of project planning with opportunities for involvement in developing and selecting alternatives.*
2. *Members of the public need to be listened to and responded to with respect. Their values and needs should be incorporated into the decision criteria.*
3. *Adequate and understandable information needs to be disseminated in many forums on proposed projects and water supply issues in general.*
4. *Recycled water projects need to be justified on fundamental needs or community desires, such as an adequate and safe water supply or prevention of water pollution.*
5. *Principles of environmental justice need to be incorporated with the costs and benefits of projects shared equitably.*
6. *The public needs a broad understanding of water supply issues to have a context in which to evaluate recycled water.*

c. Develop a consistent position on water recycling,

d. Convey the State's mission to increase recycled water use throughout all government levels via interagency collaboration,

e. Facilitate recycled water projects and communicate the rules clearly to local health offices and regional water quality control boards,

f. Encourage recycled water use by setting an example and using recycled water in public agency buildings wherever practical.

Approach and Implementation:

Recommendations 2.2.1. a and b are intended to clear up apparent confusion and misunderstanding about recycled water. For meaningful dialogue to take place, recycled water discussion needs unified definitions for the various treatment levels available. For instance, most nonpotable recycled water use discussions speak of tertiary-treated (Title 22) water. However, when the discussion switches to indirect potable reuse projects, it is still referred to as "recycled water" even though such projects may have treatment far beyond filtration, including microfiltration, reverse osmosis, ultraviolet disinfection, or ozonation. Hence, the term "recycled water" should be supplemented with additional terminology that connotes the level of treatment and the allowable human exposure.

Prevalent signage also sends mixed messages about recycled water quality. For years the public has read signs that have given the message that recycled water is dangerous (skull and cross bones). Now, the public is told it is safe for certain uses. More appropriate signage is proposed in Recommendation 3.3.1.

To implement recommendations 2.2.1. a and b the DHS should convene a six-month panel including members from industry and the public to create a set of short-hand terms for different types of recycled water. The goal is to develop a common language that is easily understood by both industry and the public. The panel should also address a standard signage for regulatory use that aids the public's understanding of recycled water. DHS should commence this panel by January 2004 with a completion date of June 2004.

As presented in recommendations 2.2.1. c-f, government, water industry officials as well as other stakeholders and interested groups need to have a shared understanding of recycled water so that they can take a leadership role and provide guidance. In 1994 a similar coalition of local, State and federal agencies and the WateReuse Association of California adopted the "Statement of Support for Water Reclamation." A coalition, including DWR, SWRCB, DHS, water agencies and organizations, such as the Water Education Foundation, American Water Works Association, California Urban Water Agencies, California Urban Water Conservation Council, WateReuse Association, and the Association of California Water Agencies should be formed to review the previous Statement of Support and revise it as necessary. This coalition could also:

- explore methods of interagency collaboration throughout all government levels to

communicate the issues, regulations, and procedures on recycled water and methods to appropriately maximize its use,

- author a guidebook to communicate the rules on recycled water clearly to local governmental agencies, health offices, regional water quality control boards, et cetera, thereby facilitating projects by removing unnecessary impediments, and
- publish a list on existing and new recycled water informational programs to be distributed throughout the industry and the community.

DWR should lead the implementation of this recommendation beginning September 2003 and the results should be presented to the agencies on or before January 2005.

In addition to the coalition, each State agency should convey its mission with regard to appropriately maximizing recycled water by providing informational materials and education to the local agencies on the legislated recycled water regulations. State agencies should also take the lead in ensuring that local offices are consistent in their application of State policy. This recommendation should be carried out by State agencies beginning July 2003 and ongoing thereafter.

Recommendation 2.2.1. f displays how governmental agencies can lead by example. To encourage recycled water use, public agencies should take a leadership role by using recycled water in public agency buildings to flush toilets, to irrigate landscapes, and/or to irrigate city parks. This recommendation is to place the appropriate infrastructure into new buildings to utilize recycled water where feasible. Governmental facilities that can be served by recycled water should be retrofitted to irrigate with recycled water and dual plumbed to use recycled water for toilet flushing and cooling towers. This recommendation should be carried out by State and local governmental agencies beginning July 2003 and ongoing thereafter.

Recommendation 2.2.2.

State funding should be provided for public education and outreach.

Approach and Implementation:

Public informational programs and outreach are not free. Communities will need financial resources to inform their public on water issues in general, and recycled water in particular. Therefore, all new bonds for recycled water projects should include public information and outreach as eligible expenditures. This recommendation should be carried out by State and local governmental agencies beginning July 2003 and ongoing thereafter.

Recommendation 2.2.3.

The State should work closely with local agencies on water recycling to:

a. Provide technical assistance on current and cost effective technology, greater education and clarification on recycled water use policy through informational materials and education supplied to the local agencies on the legislated recycled water regulations; and

b. Coordinate and publicize existing and new recycled water informational programs developed by various agencies for use throughout the industry.

Approach and Implementation:

State agencies, such as DWR, SWRCB, and DHS, should assist local agencies with information and education on current and cost effective technology for recycled water projects, as well as guidance on legislated recycled water regulations. The State should make informational materials available and provide educational presentations for recycled water. State agencies should compile a list for publication on existing and new recycled water informational programs to be distributed throughout the industry and the community. The agencies should make use of the material published by the government and water industry officials coalition proposed in recommendations 2.2.1. c-f.

DWR, SWRCB, and DHS should carry out this recommendation beginning July 2005 and ongoing thereafter.

LOCAL GOVERNMENT SUPPORT

Recommendation 2.2.4.

Appropriate local agencies should adopt well-defined local recycled water ordinances.

Approach and Implementation:

Local recycled water ordinances can facilitate the use of recycled water by specifying the conditions under which it is available or its use may be mandatory, the procedures for obtaining it and the requirements for the proper use of it to protect public health and prevent nuisance. To accomplish this recommendation, local governments need to consider their communities' needs for water and how recycled water fits into their overall plan. Since regions are unique, local governments need to appraise their water assets and all existing and potential water supply options. This is generally accomplished through their Urban Water Management Plan, water facilities master plan, the general plan or other planning documents. Local governments should carry out this recommendation beginning July 2003 and ongoing thereafter. The appropriate agency to adopt a recycled water ordinance is usually the local water retailer, which has jurisdiction over water supply and can govern the sources of water available to customers.

REGULATORY AGENCIES SUPPORT

Recommendation 2.2.5.

Local planning, building code enforcement, health and public works departments should effectively enforce local recycled water ordinances, through adequate staff and resources. Building inspectors and code enforcement officers should effectively enforce the installa-

tion of types of plumbing that would allow the use of recycled water in accordance with local recycled water ordinances.

Approach and Implementation:

While retail water suppliers can adopt ordinances requiring the use of recycled water under certain circumstances, they do not have jurisdiction over most plan reviews for subdivision or building construction. Local governments that have such jurisdiction need to enforce plumbing practices that will allow recycled water ordinances to be implemented. Local governments, in particular health departments, should obtain adequate educated staff to apprise local enforcement officers of the status and regulations regarding recycled water. Local governments should carry out this recommendation beginning July 2003 and ongoing thereafter.

The Inland Empire Utilities Agency's Carbon Canyon Water Recycling Plant provides water (10 mgd) primarily for landscape use in Chino and Chino Hills, CA.

Recommendation 2.2.6.

Convene a statewide independent review panel on indirect potable reuse to summarize the existing and on-going scientific research and address public health and safety as well as other concerns, such as environmental justice, economic issues and increased public awareness.

Approach and Implementation:

Recycled water projects in which the eventual end use will be a source of drinking water are termed indirect potable reuse projects. These projects utilize recycled water for groundwater recharge or for reservoir augmentation. The public has genuine and legitimate concerns regarding the safety of using recycled water for human consumption.

While many scientists studying recycled water believe the multiple safety factors used in its production are adequate to safeguard public health, they nevertheless recommend proceeding with indirect potable reuse with caution and carefully considering its need within the context of the local or regional water supply needs and options. The public has not always been assured. Because of the source of recycled water and the potential for ingestion, indirect potable reuse projects need to proceed in an environment of a fully informed and consenting public. The public should be provided with information about any known risks associated with groundwater recharge or reservoir augmentation, and information on possible contaminants and their detection. The measures taken to avoid, lessen or eliminate the various risks should be provided to the interested public. The public also wants to know the monitoring procedures as well as what emergency action plans are in effect in the case of any detected contaminant. An understanding of the risks associated with other possible sources of supply, such as rivers that receive discharges from wastewater treatment plants or contamination from other influences, can provide a realistic picture of recycled water quality.

Over the past ten years, several agencies have been unsuccessful in attempting to implement recycled water projects that featured indirect potable reuse for groundwater recharge or for reservoir augmentation. Because these projects encountered public opposition, it is obvious that agencies also need guidance on how to approach the public on the issues surrounding recycled water.

Some factors associated with indirect potable reuse in California need further investigation and clarification. With respect to scientific factors, previous panels have advised the State on the areas of health risk and the needs for further research, which is on-going. However, there has been a problem with articulating the science and the previous expert findings and assuring the public that public health protection has been a paramount concern of State health officials in drafting regulations and approving projects. In order to provide better communication of this information to the public, a panel on indirect potable reuse should be convened to review the science, as well as other factors associated with indirect potable reuse, such as public perception, economics and environmental justice, and advise the State and local agencies on how to proceed with indirect potable reuse. One approach would be to use the California Bay-Delta Science Program, which is administered by the California Bay-Delta Authority (Authority). The Authority is responsible for CALFED Bay-Delta Program to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System. As part of this function, the Authority evaluates water supply options that could relieve stress on the Bay-Delta System, including water recycling.

The California Bay-Delta Science Program (Program) is developing the best available scientific information, using world-class science and peer review, to guide decisions and evaluate actions that are critical to its success. This Program has three goals. The first goal is to establish a body of knowledge that is unbiased, relevant, authoritative and integrated, while communicating that knowledge to the scientific community, agency managers, stakeholders and the public. The second goal is to establish protocols and incorporate independent peer review into all Program activities. The third goal is to develop science-based performance measures for each CALFED program.

For more comprehensive guidelines on indirect potable reuse, the California Bay-Delta Science Program should appoint a panel to review existing scientific information and on-going research, assess the potential health risks of indirect potable reuse within the context of other health risks and summarize this information in language easily accessible to the public. The panel could make the public aware of potential unknown factors related to public health and articulate the on-going research to identify new potential risks and the regulatory controls in place to minimize the potential impacts should the presence of harmful chemicals be discovered in the future. The panel could review the experience of previous proposed and implemented projects and obtain a better understanding of public perception and concerns, such as social equity in the exposure of risks. The panel could advise the State and local agencies proposing indirect potable reuse on how to incorporate appropriate public information and participation in the planning process to ensure full awareness, equity, and consent. This recommendation should be carried out beginning January 2004 and its report completed and published by July 2005.

2.3. EDUCATIONAL CURRICULA

Issue

Some members of the public have a misperception that water they use is pure, and once it has been recycled, it has fallen from grace. School programs could teach how all water is recycled, and describe both natural and engineered approaches to assuring that water is safe for human consumption. Although water resource issues and very basic water cycle information is presently being taught in public schools, there is considerable room for improvement. Having the importance of water recycling added to the State education standards would dramatically improve the inclusion of the concept of water recycling in classrooms.

Recycled water is used in the landscaping of common areas, such as neighborhood parks, at Serrano, a residential development in El Dorado Hills, CA.

While individual water agencies can make strides in introducing students to recycled water and other water resource issues through their existing classroom education programs, significant change cannot take place until recognition of these water issues is made at the level of the State Board of Education. The board issues "content standards" for each grade, K-12, in each subject area such as science, math, history-social science and English-language arts. Because schools are now graded on how their students perform on the standardized State tests, principals and teachers are reluctant to allow classroom time for programs such as water education unless a clear connection can be made to the content standards for their grade level.

Many local water agencies with education programs are aware of the increased emphasis being placed on testing and the curriculum content standards and have made efforts to align their programs to the standards. While concepts such as the water cycle are included in the science content standards, recycled water is not mentioned specifically in any of the science or history/social science standards. The State needs to encourage the school districts to implement programs, and to provide educators the necessary materials and support for successful programs about water.

Recommendation 2.3.1.

A statewide panel should be convened to recommend changes to public schools and higher education curricula:

a. Develop a comprehensive water education curriculum for each grade (K-12) that incorporates recycled water in the Content Standards for California Public Schools: science standards and/or the history-social science standards,

b. Incorporate recycled water education into the curricula of institutions of higher education,

c. Enhance existing educational materials or programs, for example those offered through the Water Education Foundation, or other organizations.

Approach and Implementation:

To implement Recommendation 2.3.1. a, the Department of Education should appoint a panel on developing comprehensive water education curricula that includes recycled wa-

ter education. It is important that public education include a complete discussion of the water cycle, including elements such as wastewater treatment plant discharges and their influence on surface and groundwater supplies. The Department of Education should work with educators and the Department of Water Resources to develop comprehensive water education curricula. Department of Education should consider changes to carry out this recommendation beginning July 2003 and incorporate the changes into the applicable Content Standards at appropriate grade levels by January 2007.

The following concepts should be a part of this curriculum.

- Water is a finite resource. There is no such thing as "new" water.
- The population of California is growing, whereas developed water supplies are limited and in some cases diminishing.
- Conservation of water and other natural resources is critical.
- At the Grade 5 level and above, the water cycle should be discussed in each grade with greater detail and complexity in higher grade levels. A more sophisticated explanation of the cycle should include wastewater treatment discharges and their influence on surface and groundwater supplies.
- Water recycling is an important component in conservation efforts in California.
- Wastewater treatment plants mimic the way nature cleans water (sedimentation, aeration and filtration). However, treatment plants can clean larger quantities of water more quickly than nature.
- Recycled water is currently used for a variety of applications in California.
- Water quality is important to public health and must be considered in determining appropriate uses of recycled water.

Water education should also include field trips to water treatment and water recycling facilities, so students can learn about these processes first hand. Field and lab work should provide hands-on experience with many water cycle elements.

Recommendation 2.3.1. b points out that in addition to the need for people to become familiar with recycled water, there exists a need for university-trained specialists. Therefore, it is recommended that DWR approach the California universities about the need for more recycled water experts and request the incorporation of recycled water into their curricula. State funds available for water recycling research could be used to increase faculty and student interest in water recycling in California universities, as recommended in Recommendation 6.2.1. DWR should carry out this recommendation beginning July 2003.

To implement recommendation 2.3.1. c, DWR should help to enhance existing educational materials or programs on recycled water such as are currently offered through the Water Education Foundation, or through assistance on science fair projects. The enhancement should include such things as coloring books on recycled water, poster contests, et cetera. DWR should carry out this recommendation beginning July 2004.

2.4. STATE-SPONSORED MEDIA CAMPAIGN

Issue

The media plays an important role in broadcasting information to the public. The media can help inform the public about activities in their community by assisting utilities to spread the word about potential projects. The media informs the public of the opportunity, as well as responsibility, to speak up on important issues. In order for the media to inform the public, they need to be provided with accurate information. Regular briefings with the media ensure that the public, media, politicians, and project supporters are informed and that current questions are addressed. Informing the media is important because projects can take decades, and the people consulted in the beginning during project planning may no longer be around by the time a project is ready for implementation. Additionally, a well-informed public and a broad base of community supporters can reduce the effect of opposition caused by bad press and political misinformation.

Recommendation 2.4.1.

The State should develop a water issues information program for radio, television, print, and other media.

Approach and Implementation:

As with the anti-smoking campaign that includes radio and television advertisements reaching a large audience, a similar program should be developed to provide information on water issues on a large scale. These elements should be discussed in a water cycle context to increase public awareness of the "big" water picture. For example, a message to conserve water should also include a reminder that water is finite and therefore precious and must be preserved. By presenting water issues in the context of the water cycle, the public will become aware of the realities of water supply, including the fact that all water is recycled, and that there is considerable wastewater effluent in our present water supplies. In addition, water quality topics regarding newly discovered contaminants or concerns should be presented in a water cycle format to help describe relative risk in the context of all water supplies rather than concentrating on a specific supply such as recycled water. State agencies should develop a water issues information program and protocol for radio, television, and print media beginning July 2004 and ongoing thereafter.

Recommendation 2.4.2.

The State should work with organizations that have produced videos on water issues, including recycled water, and fund updates and expanded programming and encourage cable television networks to broadcast these videos regularly throughout the State.

Approach and Implementation:

The State should develop a program on water issues to inform the public on a large scale by utilizing the media. This program should be formulated utilizing other successful media informational campaigns. The campaign should utilize radio and television advertise-

Recycled water is used for air conditioning cooling towers in buildings in Irvine and Marin County, CA.

ments to reach large audiences. The State should also work with organizations such as the Water Education Foundation and other stakeholder groups, that have produced videos on water issues, including recycled water, and fund updates and expanded programming. Cable television networks should then be encouraged to broadcast these videos regularly throughout the State. State agencies should carry out this recommendation beginning July 2005.

Recommendation 2.4.3.

State agencies should prepare opinion editorial pieces for publication in newspapers throughout the State.

Approach and Implementation:

State agencies should develop opinion editorial pieces on water issues, including recycled water, for publication in newspapers throughout the State beginning January 2004.

Recommendation 2.4.4.

The State should retain an advertising agency/public relations firm to assist in the development of short messages with specific information on urgent topics such as drought, conservation, pollution prevention, water quality, stormwater, wastewater, or recycled water including indirect potable reuse.

Approach and Implementation:

The State DWR should carry out this recommendation beginning July 2004.

3. Plumbing Code/Cross-Connection Control

Recycled water may be used in buildings (cooling, toilet and urinal flushing, trap priming, fire suppression systems, industrial purposes, etc), and for irrigation at residential, park, school, and other urban landscape areas.

Regulations and guidelines have been developed to address public health concerns with the possible misuse of recycled water or the connection of recycled water piping with the potable water piping (cross-connection). An example of misuse is when someone unknowingly drinks from a recycled water outlet. A cross-connection can occur during initial construction, when a potable water system is retrofitted to recycled water use and potable water connections are overlooked, or when modifications or repairs are made to expand the system or increase pressure.

To help ensure against cross-connection between potable and recycled water lines in buildings, purple tape covers recycled water pipes and breakable seals are placed on valve handles to detect when water was shut off to perform plumbing changes. A log book is required to record all seal breaks and the plumbing work performed.

Portions of three California Codes have been identified as including impediments to recycled water use. These are the California Plumbing Code (CPC) Sections 601.2.2 and 601.2.3 and Appendix J dealing with dual plumbed systems, Title 17 Section 7583 et seq. dealing with cross-connection control, and Title 22 Sections 60313-60616 dealing with recycled water dual plumbed systems. These codes pose problems because of their adop-

tion status in some cases, inconsistencies between codes, and possibly unnecessarily restrictive requirements.

The Opus II building in Irvine, CA, uses recycled water treated by Irvine Ranch Water District in air conditioning cooling and toilet and urinal flushing.

3.1. UNIFORM PLUMBING CODE APPENDIX J

Issue

A national plumbing standard that is used by many states and localities is the Uniform Plumbing Code (UPC) that is issued by the International Association of Plumbing and Mechanical Officials (IAPMO). Appendix J of the Uniform Plumbing Code provides design standards to safely plumb buildings with both potable and recycled water systems. While the California Building Standards Commission (CBSC) uses the UPC as the basis of the California Plumbing Code, neither the CBSC nor any other California State agency has adopted Appendix J for use in California. The fact that Appendix J does not have official status in California is not well known, so some local agencies have been under the impression that it is a mandatory standard. On the other hand, at least one agency, the City and County of San Francisco, will not use Appendix J unless it is adopted by a State agency. Lacking a State standard, San Francisco has been hesitant to encourage indoor uses of recycled water. The IAPMO version of Appendix J contains inconsistencies with California regulations governing recycled water. There is a need for a California standard for recycled water plumbing in buildings.

Recommendation 3.1.1.

A California version of Appendix J of the Uniform Plumbing Code should be adopted in order to avoid the inconsistencies between the IAPMO version and other California regulations affecting indoor use of recycled water.

Approach and Implementation:

The Department of Water Resources in collaboration with other stakeholders should initiate the process to adopt a California version of Appendix J, considering the recommended draft of Appendix J included in Appendix D of this report. Time frame: July 2003-September 2005.

3.2. DHS GUIDANCE ON CROSS-CONNECTION CONTROL

Issue

Water Recycling Criteria are contained in Title 22 of the California Code of Regulations and provide requirements that protect public health. Article 5 of the criteria (Sections 60313-60316) include dual plumbed requirements are intended to prevent the unintentional misuse of recycled water and the cross-connection of the recycled water distribution system with the potable water system within buildings and for residential landscaping. These recycled water use sites are called out for special controls because they are believed to be at the greatest risk for unplanned public exposure. The proximity and complexity of recycled and potable plumbing systems within buildings and the potential for homeowner

modifications in residential situations create a risk. The dual plumbed section uses a combination of posting, plumbing access restrictions, plumbing labeling, supervision, periodic inspection, and testing to minimize the chance of misuse or cross-connection.

There are two concerns with the dual plumbed requirements.

1. In some counties the requirements are being applied to irrigation use areas not specified in the regulation. The sites that the dual plumbed requirements in Title 22 apply to are identified through a series of definitions in the regulation.

   Section 60301.310 defines "facility" as "any type of building or structure, or a defined area of specific use that receives water for domestic use from a public water system as defined in section 116275 of the Health and Safety Code."

   Section 60301.250 defines "dual plumbed system" and "dual plumbed" as "a system that utilizes separate piping systems for recycled water and potable water within a facility and where the recycled water is used for either of the following purposes:

   (a) to serve plumbing outlets (excluding fire suppression systems) within a building or

   (b) outdoor landscape irrigation at individual residences."

   Most of the requirements in Title 22, Article 5 (see Appendix E) apply only to dual-plumbed systems - plumbing outlets within buildings and landscape irrigation at individual residences. Due to a misunderstanding of the regulations, especially the definitions cited above, some county health departments have applied the dual plumbed requirements to all sites with both potable and recycled water service. Because the provisions for dual plumbed facilities are more stringent than for other types of sites where recycled water is used, these other sites have experienced inconvenience and expense that is not mandated by regulation.

2. Title 22, Section 60316(a) requires that "The recycled water system shall also be tested for possible cross-connections at least once every four years." The regulation Section 60314(a)(3) allows the use of a pressure (shut down), dye, or other test method. The shut down test is commonly used because it is considered conclusive, but this procedure disrupts water service, which may not be acceptable for certain users, such as penal institutions, or may be costly for some users, such as continuously operated industrial facilities. In addition to dye testing, at least one other method of assuring the absence of a cross-connection in buildings has been proposed, using numbered breakable seals on valves to detect when plumbing work has been done and log books to record what type of plumbing work was done. This latter procedure is described in the proposed draft California Appendix J included in Appendix D of this paper.

Recommendation 3.2.1.

DHS guidance should be prepared that would clarify the intent and applicability of Title 22, Article 5. If guidance cannot be written to accomplish this, the regulation should be rewritten.

Recommendation 3.2.2.

DHS guidance should be prepared that would clarify the requirement for testing in Title 22, Section 60316(a) and stress that alternatives to a pressure test are sufficient in many cases.

Recommendation 3.2.3.

DHS should amend Title 22, Article 5 to incorporate inspection and testing requirements consistent with whatever requirements are adopted as part of a California version of Appendix J of the California Plumbing Code, as recommended in Recommendation 3.1.1.

Approach and Implementation:

DHS should carry out recommendations 3.2.1 through 3.2.3. Time frame: July 2004-September 2005.

4. Regulations and Permitting

The most important State standards and regulatory programs that affect water recycling fall into two categories: public health and water quality. The DHS is responsible for adopting uniform statewide recycled water criteria related to public health and for advising the RWQCBs in their drafting of permits for each recycled water system. DHS has 21 districts in the State, which do not always uniformly interpret the State standards. County health departments also have jurisdiction over some aspects of recycled water use. In some areas, local health departments have elected to operate programs to control cross-connections. There are instances where local requirements have exceeded the requirements in State regulations, imposing an additional burden on water recycling systems and, perhaps, exceeding local authority.

Water quality regulations and the issuance and enforcement of permits for the use of recycled water are administered by nine RWQCBs under the overall jurisdiction of the SWRCB. Each RWQCB is controlled by independently appointed boards. Due to different hydrologic conditions, water quality issues and regional perspectives, the interpretation of laws and regulations governing recycled water has not always been uniform throughout the State.

Issues that have been identified are regulation of health and safety, regulation of incidental runoff, uniform interpretation of State standards, water softeners, permitting procedures, and source control.

4.1. HEALTH AND SAFETY REGULATION

Issue

Recycled water must be fully protective of public health and safety. The existing public health standards and regulatory structure for the use of recycled water are found in Titles 17 and 22, which were last updated in the year 2000. Because of the growing use of recycled water and the continued need to protect public health and safety, it is appropriate to regularly review those stan-

Sprinkler irrigation can result in minor amounts of incidental runoff from the site, which may be a concern to regulatory agencies.

dards and the regulatory structure. At the same time it is critical that there is on-going research into the emerging public health issues associated with recycled water to determine if there are any gaps in the current regulations of recycled water. Additionally, there is a need for a strong regulatory structure that promotes consistency and uniformity of regulatory oversight in California.

Recommendation 4.1.1.

The Department of Health Services should involve all stakeholders in the review of the following:

a. potential new factors that could affect the health and safety associated with the use of recycled water,

b. need for regular periodic updating of the regulations and statutes to continue providing for public health and safety in the use of recycled water,

c. effectiveness of existing regulatory structure including roles of State and local regulators,

d. whether there is a need for local enforcement agencies to have the authority to apply more protective requirements than what is included in Titles 17 and 22, and, if so, what should be the extent of that authority, and

e. additional research (see Recommendation 6.1.1. Research Funding).

Approach and Implementation:

DHS should involve all stakeholders including, but not limited to, researchers, environmental health directors and officers, epidemiologists and toxicologists, users of recycled water, recycled water producers and purveyors and others. Time frame: July 2003 to June 2004.

4.2. INCIDENTAL RUNOFF

Issue

Recycled water applied for irrigation is intended to remain on the irrigated areas to avoid public health and nuisance problems from runoff. Permits, issued by the RWQCBs, authorizing the use of recycled water for irrigation typically include provisions prohibiting runoff. Incidental runoff or overspray of minor amounts of irrigated water at the edges of irrigated areas is difficult to prevent. It is also difficult to prevent runoff of rainwater from areas irrigated with recycled water or from aesthetic ponds on golf courses filled with or previously filled with recycled water, especially during major storm events. Some RWQCBs strictly enforce the runoff prohibitions, resulting in the need for expensive design provisions or preventing the feasibility of using recycled water. The runoff prohibitions have been dubbed the "one molecule rule," implying that the existence of one molecule of wastewater origin in runoff constitutes a discharge of wastewater.

Recommendation 4.2.1.

The SWRCB should convene a committee to review the legal requirements of federal and State statutes and regulations that relate to the regulation of incidental runoff and to deter-

mine the regulatory and enforcement options that are available to Regional Water Quality Control Boards. This review should include the following items.

a. An evaluation of best available scientific data that demonstrate the effects of discharges of incidental runoff. Many recycled water producers and/or distributors have performed varied testing and monitoring of incidental runoff that could be available to the committee. This scientific evidence may be in the form of reporting requirements to regional boards, testing requirements for spills, State Implementation Plan (13267 letter), or other reports prepared for various reasons. The committee should recommend best management practices that under normal environmental conditions would allow discharge of incidental runoff without harm to the environment.

b. How other states address comparable situations in regulation and enforcement.

c. Within current legal constraints, with respect to discharges from storage or decorative ponds at use sites, options to be evaluated should include, but not be limited to:

   (i) Development of statewide general permit requirements for ponds filled with recycled water. Within the general permit, unintentional discharges of commingled recycled and stormwater would not be treated as violations, but rather water that is a mixture of rainwater and recycled water that runs off a site as a direct result of rainfall. Specific requirements of the permit would include best management practices and a method of uniform enforcement across the State.

   (ii) Regional Water Quality Control Board adoption of a specific waiver of waste discharge requirements for unintentional recycled water overflows pursuant to Water Code section 13269.

   (iii) Allowance of discharges under an NPDES permit with the following conditions:

      (a) compliance point to be at the point of leaving the wastewater treatment plant (WWTP) rather than exit of the pond,

      (b) WWTP NPDES permit may incorporate any requirements applicable to use site ponds rather than a separate permit being required for each use site where a pond exists,

      (c) monitoring and testing shall be established relative to the pond/site, and

      (d) California Toxics Rule would apply to WWTP discharge only.

d. With respect to other forms of incidental runoff, options similar to those above should be evaluated.

Approach and Implementation:

It is uncertain how much flexibility exists within the current framework of State and federal statutes and regulations in regulating incidental runoff of recycled water. It has been suggested that other states interpret federal requirements differently than the SWRCB and RWQCBs in California. It also appears that within California RWQCBs are not consistent in their regulation of incidental runoff. The Task Force participants discussed a recommendation to amend either State or federal statutes. However, it would not be appropriate to recommend statutory changes without understanding what options exist under current stat-

utes and, if these options are inappropriate, which State or federal law should be amended. The SWRCB should create a committee to conduct a legal analysis of the problem and the permissible options within the current legal framework. There is the possibility that a legislative remedy may be necessary, but this cannot be recommended without the legal analysis first. It would be helpful to decision-makers if there were more documentation regarding the water quality impacts of incidental runoff. If there are situations where a minor escape of recycled water from a use site would not have a negative impact, then there would be a basis for seeking more regulatory flexibility. Time frame: July 2003-January 2004.

4.3. UNIFORM INTERPRETATION OF STATE STANDARDS

Issue

Inconsistent regulation of water recycling by State and local officials leads to confusion and uncertainty in how to design and manage water reuse systems and appears to have led to overly restrictive regulation and added costs, creating an obstacle to achieving the full potential for water reuse.

City of Chino Hills, CA, baseball fields irrigated with recycled water.

Recommendation 4.3.1.

The SWRCB should appoint and empower a key person to provide oversight of the water recycling permits issued by the various RWQCBs. This person would act as an ombudsman to facilitate recycling and arbitrate conflicts.

Approach and Implementation:

While the SWRCB attempts to achieve uniform interpretation and application of laws and regulations through issuance of guidance documents, it has not focused on water recycling in recent years. The SWRCB serves as an appeal board for reviewing disputes over RWQCB rulings, and SWRCB decisions in these disputes often create precedents that are applied statewide. However, there is no current on-going effort to oversee the regulation of water recycling. As water recycling increases in the State and the complexity of situations increases, there is a need for a water recycling specialist within the SWRCB oversight functions who is familiar with all applicable statutes and regulations, the variety of local conditions occurring with water reuse, and the potential administrative approaches to respond to those conditions. Time frame: August 2003-ongoing.

Recommendation 4.3.2.

The DHS needs to take steps to ensure the uniform interpretation and application of water recycling criteria in Title 22 and cross-connection control provisions in Title 17 of the California Code of Regulations.

Approach and Implementation:

The DHS has a Recycled Water Unit that has the function of developing guidance for all of the DHS district staff on various issues, of assembling guidance to be readily accessible,

and coordinating meetings to discuss issues as they arise and to provide a forum for staff from various districts to collectively agree on approaches. Nevertheless, there appears to be inconsistent interpretation of statewide standards and a lack of public knowledge that the Recycled Water Unit exists to help resolve these inconsistencies. There appears to be a need for improved training of district staff on recycled water standards and communication with district staff to achieve more uniformity. DHS should develop and implement a plan to increase the public awareness of the Recycled Water Unit, increase its role in coordinating the interpretation and application of State laws and regulations, and improve centralized training of district staff in the regulation of water recycling projects. Time frame: Plan development: July-October 2003; Implementation: November 2003-ongoing.

Recommendation 4.3.3.

A legal opinion needs to be rendered whether authority exists for local health agencies to adopt water recycling requirements that are more restrictive than those included in Titles 17 and Title 22.

Approach and Implementation:

Statewide rules for cross-connection control and recycled water quality are specified in Titles 17 and 22 of the California Code of Regulations. Some DHS district offices, county health departments, or RWQCBs have imposed requirements that may be more restrictive than the requirements in Titles 17 or 22 or imposed on recycled water use sites requirements not specifically addressed in statutes. Health officials cite their authority to do this as Section 116800 of the Health and Safety Code. This authority has been disputed but the issue remains unresolved. The Opinion Unit of the California Department of Justice (Attorney General's Office) should be requested to conduct a legal analysis to determine the latitude that is permitted to impose more restrictive requirements. Time frame: July-October 2003.

Recommendation 4.3.4.

Water recycling programs in Florida should be investigated to determine whether there are concepts that should be adopted in California.

Approach and Implementation:

The State of Florida has been cited as a model of a state that has a regulatory structure that safeguards the public while allowing extensive water recycling to take place without unreasonable impediments. One or more Florida officials should be invited to a workshop to exchange information on regulatory approaches in Florida in contrast to California to identify any useful ideas for changes in California. This workshop should be hosted by SWRCB, DHS, and other knowledgeable parties. Time frame: January-February 2004.

Recommendation 4.3.5.

The RWQCBs should be more proactive during the planning of recycled water projects so issues can be addressed before design commences.

Certain agricultural crops as well as ornamental plants are sensitive to salts that may originate from water softeners and other sources.

Approach and Implementation:

In order to ensure that the design of wastewater treatment and water recycling facilities will meet regulatory requirements, it is necessary that the requirements be known before the beginning of design. The RWQCBs should be involved during the planning process of projects so that issues can be resolved and projects can proceed without regulatory delays during design and construction. Time frame: July 2003-on-going.

Recommendation 4.3.6.

Each RWQCB should have a resident expert or ombudsman on water recycling to provide consistency in permitting, coordinate with the SWRCB and other RWQCBs in maintaining consistency, and to assist agencies in facilitating permitting and conflict resolution.

Approach and Implementation:

Because of a lack of familiarity with issues and regulations peculiar with water recycling, some RWQCB staff may provide guidance to agencies that is inconsistent with other staff or with appropriate interpretation of regulations. Assigning a person at each RWQCB office as a specialist or ombudsman in water recycling would provide a resource for the office as well as a liaison with the SWRCB, DHS, and other RWQCBs to improve understanding of regulations and consistency in their application. An ombudsman would also serve as a contact person for the public and agencies to help them understand the regulations and the procedures needed to receive permits to proceed with projects. This person could also act as a mediator between the public and RWQCB staff when conflict arises to help clarify issues and determine the most efficient way to resolve the conflict. Time frame: July 2003-on-going.

4.4. WATER SOFTENERS

Issue

Over the last few decades, increasing numbers of residents in California have installed water softeners in their homes to reduce problems caused by hard water. Unfortunately, the use of softeners, particularly onsite, self-regenerative water softeners, has led to increased salt in the water that is recycled from municipal wastewater. Any salt added to recycled water can push recycled water agencies into non-compliance with their water quality permits and make the recycled water unmarketable for irrigation use, currently the primary use throughout the State, and for some industrial uses. Restrictions on the use of water softeners by local agencies have been overturned in court suits. Legislative attempts have been made to strengthen local control over household water softeners to allow more restrictions, but little headway has been made against the resistance of water softener manufacturers. Three recommendations have been developed to address this issue.

Recommendation 4.4.1.

Local agencies should be empowered to regulate the discharge of residential water softeners in the same manner as other sources of discharge into sewers. Legislation should be proposed to amend

the Health and Safety Code Sections 116775 through 116795 to reduce the restrictions on the local ability to impose bans on or more stringent standards for residential water softeners.

Approach and Implementation:

Existing law establishes efficiency standards for self-regenerative water softeners in terms of the amount of water hardness reduction per pound of salt addition. Local agencies are allowed to regulate water softeners but only under conditions wherein the local agency is out of compliance with its discharge permits. The most significant contributions of other pollutants to sewer systems are more easily regulated. It is recommended that the Legislature should pass more flexible regulatory provisions for water softeners. Time frame: July-December 2003.

Recommendation 4.4.2.

On-going or proposed studies on water softeners should continue to be pursued to develop alternatives for salt reduction in recycled water. Funding should be sought for such studies.

Approach and Implementation:

There are two on-going studies related to salinity in wastewater, salinity management practices, and water softeners. They are being conducted by the American Water Works Association Research Foundation and the Municipal Water District of Orange County and will be completed in 2003A committee should be established to review the literature and on-going and proposed studies on water softeners and their contribution to salinity problems with the purpose of identifying additional study needs. It is suggested that a research-related institution, such as the WateReuse Foundation initiate this committee. Time frame: July-September 2003.

Recommendation 4.4.3.

Within the current legal restrictions, local agencies should consider publicity campaigns to educate consumers regarding the impacts of self-regenerative water softeners and promote the use of off-site regeneration by service companies. They should also consider financial incentives to upgrade older inefficient appliances to the current standards.

Approach and Implementation:

Local agencies can influence consumer use of self-regenerative water softeners through education and financial incentives to replace older water softeners with more efficient ones that would reduce the salinity problem. Time frame: July 2003-on-going.

5. Economics of Water Recycling

Economic analysis of water recycling projects takes into account the true benefits and costs incurred to society. This entails the examination of the benefits and costs one would expect to be associated with a recycled water project. Financial analyses, in contrast to economic analyses, are intended to determine cash flow for a project and the feasibility to secure sources of funds to pay for project capital and operating costs. Financial analyses are commonly performed by agencies, but economic analyses typically are not unless they

Currently, El Dorado Irrigation District supplies about 1,000 homes in the El Dorado Hills Serrano residential development with recycled water for front and backyard irrigation.

are required by funding agencies as a funding criterion. Economic analyses, similar to environmental impact studies, allow a full and transparent accounting of costs and benefits to readily identify impacts not apparent in single viewpoint of most financial analyses. In addition, by analyzing all alternatives to water recycling to achieve project objectives, such as water supply, all alternatives can be compared on an equivalent basis to identify alternatives that have the least net cost to society.

Examples on the benefits side of a recycled water project are savings in the form of avoided costs of developing new fresh water sources and lower fertilizer costs because of nutrients present in recycled water; and on the costs side, capital costs and operations and maintenance (O&M). These are known as market benefits and costs since there is an observable market price to quantify the costs and savings. Though more difficult to quantify, one must also consider in an economic analysis the non-market benefits and costs, like environmental impacts. Non-market benefits and costs are named such because markets do not exist where one can buy and sell them for a price. However, these impacts often represent key local, regional, or societal benefits and costs that if ignored would omit a major portion of any systems-based economic feasibility analysis. To that end, analyzing non-market benefits and costs help cast a wider net in identifying stakeholders and developing collaborative partnerships early in the project planning process.

During the 1970s the concept of cost-effectiveness was introduced to incorporate a more rational basis of comparing alternatives based on true costs while still recognizing nonmonetary factors. Adapted to water recycling, the application of cost-effectiveness can be stated as:

> A water recycling project is considered cost-effective when, compared with the development of other alternatives to achieve the project objective, the proposed project will result in the minimum total resources costs over time to meet project objectives. Resource costs to be evaluated include monetary costs as well as nonmonetary factors, including social and environmental effects. An economic analysis, which monetizes costs and benefits associated with each alternative, including costs or benefits that are not just direct project costs and benefits, is given primary consideration unless other factors are overriding. Other important factors include an assessment of the recycled water market, availability of recycled water, financial feasibility, energy consumption, engineering, and environmental impacts.

Federal and California State funding programs adopted cost-effectiveness as a funding criterion and used the economic analysis as the basis for measuring total resources costs.

Another application of economic analyses is the allocation of costs on an equitable basis. Identifying the true benefits and costs of projects to a practical level of detail can help identify the proportion of the total benefits a project beneficiary is expected to enjoy and is a starting point to identifying an equitable share of funding responsibility.

Funding agencies for recycled water projects in California such as the SWRCB, DWR and USBR, each has its own economic analysis process and criteria for project funding. While

there might be overlap in the basic economic analysis, specific requirements may cause the analysis to be incompatible across agencies, so that "apples are being compared to oranges." Similarly, many funding agencies require some economic analysis or data reporting in their applications, but these requirements are sometimes not consistent, causing the applicant to do additional work to tailor each application. A consistent economic feasibility framework across funding agencies would greatly decrease duplicative work, allow projects to be compared by the same criteria and increase the opportunity for communication and collaboration for planning and identifying equitable funding partnerships.

5.1. UNIFORM ANALYTICAL METHOD FOR ECONOMIC ANALYSES

Issue

Each funding agency has its own economic analysis procedure and criteria for project funding. This lack of consistency complicates the task of project proponents intending to apply for State or federal financial assistance. Conducting an economic feasibility analysis often requires a broader investigation so as to include cost or benefit factors beyond the local project area and the non-market benefits and costs. Most local agencies consider only the cash flow factors that the agencies will experience. They are not accustomed to the concept and procedures of economic analyses. In addition, they often do not have the resources to determine some of the factors that should be included in economic analyses, such as impacts beyond their boundaries. To assist local agencies, a methodology to carry out economic analysis is needed.

Defining all potential benefits of a project will also help in distributing the funding burden of projects between beneficiaries. Without an equitable distribution of the funding burden, opportunities may be lost to develop recycled water projects, which is a clear impediment to increasing the use of recycled water.

Recommendation 5.1.1.

The State should lead in developing a uniform method for analyzing projects using economic analysis procedures and a consistent economic feasibility framework across funding agencies. This could be accomplished by an advisory team of economists, recycled water experts, and stakeholders.

a. Identify a set of desirable characteristics for an economic feasibility analysis framework based on true benefits and costs for recycled water projects in California.
b. Review existing frameworks to find the commonalities and gaps based on the characteristics from the above recommendation; add components to the framework that fill in the gaps.
c. Develop a practical and implementable process to identify and include non-market benefits and costs into the framework. Development of non-market benefits and costs that are associated with regions or types of recycled water use would provide results that could be applied to many projects. This is a large task and could be undertaken by both an advisory team and special studies.
d. Develop a mechanism to increase the opportunity for identifying equitable capital and operational funding schemes according to the beneficiaries based on allocation

Water Factory 21, operated by Orange County Water District, provides up to 15 mgd of tertiary and advanced treatment of recycled water injected into an aquifer for groundwater recharge and a seawater intrusion barrier. This has operated since 1975.

of the benefits and costs in the economic analysis. This could include beneficiaries on both the local, regional, and statewide level.

e. Develop guidance to conduct an economic feasibility analysis.

f. Develop a mechanism for information from the economic feasibility analysis to feed into the financial feasibility analysis and funding decision-making.

g. Develop appropriate benchmarks for comparing the incremental costs of developing recycled water with the cost of developing an equivalent amount through other measures such as additional water or demand reduction.

Approach and Implementation:

An expert panel of economists and water recycling specialists should be formed by DWR/SWRCB/DHS to carry out this recommendation. The panel should be formed by September 2003 and submit its findings to DWR by August 2004.

6. Science and Health/Indirect Potable Reuse

Public acceptance of recycled water use is dependent on confidence that its use is safe. The public entrusts regulatory agencies, especially the DHS, to establish sound criteria that will protect public health. To establish such criteria, it is necessary to identify the constituents of health concern that might be present in recycled water, to determine the pathways of human contact, to determine the mechanisms for reducing harmful constituents through treatment, and to calculate the relative health risk.

Four water quality factors are of particular concern: (1) microbiological quality, (2) total mineral content (e.g., total dissolved solids), (3) presence of toxicants of the heavy metal type, and (4) the concentration of stable organic substances. Particularly for the last two categories, recent studies in environmental toxicology and pharmacology have revealed potential long-term health risks associated with chemical compounds such as disinfection byproducts (DBPs) such as N-nitrosodimethyl amine (NDMA), pharmaceutically active compounds (PhACs), pesticides, and personal care products (PCPs) at low concentrations (orders of ppb and ppt). Those trace organic compounds along with some inorganic compounds such as arsenic and hexavalent chromium found in recycled water are of special concern for human and ecological health risk. In addition, there are growing concerns with those trace contaminants in recycled water, which were coincided with increasingly sensitive detection techniques that enabled detection of extremely low contaminant concentrations.

Reverse osmosis is one of the advanced technologies that is used at Water Factory 21 to treat recycled water before direct injection into a groundwater aquifer to replenish the aquifer.

As we expand indirect potable reuse, public concerns increase as well as the uncertainties in our ability to quantify all of the factors. Even with nonpotable uses, some pathogens have become of increasing concern. It is necessary to keep abreast of new chemicals and pathogens of emerging concern to ensure that existing water recycling practices and regulations are continuing to adequately protect public health. In addition, any efforts to introduce new uses of recycled water or changed practices should be based on sound scientific evidence.

6.1. RESEARCH FUNDING

Issue

Public concerns and perceptions on drinking water safety are a challenge for any water agency. Groundwater recharge with recycled water and indirect potable water reuse in general share many of the public heath concerns encountered in drinking water withdrawn from polluted rivers and reservoirs.

Professor Takashi Asano (l.) leads discussion on science and health issues being addressed by the Recycled Water Task Force.

Continued innovative research in the broad scientific foundations of water recycling and reuse is needed to establish and improve the broad scientific understanding of water reuse in the context of California's sustainable water supply, wastewater generation and disposal, and environmental impact associated with increasing population growth and urbanization. Research needs to address the four water quality factors described in the introduction of this section, technology for treatment and monitoring, mechanisms of human exposure, and assessment of health risk.

Recommendation 6.1.1.

Expand funding sources to include sustained State funding for research on cost-effective treatment, testing and monitoring methods, development of innovative/emerging technologies, study of emerging issues and fundamental scientific principles addressing technology, and public and environmental health related to water reuse.

Approach and Implementation:

The Legislature should pass a bond allocating funds for sustainable State funding for research to DWR or through existing or new mechanisms. In return, DWR should work with academic and research institutions on water resources relevant to water recycling issues. This includes feasibility studies, biophysical, engineering, economical, and social research issues. Time frame: July-December 2003. (See recommendation 1.5.1, Chapter 5.)

6.2. UNIVERSITY ACADEMIC PROGRAM FOR WATER RECYCLING

Issue

It is critical for California to thoroughly assess the best way to manage its water supplies mix and make the best use of recycled water to augment the increasing demand on the limited available freshwater. In addition, water recycling issues cross academic disciplines from water resources to groundwater hydrology to environmental toxicology. There is a need to have an integrated and comprehensive academic program addressing all relevant aspects of water recycling in the context of water resources management. This can be achieved by strong academic and research programs to include a water resources and water recycling curriculum for student development and a collaborative research program with a core of faculty with different expertise and approaches to study water recycling issues. Such academic cores can attract faculty and students to pursue water recycling as an area of interest, producing a steady supply of

Scientific research on recycled water is essential to improve treatment technology, assess the health risk of recycled water, and develop new uses.

*"**Community**" - Public at large including, but not limited to, local ethnic groups, political/social/economic groups, environmental justice advocates and environmentalists.*

*"**Stakeholders**" - Individuals and organizations who are involved in or may be affected by water recycling activities.*

highly trained professionals and a venue within California for fundamental and applied research in this field. Water recycling is too limited a discipline to expect that every university will be able to support a comprehensive curriculum and research program on water recycling. Water recycling tends to be an offshoot of other disciplines. To develop a comprehensive water recycling academic program, it is necessary to interest a variety of faculty to devote some of their research and teaching time to water recycling. Effort should be made to develop such a core program on at least one California campus.

Recommendation 6.2.1.

Encourage an integrated academic program on one or more campuses for water recycling research and education, which is expected to generate well-educated practitioners on water recycling production, quality, and use, using State research funds as an incentive.

Approach and Implementation:

The Legislature should pass a bond allocating funds for a sustainable State funding for research to DWR or through existing or new mechanisms. A portion of research funds should be channeled to integrated academic programs to foster water recycling as an academic specialty for both research and teaching. Time frame: July-December 2003. (See recommendation 1.5.1, Chapter 5.)

CHAPTER 5

Additional Important Recommendations

In addition to the key recommendations set forth in Chapter 4, the Task Force has adopted additional recommendations that will also enhance our ability to implement water recycling projects. These additional recommendations are presented in this chapter organized under the same six issue areas described in Chapter 4. While considered less important than the previous set of recommendations, they nevertheless are feasible to implement and in some cases are essential to address specific types of projects. The numbering of issues continues from the previous chapter.

1. Funding for Water Recycling

1.2. FUNDING COORDINATION

Issue

Different funding agencies often lack coordination of their efforts so as to maximize benefits and prioritize funding.

Recommendation 1.2.1.

A revised funding procedure should be developed to provide local agencies with assistance in potential State and federal funding opportunities. Assistance and guidance would be provided to such agencies as follows:

a. The SWRCB would facilitate a newly established Water Recycling Funding Coordination Committee (Committee) to coordinate applicant's funding needs with the appropriate funding agencies. The Committee would guide the local agency through the identification of (1) Correct funding source(s), (2) Accountability measures and (3) Monitoring and assessment reporting requirements.

b. The Committee would establish quantifiable objectives to be used in the review of a proposed project. Objectives should include 1) the local, regional, and State benefits, and; 2) non-water supply benefits, resulting from the project. When reviewing proposed projects, the Committee would recommend modifications to maximize the benefit to the State's water supply.

c. The Committee would work cooperatively with funding agencies, streamlining project selection while ensuring an open process for setting selection criteria. Peer review

and public review of the project selection would also be provided. The Committee would work to ensure that projects have an appropriate level of scientific review, and ongoing monitoring and data analysis.

d. The Committee should maintain a listing of local, State and federally funded projects. The list should include detailed project cost and water supply yield information.

Approach and Implementation:

The SWRCB should facilitate the establishment of a Committee to implement the recommendation above. Members of the Committee would include representatives from the SWRCB, DWR, USBR, CALFED, the California WateReuse Association and other stakeholders. The committee would coordinate with the CALFED Bay-Delta Program, which is dedicated to accelerating the implementation of cost-effective actions to conserve and recycle water throughout the State as articulated in its August 2000 Record of Decision. Time frame: January 2004 - ongoing.

1.3. REGIONAL PLANNING CRITERION

Issue

Funding for water recycling projects could be more beneficial when regional planning is taken into consideration.

Recommendation 1.3.1.

State funding agencies should use information from completed regional studies when determining the prioritization of funding, for those projects encompassed under an existing regional plan. The process does not exclude projects where regional plans do not exist.

Approach and Implementation:

State funding agencies including SWRCB, DWR and DHS should use available information from completed studies as a basis to prioritize funding. Time frame: January 2004 - ongoing.

1.4. FUNDING INFORMATION OUTREACH

Issue

Potential applicants for funding encounter difficulties in finding information on funding sources and understanding their procedures.

Recommendation 1.4.1.

Public information to support education and outreach efforts should be provided by having funding agencies:

a. Present public funding availability at statewide conferences,

b. Establishing an Annual Water Recycling Funding Information Workshop to assist participants in preparing funding application packages for all funding sources (Federal and State) available, and

c. One common website.

Approach and Implementation:

The SWRCB should be in charge of setting up and maintaining a common water recycling website that would direct potential applicants and include information on funding sources and procedures. The website should go on line no later than June 2004.

SWRCB should organize annual water recycling information workshops to assist funding applicants in preparing their application packages. In addition, SWRCB should present funding information availability at statewide conferences. Time frame: September 2003 and ongoing thereafter.

Recycled water can be used for landscape irrigation of parks, as shown in the 8th Street Linear Park, Pittsburg, CA..

1.5. DEPARTMENT OF WATER RESOURCES TECHNICAL ASSISTANCE

Issue

For successful water recycling projects, there is a great need for technical assistance in terms of local and regional planning as well as the study of emerging issues and the exploration of new technologies.

Recommendation 1.5.1.

Funding sources should be expanded to include sustainable State funding (research funding to DWR only) for DWR's technical assistance and research, including flexibility to work on local and regional planning process, on-going studies of emerging issues, and new technology.

Approach and Implementation:

The Legislature should pass a bond allocating funds for a sustainable State funding for DWR technical assistance for water recycling. This includes feasibility studies, research and development, pilot testing, technology development and the study of emerging issues. Time frame: July-December 2003.

1.6. PROJECT PERFORMANCE ANALYSIS

Issue

There is a lack of a comprehensive cost/benefit analysis of past water recycling projects. Such information is crucial for future planning and projections.

Recommendation 1.6.1.

Funding agencies should be provided with the resources to perform comprehensive analyses of performance of existing water recycling projects. The analyses should include determina-

Purple colored pipes ready for installation to deliver recycled water. Purple has been designated for the piping used for recycled water in the California Health and Safety Code Section 116815.

tion of actual costs and benefits, and recycled water deliveries. The funding agencies should conduct these analyses jointly in an open and peer-reviewed process. These analyses should quantify recycled water yield in acre-feet per year and compare actual yield with planned yield. The analyses should list other benefits of recycling (such as water supply reliability), and where possible to quantify these benefits. They also should provide costs in equivalent units such as equivalent annual cost.

Approach and Implementation:

The Legislature should pass a bond to fund a comprehensive analysis to determine the performance (cost and benefits) of past water recycling activities and project future performance. Funds would be administered by the SWRCB. Time frame: July-December 2003.

2. Public Dialogue / Public Outreach

(There are no additional recommendations beyond those listed in Chapter 4.)

3. Plumbing Code/Cross-Connection Control

3.3. RECYCLED WATER SYMBOL CODE CHANGE

Issue

The Department of Housing and Community Development (HCD) initiated amendments to the California Plumbing Code, Sections 601.2.2 and 601.2.3, which covers recycled water systems within HCD controlled occupancies (hotels, apartment houses, employee housing, accessory buildings in mobile home parks, etc.). The Code amendments require that "A universal poison symbol of skull and crossbones shall be provided." The Statement of Reasons for these sections states "... to provide additional measures to protect the health and safety of the public...."

The plumbing code already requires labeling of recycled water piping. The marking requirements for recycled water are continuous along the piping.

The skull and crossbones requirement is perhaps intended to supply a non-English indication that the contents of the pipe are not suitable for ingestion. There is a symbol in the Water Recycling Criteria (CCR Title 22, Section 60310(g)) that can be used to indicate that water is not safe for consumption yet not alarm the public.

The quality of recycled water required for use within buildings of the type controlled by HCD (CCR Title 22, Sections 60306 and 60307) is also considered safe for uses such as park and playground irrigation, truck crop irrigation, and swimming - uses where some ingestion is expected. The anticipated ingestion exposure for swimming is 100 mL and the expected risk of illness when swimming in this quality recycled water is approximately 1 in 10,000. It is misleading to suggest that recycled water is a poison.

Recommendation 3.3.1.

Housing and Community Development Department should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code.

Approach and Implementation:

DWR and DHS should request Housing and Community Development Department to initiate the change in time for the California Building Commission's 2004 annual code cycle.

3.4. STAKEHOLDER REVIEW OF PROPOSED CROSS-CONNECTION CONTROL REGULATIONS

Issue

DHS is drafting proposed changes to the cross-connection control regulations. There are concerns with the proposed requirements in the working draft of revisions. There would be a requirement for a double check valve on fire systems supplied by the potable water system where recycled water is used in a separate piping system within the same building. This requirement would make it difficult or impossible to retrofit a building with an existing fire system. The double check assembly would cause a pressure drop of approximately 10 psi. This might be enough to compromise the performance of a fire system that has not been designed for the head loss. Fire systems may not be engineered to exactly fit a building of site specification and it may be that a fire system can absorb a 10 psi drop without compromising the system. New systems can be designed to address the pressure drop.

Another issue to resolve is a conflict between the current Title 17 requirements and the California Plumbing Code. The California Fire Marshall is opposed to backflow devices on Class I and II fire systems and has amended Sections 603.4.18 and 603.4.19 of the 2001 California Plumbing Code to prohibit the installation of these devices.

Recommendation 3.4.1.

Stakeholders are encouraged to review the DHS draft changes of the Title 17 Cross-connection Control requirements and comment as appropriate.

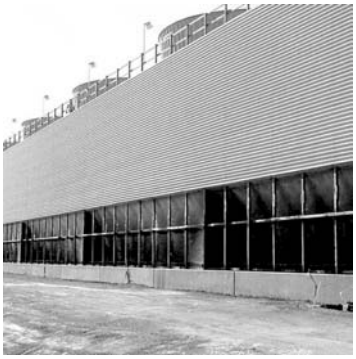
Approach and Implementation:

DHS should carry out this recommendation beginning July 2004.

3.5. CROSS-CONNECTION RISK ASSESSMENT

Issue

Despite a long history of water reuse in California, the question of safety of water reuse is still difficult to define and delineation of acceptable health risks has been hotly debated. Health risks associated with exposure to enteric viruses in recycled water were analyzed using a quantitative microbial risk assessment approach in 1990s. Monitoring data from



Los Medanos Energy Center utilizes recycled water for cooling in Pittsburg, CA.

four wastewater treatment facilities in California on enteric virus concentrations in unchlorinated secondary effluents were used as baseline data for the risk analysis. This assessment needs to be expanded and refined.

Recommendation 3.5.1.

The State should support a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water. To assess potential health risks associated with the use of recycled water in various reuse applications, new comprehensive risk assessment should be carried to identify:

- the risk of a worst case cross-connection,
- the likelihood of a cross-connection in various use situations, and
- microbiological and chemical exposure risks.

The risk assessment would provide a scientific basis for regulations controlling potential cross-connections.

Approach and Implementation:

DHS in collaboration with other State and federal agencies and research institutions should carry out this recommendation beginning July 2004.

4. Regulations and Permitting

4.5. PERMITTING PROCEDURES

Issue

As a minimum, each recycled water distribution system must have at least one permit from a RWQCB. The permit must incorporate statewide standards adopted by DHS and may include other recommendations by DHS protective of public health. All new projects or additions are required to submit engineering reports for DHS review. Some agencies have found the procedures of DHS and the RWQCBs to be lengthy and cumbersome. There may be opportunities to streamline these procedures. Aspects of this issue that have been suggested for consideration are 1) investigation of the timing of permits vis-à-vis the CEQA process, 2) the permitting of seasonal storage, and 3) the development of a one-stop approach to permitting. There is an overlap in the permitting issues and the uniform interpretation of State standards issue addressed in the previous chapter. After analysis of the issue, the Task Force makes the following recommendations in addition to those captured in under the uniform interpretation of State standards issue.

Recommendation 4.5.1.

DHS should continue to maintain and update its “California Health Laws Related to Recycled Water - The Purple Book,” which is an excellent resource for the permit requirements related to recycled water projects.

Approach and Implementation:

The Purple Book, named after the standard color used for recycled water piping, is an effective resource. Often such resources are left to languish by their creators. The Task Force recognizes this useful document and urges it maintenance and encourages its greater accessibility by improving the DHS Web site to be able to find it. Time frame: July 2003-on-going thereafter.

Recommendation 4.5.2.

Association of California Water Agencies and California Association of Sanitation Agencies should clarify for their members: under what circumstances water and wastewater agencies must seek permits from local land use and building authorities for recycled water projects.

Approach and Implementation:

In addition to State permits, there may be local permits required for the construction of water recycling facilities. There has been confusion on the part of project sponsors and local permitting authorities regarding when it is appropriate to require or obtain such permits. It would be a service for the water recycling agencies if the associations representing water and wastewater agencies to clarify the circumstances such permits are required. Time frame: July-December 2003.

Recommendation 4.5.3.

DHS should clarify the requirements for engineering reports to cover multiple sites of similar use.

Approach and Implementation:

An increasing number of recycled water projects involve distribution systems with dozens or hundreds of individual sites and continual additions of new customers as the systems expand. While DHS review is important to protect public health, the production of formal engineering reports for each site and each new addition can be cumbersome when the issues related to the sites have already been addressed for previous sites of similar use. DHS should clarify the requirements for engineering reports and the formats for them that would reduce the work in their preparation when multiple sites of similar use are involved. Time frame: January-March 2004.

Recommendation 4.5.4.

State and local tax incentives should be provided to recycled water users to help offset the permitting and reporting costs associated with the use of recycled water.

Approach and Implementation:

Recycled water users may incur additional costs for using recycled water instead of potable water. For example, separate plumbing systems must be installed to deliver two sources of water. The users may also be required to keep logs of all repair and mainte-

nance activities on the recycled water piping systems to verify that cross-connections have not occurred. Many agencies provide a financial incentive to use recycled water by selling the recycled water at a lower price than potable water, sometimes using potable water revenue to subsidize the recycled water system costs. Another mechanism could be providing tax incentives to users. The Legislature should consider tax incentives to offset costs incurred by users of recycled water. Local agencies should consider tax or other financial incentives to offset costs incurred by users of recycled water. Time frame: July 2003 and on-going thereafter.

4.6. SOURCE CONTROL

Issue

Source water/wastewater quality is a significant potential impediment to the expansion of recycled water usage in California. While it can be resolved through technology and management, the costs both monetarily and to public perception of recycled water can be expensive. Local agencies promoting water recycling must be aware of the potential presence of chemicals in recycled water and the potential public perception of what might be in the water. Thus, they must ensure that there is a strong source control program in place to maintain public confidence in the safety of water recycling projects.

Recommendation 4.6.1.

Local agencies should maintain strong source control programs to protect the quality of recycled water for potential uses and protect public health.

Approach and Implementation:

Local agencies maintain source control programs that include identification of all dischargers into sewer systems, analyses of discharge contributions, establishment of discharge limits on chemicals of concern, strong enforcement of limits, and public education programs regarding household chemicals that are unregulated. Time frame: July 2003 and on-going thereafter.

5. Economics of Water Recycling

5.2. ECONOMIC ANALYSIS

Issue

A project may be economically feasible, but not financially feasible and vice versa. Economic analyses provide more transparency on true benefits and costs and increase the probability of identifying project beneficiaries that can make the project more financially feasible and economically justified. Often project feasibility studies overlook economic analyses and focus on financial analyses.

Recommendation 5.2.1.

Local agencies are encouraged to perform economic analyses (quantifying total benefits and costs) of water recycling projects in addition to financial analyses (to determine cash flow) even if they are not seeking State or federal funding.

Approach and Implementation:

Agencies need to include such analysis in their feasibility studies once a guidebook on conducting economic feasibility analysis is developed pursuant to Recommendation 5.1.1 (e) Time frame: January 2004 - ongoing.

Recommendation 5.2.2.

A financial and an economic analysis should be included as two of the funding criteria in State and federal funding programs. Projects proposed for funding should be financially feasible (sufficient cash flow to pay for and maintain the project) and economically feasible (total statewide project benefits exceed total statewide project costs). The funding agencies should provide guidance and assistance for all funding applicants to conduct the analyses; and review the analyses in applications to ensure they are done appropriately and consistently. These analyses need not duplicate appropriate analyses already performed by local agencies.

Approach and Implementation:

A revised funding procedure as required by Recommendation 1.2.1 needs to include a requirement that agencies applying for public funds submit a financial and an economic analysis to be eligible to receive funding. Time frame: January 2004 - ongoing.

6. Science and Health/Indirect Potable Reuse

6.3. STATEWIDE SCIENCE-BASED PANEL ON INDIRECT POTABLE REUSE

Issue

After extensive discussions and deliberation on this issue, recommendation was made not to reconvene the California Indirect Potable Reuse Committee. The State of California Department of Health Services should be able to make informed and scientific determinations on issues related to indirect potable reuse based on the following publications.

- "Report of the Scientific Advisory Panel on Groundwater Recharge with Reclaimed Wastewater", Prepared for State of California, State Water Resources control Board, Department of Water Resources, and Department of Health Services, November 1987.
- "Issues in Potable Reuse - The viability of augmenting drinking water supplies with reclaimed water", National Research Council, 1998.
- " A Proposed Framework for Regulating the Indirect Potable Reuse", Prepared by The California Potable Reuse Committee, January 1996.
- DHS Draft Groundwater Recharge Regulations (August 2002)

Recommendation 6.3.1.

It is recommended not to reconvene the statewide science-based panel to address indirect potable reuse. However, it is recommended to convene a new statewide panel to address issues related to indirect potable reuse as presented in recommendation 2.2.6.

Approach and Implementation:

The proposed panel on indirect potable reuse is described in Recommendation 2.2.6.

CHAPTER 6

Summary & Implementation

While the Recycled Water Task Force has identified numerous obstacles and impediments to water recycling in California, it has also found that California has exhibited overall support for water recycling and has in place a very effective regulatory environment to ensure the safe use of recycled water and still allow use at over 4,000 farms, parks, golf courses, commercial and industrial enterprises, and other sites. In most cases, significant obstacles are not present or may be overcome in the inevitable process of integrating the multitude of interests into the planning process for projects.

The emphasis is to improve the way all levels of government function and assist each other and the public to enhance the ability for cost-effective and safe projects to proceed and help satisfy the growing demand for water in California. The Task Force focused its attention on the issues and solutions that it thought would make the most difference and could be effectively implemented. The recommendations of the Task Force have been discussed in the previous two chapters and are analyzed in more depth in the white papers of the six workgroups of the Task Force. They are summarized in Table 1.

As can be seen from the table, if we are to remove the obstacles to water recycling, virtually every entity involved in water recycling activities has a role to play in implementing the recommendations. The time frames for implementation are believed to be realistic, but many factors and priorities of the various entities will come into play that the Task Force could not assess. It is important, however, that the recommendations not be displaced by other priorities and then forgotten. The various agencies need to display their commitment to fulfill these recommendations, even if they need to firmly establish their own timetables.

The fulfillment of the recommendations requires resources and a will to take action. In many cases they call upon all levels of government, including local agencies, to take a different attitude and approach in the conduct of their missions and the development of projects. There is a need for greater willingness to listen to alternative viewpoints and concerns, whether they come from the public or recycled water customers or from other governmental agencies. There is also the need for greater effort to ensure the legal sound-

ness of governmental decisions and to communicate them effectively and respectfully. The three primary agencies involved in assisting this Task Force, DWR, SWRCB, and DHS, should continue their collaboration to insure a timely implementation of the recommendations. It is expected that with DWR taking a leadership role, the other agencies would assign staff to assist in seeing the recommendations reach fruition.

There is tremendous potential for increased use of recycled water in California. The Task Force is grateful for the opportunity to assist the State in fulfilling this potential.

Sand Canyon Reservoir, where recycled water is stored by Irvine Ranch Water District before delivery to customers for nonpotable uses.

Table 4. Summary of Task Force Recommendations.

Recommendation	*Implementing Agency*	*Time Frame*
⋆ ⋆ ⋆ *Key Recommendations* ⋆ ⋆ ⋆		
{1.1} Increase State and federal funding for reuse/recycling beyond current sources.		
1. State funding for reuse/recycling should be increased beyond Proposition 50 and other current sources.	Leg./SWRCB	Jul.-Dec. 03
2. The California Water Commission, in cooperation with DWR and SWRCB, is strongly encouraged to seek federal cost sharing legislation for water recycling.	CWC/ DWR/ SWRCB	Jul.03-ongoing
{2.1} Engage the public in an active dialogue using a community value-based decision-making model in planning water recycling projects.	SWRCB/DWR	Jul.03 – ongoing
1. Increase public participation through vigorous outreach, augmenting the notification requirements stipulated by CEQA and NEPA.	BDPAC Local agencies	Jan.04 – Jan.05 Jul.03-ongoing
2. Hold more public meetings to gather and supply information at appropriate venues.		
3. Make project decisions that respect and incorporate the community's values and concerns (considering growth, coordination with local planning, environmental justice issues, et cetera).		
4. Convene an independent advisory committee composed of experts in the field and consumers from a variety of viewpoints who have no vested interest to review the proposed project alternatives, its implementation and operation where needed.	Local agencies	Jul.03-ongoing
5. Educate and consider with the public all the alternatives for locally achieving water supply goals.		
6. Local Agencies cultivate and utilize the media opportunities for their projects.		

Table 4. Summary of Task Force Recommendations (Continued).

Recommendation	*Implementing Agency*	*Time Frame*
{2.2} Establish Leadership support for water recycling to include convening a statewide panel to address issues related to indirect potable reuse.		
State Support		
1. Take a leadership role on water recycling		
a. Develop a common language of referring to recycled water treatment levels and uses to improve public discussions.	Leg./DHS	Fall 03-Jul.04
b. Set a standard signage for regulatory use which increases the public's understanding of recycled water.	Leg./DHS	Fall 03-Jul.04
c. Develop a consistent position on water recycling.		
d. Convey its mission to maximize recycled water use throughout all government levels via interagency collaboration.	DWR/SWRCB/ DHS	Sep.03-Jan.05
e. Facilitate projects and communicate the rules clearly to local health offices.		
f. Encourage recycled water use by using it in public agency buildings to flush toilets, and to irrigate city parks.	State/local gov.	Jul.03-ongoing
2. Provide funding for public education and outreach.	State/local gov.	Jul.03-ongoing
3. Work closely with local agencies on water recycling to include: technical assistance, greater education and clarification on recycled water use policy, coordination of existing and new recycled water informational programs.	DWR/SWRCB/ DHS	Jul.05-ongoing
Local Government Support		
4. Appropriate local agencies should adopt well-defined local recycled water ordinances.	Local Gov.	Jul.03-ongoing
Regulatory Agencies Support		
5. Building inspectors, code enforcement officers, etc., should effectively enforce the installation of types of plumbing that would allow the use of recycled water in accordance with local recycled water ordinances.	Local Gov.	Jul.03-ongoing
6. Convene a statewide independent review panel on indirect potable reuse to ensure adequate health and safety assurance for California residents.	CBDA	Jan.04-Jul.05

Table 4. Summary of Task Force Recommendations (Continued).

Recommendation	Implementing Agency	Time Frame
{2.3} Convene a Statewide panel to recommend changes to public schools and higher education curriculum.		
a. Develop a comprehensive water education curriculum for each grade (K-12) which incorporates recycled water in the Content Standards for California Public Schools: science standards and/or the history-social science standards.	Board of Ed.	Jul.03-Jan-07
b. Approach institutions of higher education to incorporate recycled water education into their curriculum.	DWR/UC/CSU	Jul.03- ongoing
c. Enhance existing programs, for example those offered through the Water Education Foundation, or other organizations.	DWR	Jul.04- ongoing
{2.4} Adopt a State-sponsored media campaign to increase public awareness and knowledge of recycled water:		
1. Develop a water issues information program for radio, television, and print.	State Agencies	Jul.04-ongoing
2. Work with organizations that have produced videos on water issues, including recycled water, and fund updates and expanded programming and encourage cable TV networks to broadcast these videos regularly throughout the State.	State Agencies	Jul.05-ongoing
3. Prepare op ed pieces for publication in newspapers throughout the State.	State/Local	Jul.04-ongoing
4. Retain an advertising agency/public relations firm to assist in the development of short messages with specific information on urgent topics such as drought, conservation, pollution prevention, water quality, stormwater, wastewater, or recycled water including indirect potable reuse. (Emphasis should be inclusive of the locales' diversity).	State Agencies	Jul.04-ongoing
{3.1} California should adopt its own Appendix J of the Uniform Plumbing Code in order to avoid the inconsistencies between the IAPMO version and other California regulations. Encourage adoption by the DWR of the recommended version of Appendix J (included as Appendix D in this report) at the earliest opportunity.	DWR	Jul.03-Sep.05
{3.2} Prepare DHS guidance to achieve more consistent interpretation of State standards.		
1. DHS guidance should be prepared that would clarify the intent and applicability of Title 22, Article 5. If guidance cannot be written to accomplish this, the regulation should be rewritten.	DHS	Jul.03-Sep.05
2. DHS guidance should be prepared that would clarify the requirement for testing in Title 22, Section 60316(a) and stress that alternatives to a pressure test are sufficient in many cases.	DHS	Jul.03-Sep.05
3. DHS should amend Title 22, Article 5 to incorporate inspection and testing requirements consistent with whatever requirements are adopted as part of a California version of Appendix J, as recommended in Recommendation 3.1.1.	DHS	Jul.03-Sep.05

Table 4. Summary of Task Force Recommendations (Continued).

Recommendation	*Implementing Agency*	*Time Frame*
{4.1.} **Health and Safety Regulation --** The Department of Health Services should involve stakeholders in a review of various factors to identify any needs for enhancing existing local and State health regulation associated with the use of recycled water.	DHS	Jul. 03-Jun.04
{4.2} **Investigate, within the current legal framework, alternative approaches to achieve more consistent and less burdensome regulatory mechanisms affecting incidental runoff of recycled water from use sites.**		
1. The SWRCB should convene a committee to review the legal requirements of federal and State statutes and regulations that relate to the regulation of incidental runoff and to determine the regulatory and enforcement options that are available to Regional Water Quality Control Boards.	SWRCB	Jul. 03-Jan. 04
{4.3} **Create uniform interpretation of State standards in State and county regulatory programs.**		
1. The SWRCB should appoint and empower a key person to provide oversight of the water recycling permits issued by the various regional boards. This person would act as an ombudsman to facilitate recycling and arbitrate conflicts.	SWRCB	Aug.03-ongoing
2. The DHS needs to take steps to ensure the uniform interpretation and application of Water Recycling Criteria in Title 22 of the Code of Regulations and other regulations applicable to water recycling.	DHS	Plan: Jul.-Oct.03 Imp: Nov.03-on
3. Conduct a legal review to determine whether authority exists for local health agencies to adopt water recycling requirements that are more restrictive than those included in Titles 17 and Title 22.	DHS	Jul.03-Oct.03
4. Investigate the water recycling programs in Florida to determine whether there are concepts that should be adopted in California.	SWRCB/DHS WateReuse	Jan.04-Feb.04
5. The RWQCBs should be more proactive during the planning of recycled water projects so issues can be addressed before design commences.	RWQCB	Jul.03-ongoing
6. Each RWQCB should have a resident expert on water recycling to provide consistency in permitting and coordinate with other RWQCBs in maintaining consistency.	RWQCB	Jul.03-ongoing

Table 4. Summary of Task Force Recommendations (Continued).

Recommendation	*Implementing Agency*	*Time Frame*
{4.4} Legislation to increase local flexibility to regulate water softeners.		
1. Local agencies should be empowered to regulate the discharge of residential water softeners in the same manner as other sources of discharge into sewers. Legislation should be proposed to amend the Health and Safety Code Sections 116775 through 116795 to reduce the restrictions on the local ability to impose bans on or more stringent standards for residential water softeners.	Legislature	Jul.03-Dec.03
2. On-going or proposed studies on water softeners should continue to be pursued to develop alternatives for salt reduction in recycled water. Funding should be sought for such studies.	Research related institutions	Jul.03-Sep.03
3. Within the current legal restrictions, local agencies should consider publicity campaigns to educate consumers regarding the impacts of self-regenerative water softeners and promote the use of off-site regeneration by service companies. They should also consider financial incentives to upgrade older inefficient appliances to the current standards.	Local Agencies	Jul.03-ongoing
{5.1} Develop a uniform method for analyzing projects and a consistent economic feasibility framework across funding agencies. This could be accomplished by an advisory team of economists, recycled water experts, and stakeholders.		
a. Identify a set of desirable characteristics for an economic feasibility analysis framework based on true benefits and costs for recycled water projects in California.	DWR / SWRCB / DHS	Sep.03-Aug.04
b. Review existing frameworks to find the commonalities and gaps based on the characteristics from a) above; add components to the framework that fill in the gaps.		
c. Develop a practical and implementable process to identify and include non-market benefits and costs into the framework.		
d. Develop a mechanism to increase the opportunity for identifying equitable capital and operational funding schemes according to the beneficiaries based on allocation of the benefits and costs in the economic analysis.		
e. Develop guidance to conduct an economic feasibility analysis.		
f. Develop a mechanism for information from the economic feasibility analysis to feed into the financial feasibility analysis and funding decision making.		
g. Develop appropriate benchmarks for comparing the incremental costs of developing recycled water with the cost of developing an equivalent amount through fresh water projects.		
{6.1} Expand funding sources to include sustainable State funding for research including research on treatment, testing and monitoring methods, development of innovative/emerging technologies, study of emerging issues and fundamental scientific principles addressing technology, public and environmental health.	Leg./DWR	Jul.-Dec. 03

Table 4. Summary of Task Force Recommendations (Continued).

Recommendation	Implementing Agency	Time Frame
{6.2} Encourage an integrated academic program on one or more campuses for water reuse research and education, which is expected to generate well-educated practitioners on water recycling production, quality, and use.	State	Jul.03-Dec.03
* * * *Additional Important Recommendations* * * *		
{1.2} Develop a revised funding procedure to provide local agencies with assistance in potential State and federal funding opportunities. a. The SWRCB will facilitate a newly established Water Recycling Funding Coordination Committee (Committee) to coordinate applicant's funding needs with the appropriate funding agencies. b. The Committee will establish quantifiable objectives to be used in the review of a proposed project. Objectives shall include 1) the local, regional, and State benefits, and; 2) non-water supply benefits, resulting from the project. c. The Committee will work cooperatively with funding agencies, streamlining project selection within one agency while ensuring an open process for setting selection criteria. d. The Committee shall maintain a listing of local, State and federally funded projects. The list should include detailed project cost and water supply yield information.	SWRCB/DWR/ DHS/USBR	Jan.04-ongoing
{1.3} State funding agencies will use information from regional studies to prioritize funding for projects encompassed under a regional plan. The process does not exclude projects where regional plans do not exist.	SWRCB/DWR/ DHS/USBR	Jan.04-ongoing
{1.4} Present information on funding availability through workshops, conferences and on the Internet.	SWRCB	Jan.04 - ongoing
{1.5} Expand funding sources to include sustainable State funding for DWR's technical assistance and research, including flexibility to work on local and regional planning, emerging issues, and new technology.	Legislature	Jul.03-Dec.03
{1.6} Provide funding agencies with the resources to perform comprehensive analysis of past recycling performance (costs and benefits) and projection of future performance.	Legislature	Jul.03-Dec.03
{3.3} Housing and Community Development Department should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code. DWR and DHS should request HCD to initiate the change in time for the California Building Commission's 2004 annual code cycle.	DWR/DHS /HCD	2004 Annual Code Cycle Change

Table 4. Summary of Task Force Recommendations (Continued).

Recommendation	Implementing Agency	Time Frame
{3.4} Encourage stakeholders to review the DHS draft changes of the Title 17 Cross-connection Control requirements and comment as appropriate.	DHS	Jul.04-ongoing
{3.5} Support a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water. The risk assessment would provide a scientific basis for regulations controlling potential cross-connections.	DHS	Jul.04-
{4.5} Permitting Procedures		
1. DHS should continue to maintain and update its "California Health Laws Related to Recycled Water - The Purple Book", which is an excellent resource for the permit requirements related to recycled water projects.	DHS	Jul.03-ongoing
2. ACWA and CASA should clarify for its members: under what circumstances water and wastewater agencies must seek permits from local land use and building authorities for recycled water projects.	ACWA/CASA	Jul.03-Dec.03
3. DHS should clarify the requirements for engineering reports to cover multiple sites of similar use.	DHS	Jan.04-Mar.04
4. State and local tax incentives should be provided to recycled water users to help offset the permitting and reporting costs associated with the use of recycled water.	Legislature and local Agencies	Jul.03-ongoing
{4.6} Maintain strong source control programs and increase public awareness of their importance in reducing pollution and ensuring a safe recycled water supply.	Local Agencies	Jul.03-ongoing
{5.2} Encourage local agencies to perform economic analyses of water recycling projects; and include such analyses as two of the funding criteria in State and federal funding programs.		
1. Local agencies are encouraged to perform economic analyses even if they are not seeking State or federal funding.	Local Agencies	Jan.04-ongoing
2. Include a financial and an economic analysis as two of the funding criteria in State and federal funding programs.	Funding Agencies	Jan.-04-ongoing
{6.3} Recommend not reconvening the statewide science-based panel to address indirect potable reuse.		

Appendix A

Assembly Bill No. 331

(Goldberg)

Appendix A

Assembly Bill No. 331

CHAPTER 590

An act to add Section 13578 to the Water Code, relating to recycled water.

[Approved by Governor October 7, 2001. Filed with Secretary of State October 9, 2001.]

LEGISLATIVE COUNSEL'S DIGEST

AB 331, Goldberg. 2002 Recycled Water Task Force.

Under existing law, the Department of Water Resources is among the principal state agencies with primary authority over water. Existing law regulates the use of recycled water.

This bill would require the department to convene the 2002 Recycled Water Task Force with specified membership to advise the department in investigating the opportunities for using recycled water in industrial and commercial applications and in identifying impediments and constraints to increasing the industrial and commercial use of recycled water, and would require a report to the Legislature with recommendations on specified topics not later than July 1, 2003. The bill would require the department to carry out these duties only to the extent that certain funds are made available for that purpose.

The people of the State of California do enact as follows:

SECTION 1. Section 13578 is added to the Water Code, to read:

13578. (a) In order to achieve the statewide goal for recycled water use established in Section 13577 and to implement the Governor's Advisory Drought Planning Panel Critical Water Shortage Contingency Plan recommendations, Section F2, as submitted December 29, 2000, the department shall identify and report to the Legislature on opportunities for increasing the use of recycled water, as defined in paragraph (3) of subdivision (b) of Section 13575, and identify constraints and impediments, including the level of state financial assistance available for project construction, to increasing the use of recycled water.

(b) The department shall convene a task force, to be known as the 2002 Recycled Water Task Force, to advise the department in implementation of subdivision (a), including making recommendations to the Legislature regarding the following:

(1) How to further the use of recycled water in industrial and commercial applications, including, but not limited to, those applications set forth in Section 13552.8. The task force shall evaluate the current regulatory framework of state and local rules, regulations, ordinances, and permits to identify the obstacles and disincentives to industrial and commercial reuse. Issues to be investigated include, but are not limited to, applicability of visual inspections instead of pressure tests for cross-connections between potable and nonpotable water systems, dual piping trenching restrictions, fire suppression system design, and backflow protections.

(2) Changes in the Uniform Plumbing Code, published by the International Association of Plumbing and Mechanical Officials, that are appropriate to facilitate the use of recycled water in industrial and commercial settings. The department shall make recommendations to the California Building Standards Commission with regard to suggested revisions to the California Plumbing Code necessary to incorporate the changes identified by the task force.

(3) Changes in state statutes or the current regulatory framework of state and local rules, regulations, ordinances, and permits appropriate to increase the use of recycled water for commercial laundries and toilet and urinal flushing in structures including, but not limited to, those defined in subdivision (c) of Section 13553. The department shall identify financial incentives to help offset the cost of retrofitting privately and publicly owned structures.

(4) The need to reconvene the California Potable Reuse Committee established by the department in 1993 or convene a successor committee to update the committee's finding that planned indirect potable reuse of recycled water by augmentation of surface water supplies would not adversely affect drinking water quality if certain conditions were met.

(5) The need to augment state water supplies using water use efficiency strategies identified in the CALFED Bay-Delta Program. In its report pursuant to subdivision (a), the department shall identify ways to coordinate with CALFED to assist local communities in educating the public with regard to the statewide water supply benefits of local recycling projects and the level of public health protection ensured by compliance with the uniform statewide water recycling criteria developed by the State Department of Health Services in accordance with Section 13521.

(6) Impediments or constraints, other than water rights, related to increasing the use of recycled water in applications for agricultural, environmental, or irrigation uses, as determined by the department.

(c) (1) The task force shall be convened by the department and be comprised of one representative from each of the following state agencies:

(A) The department.

(B) The State Department of Health Services.

(C) The state board.

(D) The California Environmental Protection Agency.

(E) The CALFED Bay-Delta Program.

(F) The Department of Food and Agriculture.

(G) The Building Standards Commission.

(H) The University of California.

(I) The Resources Agency.

(2) The task force shall also include one representative from a recognized environmental advocacy group and one representative from a consumer advocacy group, as determined by the department, and one representative of local agency health officers, one representative of urban water wholesalers, one representative from a groundwater management entity, one representative of water districts, one representative from a nonprofit association of public and private members created to further the use of recycled water, one representative of commercial real estate, one representative of land development, one representative of industrial interests, and at least two representatives from each of the following as defined in Section 13575:

(A) Recycled water producer.

(B) Recycled water wholesaler.

(C) Retail water supplier.

(d) The department and the task force shall report to the Legislature not later than July 1, 2003.

(e) The department shall carry out the duties of this section only to the extent that funds pursuant to Section 79145, enacted as part of the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (Division 26 (commencing with Section 79000)), are made available for the purposes of this section.

Appendix B

Memorandum of Agreement Between DHS and SWRCB on Use of Reclaimed Water

Appendix B

Note: The following MOA is included as a source of information that may be useful to the reader of this report. However, two items need to be clarified or corrected. With regard to Section II.C. Regulatory Enforcement, the question of the scope of the authority of local health agencies to impose additional requirements and take enforcement actions with respect to water recycling is an issue that the Task Force has identified as in need of review. With regard to Section II.G. Operator Certification, since 1996 a change in regulations provides that the SWRCB may approve the use of certified water treatment plant operators in lieu of wastewater treatment plant operators to operate recycled water treatment plants consisting of only tertiary or advanced treatment processes.

MEMORANDUM OF AGREEMENT BETWEEN
THE DEPARTMENT OF HEALTH SERVICES
AND
THE STATE WATER RESOURCES CONTROL BOARD
ON USE OF RECLAIMED WATER

This Memorandum of Agreement (hereafter MOA) is made between the Department of Health Services (hereafter Department) and the State Water Resources Control Board (hereafter SWRCB) on behalf of itself and the nine California Regional Water Quality Control Boards (hereafter RWQCBs). This MOA sets forth principles, procedures, and agreements to which these agencies commit themselves relative to use of reclaimed water in California. It is effective upon the date that it is executed by both parties.

I. PURPOSE AND SCOPE OF MOA

Water reclamation involves several activities that have potential impacts on public health. The primary activities are the introduction of pollutants into the wastewater collection system, wastewater treatment, storage and distribution of reclaimed water, and the use of the reclaimed water. The planning, design, construction, and operation of the various facilities associated with these activities all require oversight by regulatory agencies to ensure protection of public health.

This MOA is intended to assure that the respective authority of the Department, the SWRCB, and the RWQCBs relative to use of reclaimed water will be exercised in a coordinated and cohesive manner designed to eliminate overlap of activities, duplication of effort, gaps in regulation, and inconsistency of action. To that end, this establishes basic principles relative to activities of the agencies hereto and the RWQCBs, clarifies primary areas of responsibility and authority between these agencies, and provides for methods and mechanisms necessary to assure ongoing, continuous future coordination of activities relative to use of reclaimed water in this State.

The MOA is intended to serve as an umbrella agreement between the agencies hereto. It will be supplemented, as appropriate, by addenda which will reflect any additional agreements, commitments and understandings arrived at by the agencies hereto. This MOA replaces the previous MOA on use of reclaimed water executed on 5 December 1988.

II. GENERAL BACKGROUND

A. Basic Authorities and Responsibilities

In order to supplement existing surface and ground water supplies to help meet water needs in the State, it is State policy that use of reclaimed water in the State be promoted to the maximum extent (California Water Code, Sections 13510-13512). One of the primary conditions on the use of reclaimed water is protection of public health (Water Code Sections 13521, 13522, 13550(a)(3)).

The Department is the primary State agency responsible for protection of public health and the regulation of drinking water. The Legislature has defined several specific regulatory responsibilities of the Department related directly or indirectly to water reclamation activities including: establishment of statewide water reclamation criteria; advising RWQCBs in the drafting of water reclamation requirements (permits); review and approval of certain proposed water reclamation projects; abatement of contamination resulting from use of reclaimed water where public health is seriously threatened; and control of cross connections between potable and nonpotable water systems.

The SWRCB and the RWQCBs are the primary State agencies charged with the protection, coordination, and control of water quality and the assignment of water rights in the State. Specific regulatory responsibilities affecting water reclamation include approval of pollutant source control programs for wastewater collection systems, issuance and enforcement of water reclamation requirements to producers and users of reclaimed water, definition of beneficial uses of surface and ground water bodies through the establishment of water quality control plans, regulation of operators of wastewater and water reclamation treatment plants, and water right determinations regarding water reclamation.

To assure protection of public health where reclaimed water use is involved, the Department has been statutorily directed to establish uniform statewide reclamation criteria for the various uses of reclaimed water (Water Code Section 13521). The Department has promulgated regulatory criteria which are currently set forth in Title 22, Division 4, Section 60301 et seq., California Code of Regulations. The Department's regulatory criteria include specified approved uses of reclaimed water, numerical limitations and requirements, treatment method requirements and performance standards. The Department's regulations allow use of alternative methods of treatment, in some cases, so long as the alternative methods used are determined by the Department to assure equivalent treatment and reliability.

B. Water Reclamation Requirements and Reports

All persons who reclaim or propose to reclaim water, or who use or propose to use reclaimed water, must file a report with the appropriate RWQCB (Water Code Section 13522.5). If a RWQCB determines that it is necessary to protect public health, safety, or welfare, it may prescribe water reclamation requirements where reclaimed water is used or proposed to be used (Water Code Section 13523). Where regulatory criteria have been adopted, no person may either reclaim water or use reclaimed water until the appropriate RWQCB has either issued reclamation requirements or waived the necessity for such requirements (Water Code Section 13524). In the process of issuing reclamation requirements, the RWQCBs must consult with and consider recommendations of the Department (Water Code Section 13523). Any reclamation requirements which are issued by the RWQCBs, whether applicable to the reclaimer or to the user of reclaimed water, must be in conformance with any regulatory reclamation criteria adopted by the

Department. Water reclamation requirements for a proposed use of reclaimed water that is not specifically addressed in the Title 22 water reclamation criteria adopted by the Department are considered on a case-by-case basis.

The RWQCBs have the option of issuing a master reclamation permit in lieu of individual water reclamation requirements for a project involving multiple users. Such permits would combine the waste discharge requirements pursuant to Water Code Sections 13260 et seq. and water reclamation requirements. A master permit may be issued to a supplier or distributor, or both, of reclaimed water. The procedures for adoption by the RWQCBs are the same as for water reclamation requirements and include the same consultation with the Department (Water Code Section 13523.1). Except upon written request from a RWQCB, the reporting requirement in Section 13522.5 is waived for users supplied with reclaimed water from a supplier or distributor operating under a master permit (Water Code Section 13522.5). However, other reporting and plan review requirements, such as those specified in the Title 22 reclamation criteria, may be included as requirements in the master permit. In addition the RWQCBs have the option of issuing general waste discharge requirements or general water reclamation requirements, under which all producers of reclaimed water may apply to be covered, in lieu of individual orders.

Water Code Section 13554.2(e) requires the Department to review and approve proposed water reclamation projects (within specified time frames) that are submitted to the Department by producers or distributors of reclaimed water for review. The Department may delegate some or all of its responsibilities, with respect to review and approval of a proposed project, to a local health department with the concurrence of the project proponent (Water Code Section 13554.2(c)). The reclaimed water producer or distributor submitting the proposed project for review must reimburse the Department for its cost of conducting the review and issuing the approval or denial (Water Code Section 13554.2(a)).

Where reclaimed water use is involved or proposed, the RWQCBs have the authority to require construction reports and such other reports as may be necessary to assure protection of both public health and water quality (Water Code Section 13523). Additional engineering, construction, and operational reports are specified in the Title 22 criteria adopted by the Department.

C. Regulatory Enforcement

Where use of reclaimed water is involved, the RWQCBs have the exclusive authority to enforce water reclamation requirements. In extreme cases involving serious public health threats, the Department may take steps to abate any contamination which may result from use of reclaimed water (Water Code Section 13522). The RWQCBs may undertake various enforcement actions, both of a civil nature and relative to criminal sanctions, for failure to file necessary reports, for reclamation or use of reclaimed water without reclamation

requirements, or for violation of any reclamation requirements imposed by a RWQCB (Water Code Sections 13522, 13522.7, and 13525).

In addition to the authority vested in the SWRCB, the RWQCBs, and the Department relative to the use of reclaimed water, various local health agencies have an independent and autonomous role and authority to impose additional requirements and take enforcement actions with respect to water reclamation pursuant to local ordinances.

D. Cross Connection Control

The Department has responsibility for protection of potable water systems through cross connection control and backflow prevention. (Health and Safety Code Division 5, Part 1, Chapter 7.9, Sections 4049.50 et seq.; California Code of Regulations, Title 17, Division 1, Chapter 5, Group 4, Article 2, Sections 7601 et seq.). The Department has specified the backflow protection measures required at sites where reclaimed water is used.

E. Source Control

The federal Clean Water Act mandates municipal wastewater dischargers of 5 MGD or more into surface waters have an industrial pretreatment program (Clean Water Act, Sections 301 and 307). The purpose of this program is to control the input of constituents into sewer systems that could be harmful to wastewater treatment processes, treatment plant personnel, or the ability of a plant to meet effluent limitations. These requirements are implemented through the National Pollutant Discharge Elimination System (NPDES) permits issued by RWQCBs. Annual reports on the pretreatment programs submitted by the dischargers are reviewed by the RWQCBs. In addition, RWQCBs conduct inspections periodically to monitor these programs.

In the case of most water reclamation projects, all of the constituents of concern for public health protection are covered by current pretreatment programs. There is the potential that for certain types of reuse, particularly indirect potable reuse, some constituents would not come under the authority of the federal statutes to control through a pretreatment program. However, RWQCBs have the authority to include additional pretreatment program requirements or broader source control requirements in permits. Once such requirements are a part of a permit, the wastewater agency would be obligated to comply with the permit and the RWQCB would have authority to enforce the requirement.

F. Potable Water Supply Source Control

Planned indirect potable reuse of reclaimed water is commonly practiced in California through artificial ground water recharge with reclaimed water. Furthermore, indirect potable reuse is being proposed through the introduction of reclaimed water into a water supply reservoir that would serve as a raw water supply for a potable water system. The

Department has the responsibility to identify when and under what conditions a raw water supply is suitable for potable purposes.

G. Operator Certification

The qualifications of operators of wastewater treatment plants are determined by the SWRCB (Water Code Section 13627; California Code of Regulations Title 23, Chapter 26, Sections 3670 et seq.) Where water reclamation is involved, the SWRCB may require operators to be certified wastewater treatment plant operators. The water reclamation criteria promulgated by the Department states that operators of water reclamation plants shall meet the requirements for wastewater treatment plant operators specified by the SWRCB (California Code of Regulations, Section 60325).

H. Water Rights

Under certain conditions the use of potable water for nonpotable purposes is a waste or unreasonable use of water if reclaimed water is available (Water Code Sections 13550 et seq.). It is the responsibility of the SWRCB to make determinations under this provision. The SWRCB does not as a matter of course make this determination; such determination typically occurs in an adversarial proceeding after a complaint is filed. One of the conditions of the determination is that there is concurrence with the Department that the use of reclaimed water will not be detrimental to public health.

Prior to making any change in the point of discharge, place of use or purpose of use of treated wastewater, the owner of any wastewater treatment plant must obtain approval of the SWRCB (Water Code Sections 1210-1212). The Division of Water Rights of the SWRCB reviews and acts on such changes pursuant to the provisions of Section 1700 et seq. of the California Water Code. If a change in discharge or use of treated wastewater would occur due to a water reclamation project undertaken in response to a discharge restriction or other action by a RWQCB exercising its regulatory authority under Division 7 (commencing with Section 13000) of the Water Code, prior approval under Sections 1210-1212 is not required.

III. GENERAL PRINCIPLES

The general principles hereby agreed to by the Department, the SWRCB, and the RWQCBs are as follows:

A. All requests for water reclamation requirements submitted to a RWQCB pursuant to Section 13522.5 shall be considered to be a request for review by the Department pursuant to Section 13554.2, since Departmental review and recommendations are required by Section 13523.

B. Wherever feasible, the Department shall use the issuance of water reclamation requirements by a RWQCB as the preferred method of granting Departmental approval to a proposed project to avoid the issuance of separate project approvals by the Department.

C. Reclamation requirements issued by the RWQCBs will impose all applicable statewide reclamation criteria adopted by the Department and set forth in Title 22 regulations.

D. The Department will identify in its recommendations to a RWQCB with respect to proposed water reclamation requirements any conditions upon which its approval of a proposed project is based. The RWQCB staff will incorporate any "conditions of approval" submitted as part of the Department's recommendations into the water reclamation requirements proposed for adoption by the RWQCB.

E. Each agency hereto, when evaluating policies and procedures of its programs that affect water reclamation, shall consult with the other agency before adopting new policies or procedures.

F. Each agency hereto shall, to the maximum extent compatible with fulfillment of its primary responsibility to protect and preserve public health and water quality, promote and facilitate use of reclaimed water in this State.

G. As the primary enforcement agencies, the RWQCBs will enforce all aspects of the water reclamation requirements including the Title 22 regulatory requirements. The Department will provide technical assistance to the RWQCBs in carrying out the enforcement program. Where a public water system is involved in the supplying or distribution of the reclaimed water, the Department will use its enforcement authority over public water systems (such as cross connection control) to assist the RWQCBs in their enforcement efforts.

IV. PROGRAM PROVISIONS AND COMMITMENTS

To assure fulfillment of the purposes and principles set forth in this MOA, the agencies hereto commit themselves to the following programmatic approaches and procedures:

A. The RWQCBs will submit copies of proposed project reports or proposals to use reclaimed water as they are received rather than waiting until draft water reclamation permit requirements are completed in order to allow adequate time for review and, if necessary, preliminary discussion between the agencies.

B. The Department agrees to review and respond to water reclamation proposals and proposed water reclamation requirements within 30 days of receiving such referrals from the RWQCB. Should the Department determine that the project report is incomplete [per Water Code Section 13554.2(e)], it will immediately inform the RWQCB and indicate the additional information needed in order to complete the review of the proposed project.

C. In the event a recommendation of the Department is deemed by the RWQCB staff to be inappropriate for inclusion into water reclamation requirements, it will advise the appropriate District Office of the Department. The two agencies agree to meet and try to resolve any differences.

D. When requested by the Department, the RWQCB staff will incorporate a condition into a proposed master permit requiring the producer or distributor of the reclaimed water to submit plans, specifications, reports, or other specified material, to the Department for review and approval for specified new uses or new use areas that are added subsequent to the issuance of the master permit.

E. The Department will incorporate into any local delegation a requirement that the local agency abide by the terms and conditions of this MOA in the same manner as the Department.

F. When deemed necessary by the RWQCB, the Department will attend any RWQCB meeting or hearing to explain or defend any of the Department's conditions of approval or recommendations.

G. The RWQCBs will defer to the Department with respect to any questions involving interpretation of any Title 22 criteria.

H. RWQCB staffs will not waive reclamation requirements nor propose waiver of reclamation requirements for any proposed use of reclaimed water without consultation with the Department.

I. The agencies will work jointly to develop a definitive statement of policy and appropriate guidelines regarding the applicability of the ground water recharge regulations to various reclamation or wastewater disposal facilities.

J. The agencies agree to keep each other informed of any actions relating to specific projects and will send copies of all correspondence with project proponents or others that relate to a specific project to the other agency.

K. The Department agrees to try to coordinate its efforts with those of local health departments in order to foster a closer working relationship with local agencies and to reduce any potential conflicts for the RWQCBs.

L. In recognition of budget and staff limitations, the agencies hereto may be unable to fulfill all of the tasks outlined herein and, therefore, agree to commit to setting priorities that assure public health protection.

M. The RWQCBs will expeditiously notify the Department of all significant violations of reclamation requirements or improper reclamation uses within their jurisdictions. The Department will expeditiously notify the appropriate RWQCB of improper reclamation uses or violation of reclamation requirements which become known to the Department.

V. DISPUTE AND CONFLICT RESOLUTION

It is the desire of the agencies hereto to establish a speedy, efficient, informal method for resolution of interagency disputes, problems or conflicts. To that end, except as otherwise provided in this MOA, and to the extent not inconsistent with any formal administrative appeals which may be pending, the agencies agree that:

A. Any concerns, issues or disputes, arising between the RWQCB staffs and the Department that cannot be resolved by meetings and discussions between the RWQCB Executive Officer and the Department's District Engineer will be brought to the attention of the Executive Director of the SWRCB. The Executive Director will attempt to resolve the matter to the satisfaction of both parties and will, if necessary, meet and confer with the Chief of the Department's Division of Drinking Water and Environmental Management.

B. Nothing contained herein shall be construed to deprive the Department of formal appeal rights relative to any alleged RWQCB action or inaction. In the event of such an appeal, the SWRCB will expedite any review process.

VI. MODIFICATION AND PERIODIC REVIEW

This MOA may be modified in writing at any time by mutual agreement of the agencies hereto. Proposed modifications may be suggested by any agency hereto at any time.

The agencies hereto will meet periodically, not less than once each year, to discuss the actions of each agency relative to this agreement, to devise and agree to appropriate activities for the forthcoming fiscal year, and to consider additional actions and activities which each agency can take to better coordinate their activities and further promote use of reclaimed water in the State.

Director
Department of Health Services

Date: 20 Feb 96

Executive Director
State Water Resources Control Board

Date: 25 Jan 96

Appendix C

Compendium of State Laws Regarding Water Recycling

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Introduction

Legal requirements applicable to recycled water are found in State statutes (laws) and regulations. Statutes are the body of laws approved by the State Legislature and signed by the Governor. Most statutes are codified for ease of reference. Most statutes relevant to recycled water are contained in the Water Code, but there are important references in the Public Resources Code, Health and Safety Code, and other codes. A portion of the Water Code is designated the Porter-Cologne Water Quality Control Act, which includes the permitting of wastewater treatment plants and water recycling facilities, as well as other water quality-related provisions.

Regulations are adopted by State agencies in order to implement the statutes. They are contained in the California Code of Regulations (CCR). The CCR is divided into titles and each title is assigned to particular agencies. The most relevant titles for recycled water are Title 17, which contains regulations to protect against cross-connections between potable and nonpotable water systems, and Title 22, which includes health-related requirements for recycled water systems, such as the types of treatment needed. These two titles are adopted by the Department of Health Services.

The Water Code defines "**reclaimed water**" or "**recycled water**" to mean 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.
In 1995, provisions of the Water Code, Fish and Game Code, Health and safety Code, and other statues were amended to replace terms such as wastewater "**reclamation**" and "**reclaimed water**" with "**water recycling**" and "**recycled water**." The legislation (AB 1247, Setencich) was intended to enhance public acceptance of recycled water supplies.

Recycled Water - Definition

WATER CODE SECTION 13050 (n)

"**Recycled water**" means 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 therefor considered a valuable resource.

WATER CODE SECTION 26

For the purposes of this code, "recycled water" or "reclaimed water" has the same meaning as recycled water as defined in subdivision (n) of Section 13050.

Recycled Water - Recycling Criteria

WATER CODE SECTIONS 13520-13529.4

13520. As used in this article "**recycling** criteria" are the levels of constituents of **recycled water**, and means for assurance of reliability under the design concept which will result in **recycled water** safe from the standpoint of public health, for the uses to be made.

13521. The State Department of Health Services shall establish uniform statewide **recycling** criteria for each varying type of use of **recycled water** where the use involves the protection of public health.

13522. (a) Whenever the State Department of Health Services or any local health officer finds that a contamination exists as a result of the use of **recycled water**, the department or local health officer shall order the contamination abated in accordance with the procedure provided for in Chapter 6 (commencing with Section 5400) of Part 3 of Division 5 of the Health and Safety Code. (b) The use of **recycled water** in accordance with

the uniform statewide **recycling** criteria established pursuant to Section 13521, for the purpose of this section, does not cause, constitute, or contribute to, any form of contamination, unless the department or the regional board determines that contamination exists.

13522.5. (a) Except as provided in subdivision (e), any person **recycling** or proposing to **recycle water**, or using or proposing to use **recycled water**, within any region for any purpose for which **recycling** criteria have been established, shall file with the appropriate regional board a report containing information required by the regional board. (b) Except as provided in subdivision (e), every person **recycling water** or using **recycled water** shall file with the appropriate regional board a report of any material change or proposed change in the character of the **recycled water** or its use. (c) Each report under this section shall be sworn to, or submitted under penalty of perjury. (d) This section shall not be construed so as to require any report in the case of any producing, manufacturing, or processing operation involving the **recycling of water** solely for use in the producing, manufacturing, or processing operation. (e) Except upon the written request of the regional board, a report is not required pursuant to this section from any user of **recycled water** which is being supplied by a supplier or distributor for whom a master **recycling** permit has been issued pursuant to Section 13523.1.

13522.6. Any person failing to furnish a report under Section 13522.5 when so requested by a regional board is guilty of a misdemeanor.

13522.7. The Attorney General, at the request of the regional board, shall petition the superior court for the issuance of a temporary restraining order, temporary injunction or permanent injunction, or combination thereof, as may be appropriate, requiring any person not complying with Section 13522.5 to comply forthwith.

13523. (a) Each regional board, after consulting with and receiving the recommendations of the State Department of Health Services and any party who has requested in writing to be consulted, and after any necessary hearing, shall, if in the judgment of the board, it is necessary to protect the public health, safety, or welfare, prescribe **water reclamation** requirements for water which is used or proposed to be used as **reclaimed water**. (b) The requirements may be placed upon the person **reclaiming water**, the user, or both. The requirements shall be established in conformance with the uniform statewide **reclamation** criteria established pursuant to Section 13521. The regional board may require the submission of a preconstruction report for the purpose of determining compliance with the uniform statewide **reclamation** criteria. The requirements for a use of **reclaimed water** not addressed by the uniform statewide **reclamation** criteria shall be considered on a case-by-case basis.

13523.1. (a) Each regional board, after consulting with, and receiving the recommendations of, the State Department of Health Services and any party who has requested in writing to be consulted, with the consent of the proposed permittee, and after any necessary hearing, may, in lieu of issuing waste discharge requirements pursuant to Section 13263 or **water reclamation** requirements pursuant to Section 13523 for a user of **reclaimed water**, issue a master **reclamation** permit to a supplier or distributor, or both, of **reclaimed water**. (b) A master **reclamation** permit shall include, at least, all of the following: (1) Waste discharge requirements, adopted pursuant to Article 4 (commencing with Section 13260) of Chapter 4. (2) A requirement that the permittee comply with the uniform statewide **reclamation** criteria established pursuant to Section 13521. Permit conditions for a use of **reclaimed water** not addressed by the uniform statewide **water reclamation** criteria shall be considered on a case-by-case basis. (3) A requirement that the permittee establish and enforce rules or regulations for **reclaimed water** users, governing the design and construction of **reclaimed water** use facilities and the use of **reclaimed water**, in accordance with the uniform statewide **reclamation** criteria established pursuant to Section 13521. (4) A requirement that the permittee submit a quarterly report summarizing **reclaimed water** use, including the total amount of **reclaimed water** supplied, the total number of **reclaimed water** use sites, and the locations of those sites, including the names of the hydrologic areas underlying the **reclaimed water** use sites. (5) A requirement that the permittee conduct periodic inspections of the facilities of the **reclaimed water** users to monitor compliance by the users with the uniform statewide **reclamation** criteria established pursuant to Section 13521 and the requirements of the master **reclamation** permit. (6) Any other requirements determined to be appropriate by the regional board.

13523.5. A regional board may not deny issuance of **water reclamation** requirements to a project which violates only a salinity standard in the basin plan.

13524. No person shall **recycle water** or use **recycled water** for any purpose for which **recycling** criteria have been established until **water recycling** requirements have been established pursuant to this article or a regional board determines that no requirements are necessary.

13525. Upon the refusal or failure of any person or persons **recycling water** or using **recycled water** to comply with the provisions of this article, the Attorney General, at the request of the regional board, shall petition the superior court for the issuance of a temporary restraining order, preliminary injunction, or permanent injunction, or combination thereof, as may be appropriate, prohibiting forthwith any person or persons from violating or threatening to violate the provisions of this article.

13525.5. Any person **recycling water** or using **recycled water** in violation of Section 13524, after such violation has been called to his attention in writing by the regional board, is guilty of a misdemeanor. Each day of such **recycling** or use shall constitute a separate offense.

13526. Any person who, after such action has been called to his attention in writing by the regional board, uses **recycled water** for any purpose for which **recycling** criteria have been established prior to the establishment of **water recycling** requirements, is guilty of a misdemeanor.

13527. (a) In administering any statewide program of financial assistance for water pollution or water quality control which may be delegated to it pursuant to Chapter 6 (commencing with Section 13400) of this division, the state board shall give added consideration to water quality control facilities providing optimum **water recycling** and use of **recycled water**. (b) Nothing in this chapter prevents the appropriate regional board from establishing waste discharge requirements if a discharge is involved.

13528. No provision of this chapter shall be construed as affecting the existing powers of the State Department of Health Services.

13529. The Legislature hereby finds and declares all of the following: (a) The purpose of Section 13529.2 is to establish notification requirements for unauthorized discharges of **recycled water** to waters of the state. (b) It is the intent of the Legislature in enacting this section to promote the efficient and safe use of **recycled water**. (c) The people of the state have a primary interest in the development of facilities to **recycle water** to supplement existing water supplies and to minimize the impacts of growing demand for new water on sensitive natural water bodies. (d) A substantial portion of the future water requirements of the state may be economically met by the beneficial use of **recycled water**. (e) The Legislature has established a statewide goal to **recycle** 700,000 acre-feet of water per year by the year 2000 and 1,000,000 acre-feet of water per year by the year 2010. (f) The use of **recycled water** has proven to be safe and the State Department of Health Services is drafting regulations to provide for expanded uses of **recycled water**.

13529.2. (a) Any person who , without regard to intent or negligence, causes or permits an unauthorized discharge of 50,000 gallons or more of **recycled water**, as defined in subdivision (c), or 1,000 gallons or more of **recycled water**, as defined in subdivision (d), in or on any waters of the state , or causes or permits such unauthorized discharge to be discharged where it is, or probably will be, discharged in or on any waters of the state, shall, as soon as (1) that person has knowledge of the discharge, (2) notification is possible, and (3) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the appropriate regional board. (b) For the purposes of this section, an unauthorized discharge means a discharge not authorized by waste discharge requirements pursuant to Article 4 of Chapter 4 (commencing with Section 13260), **water reclamation** requirements pursuant to Section 13523, a master **reclamation** permit pursuant to Section 13523.1, or any other provision of this division. (c) For the purposes of this section, "**recycled water**" means wastewater treated as "disinfected tertiary 2.2 **recycled water**," as defined or described by the State Department of Health Services or wastewater receiving advanced treatment beyond disinfected tertiary 2.2 **recycled water**. (d) For purposes of this section, "**recycled water**" means "**recycled water**," as defined in subdivision (n) of Section 13050, which is treated at a level less than "disinfected tertiary 2.2 **recycled water**," as defined or described by the State Department of Health Services. (e) The requirements in this section supplement, and shall not supplant, any other provisions of law.

13529.4. (a) Any person refusing or failing to provide the notice required by Section 13529.2, or as required by a condition of waste discharge requirements requiring notification of unauthorized releases of **recycled water** as defined in Section 13529.2, may be subject to administrative civil liability in an amount not to exceed the following: (1) For the first violation, or a subsequent violation occurring more than 365 days from a previous violation, five thousand dollars ($5,000). (2) For a second violation occurring within 365 days of a previous violation, ten thousand dollars ($10,000). (3) For a third or subsequent violation occurring within 365 days of a previous violation, twenty-five thousand dollars ($25,000). (b) The penalties in this section supplement, and shall not supplant, any other provisions of law.

TITLE 22 CODE OF REGULATIONS - SECTION 60321

60321. Sampling and analysis - (a) Disinfected secondary-23, disinfected secondary-2.2, and disinfected tertiary **recycled water** shall be sampled at least once daily for total coliform bacteria. The samples shall be taken from the disinfected effluent and shall be analyzed by an approved laboratory. (b) Disinfected tertiary **recycled water** shall be continuously sampled for turbidity using a continuous turbidity meter and recorder following filtration. Compliance with the daily average operating filter effluent turbidity shall be determined by averaging the levels of recorded turbidity taken at four-hour intervals over a 24-hour period. Compliance with turbidity pursuant to section 60301.320 (a)(2)(B) and (b)(1) shall be determined using the levels of recorded turbidity taken at intervals of no more than 1.2-hours over a 24-hour period. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2-hours may be substituted for a period of up to 24-hours. The results of the daily average turbidity determinations shall be reported quarterly to the regulatory agency. (c) The producer or supplier of the **recycled water** shall conduct the sampling required in subsections (a) and (b).

Recycled Water - Water Recycling Act of 1991

WATER CODE SECTIONS 13575-13583

13575. (a) This chapter shall be known and may be cited as the **Water Recycling** Act of 1991. (b) As used in this chapter, the following terms have the following meanings: (1) "Customer" means a person or entity that purchases water from a retail water supplier. (2) "Entity responsible for groundwater replenishment" means any person or entity authorized by statute or court order to manage a groundwater basin and acquire water for groundwater replenishment. (3) "**Recycled water**" has the same meaning as defined in subdivision (n) of Section 13050. (4) "**Recycled water** producer" means any local public entity that produces **recycled water**. (5) "**Recycled water** wholesaler" means any local public entity that distributes **recycled water** to retail water suppliers and which has constructed, or is constructing, a **recycled water** distribution system. (6) "Retail water supplier" means any local entity, including a public agency, city, county, or private **water** company, that provides retail water service. (7) "Retailer" means the retail water supplier in whose service area is located the property to which a customer requests the delivery of **recycled water** service.

13576. The Legislature hereby makes the following findings and declarations: (a) The State of California is subject to periodic drought conditions. (b) The development of traditional water resources in California has not kept pace with the state's population, which is growing at the rate of over 700,000 per year and which is anticipated to reach 36 million by the year 2010. (c) There is a need for a reliable source of water for uses not related to the supply of potable water to protect investments in agriculture, greenbelts, and recreation and to replenish groundwater basins, and protect and enhance fisheries, wildlife habitat, and riparian areas. (d) The environmental benefits of **recycled water** include a reduced demand for water in the Sacramento-San Joaquin Delta which is otherwise needed to maintain water quality, reduced discharge of waste into the ocean, and the enhancement of groundwater basins, recreation, fisheries, and wetlands. (e) The use of **recycled water** has proven to be safe from a public health standpoint, and the State Department of Health Services is updating regulations for the use of **recycled water**. (f) The use of **recycled water** is a cost-effective, reliable method of helping to meet California's water supply needs. (g) The development of the infrastructure to distribute **recycled water** will provide jobs and enhance the economy of the state. (h) Retail water suppliers and **recycled water** producers and wholesalers should promote the substitution of **recycled water** for potable water and imported water in order to maximize the appropriate cost-effective use of **recycled water** in California. (i) **Recycled water** producers, retail water suppliers, and entities responsible for groundwater replenishment should cooperate in joint technical, economic, and environmental studies, as appropriate, to determine the feasibility of providing

recycled water service. (j) Retail water suppliers and **recycled water** producers and wholesalers should be encouraged to enter into contracts to facilitate the service of **recycled** and potable water by the retail water suppliers in their service areas in the most efficient and cost-effective manner. (k) **Recycled water** producers and wholesalers and entities responsible for groundwater replenishment should be encouraged to enter into contracts to facilitate the use of **recycled water** for groundwater replenishment if **recycled water** is available and the authorities having jurisdiction approve its use. (l) Wholesale prices set by **recycled water** producers and **recycled water** wholesalers, and rates that retail water suppliers are authorized to charge for **recycled water**, should reflect an equitable sharing of the costs and benefits associated with the development and use of **recycled water**.

13577. This chapter establishes a statewide goal to **recycle** a total of 700,000 acre-feet of water per year by the year 2000 and 1,000,000 acre-feet of water per year by the year 2010.

13578. (a) In order to achieve the statewide goal for **recycled water** use established in Section 13577 and to implement the Governor' s Advisory Drought Planning Panel Critical Water Shortage Contingency Plan recommendations, Section F2, as submitted December 29, 2000, the department shall identify and report to the Legislature on opportunities for increasing the use of **recycled water**, as defined in paragraph (3) of subdivision (b) of Section 13575, and identify constraints and impediments, including the level of state financial assistance available for project construction, to increasing the use of **recycled water**. (b) The department shall convene a task force, to be known as the 2002 **Recycled Water** Task Force, to advise the department in implementation of subdivision (a), including making recommendations to the Legislature regarding the following: (1) How to further the use of **recycled water** in industrial and commercial applications, including, but not limited to, those applications set forth in Section 13552.8. The task force shall evaluate the current regulatory framework of state and local rules, regulations, ordinances, and permits to identify the obstacles and disincentives to industrial and commercial **reuse**. Issues to be investigated include, but are not limited to, applicability of visual inspections instead of pressure tests for cross-connections between potable and nonpotable water systems, dual piping trenching restrictions, fire suppression system design, and backflow protections. (2) Changes in the Uniform Plumbing Code, published by the International Association of Plumbing and Mechanical Officials, that are appropriate to facilitate the use of **recycled water** in industrial and commercial settings. The department shall make recommendations to the California Building Standards Commission with regard to suggested revisions to the California Plumbing Code necessary to incorporate the changes identified by the task force. (3) Changes in state statutes or the current regulatory framework of state and local rules, regulations, ordinances, and permits appropriate to increase the use of **recycled water** for commercial laundries and toilet and urinal flushing in structures including, but not limited to, those defined in subdivision (c) of Section 13553. The department shall identify financial incentives to help offset the cost of retrofitting privately and publicly owned structures. (4) The need to reconvene the California Potable **Reuse** Committee established by the department in 1993 or convene a successor committee to update the committee's finding that planned indirect potable **reuse** of **recycled water** by augmentation of surface water supplies would not adversely affect drinking water quality if certain conditions were met. (5) The need to augment state water supplies using water use efficiency strategies identified in the CALFED Bay-Delta Program. In its report pursuant to subdivision (a), the department shall identify ways to coordinate with CALFED to assist local communities in educating the public with regard to the statewide water supply benefits of local **recycling** projects and the level of public health protection ensured by compliance with the uniform statewide water **recycling** criteria developed by the State Department of Health Services in accordance with Section 13521. (6) Impediments or constraints, other than water rights, related to increasing the use of **recycled water** in applications for agricultural, environmental, or irrigation uses, as determined by the department. (c) (1) The task force shall be convened by the department and be comprised of one representative from each of the following state agencies: (A) The department. (B) The State Department of Health Services. (C) The state board. (D) The California Environmental Protection Agency. (E) The CALFED Bay-Delta Program. (F) The Department of Food and Agriculture. (G) The Building Standards Commission. (H) The University of California. (I) The Resources Agency. (2) The task force shall also include one representative from a recognized environmental advocacy group and one representative from a consumer advocacy group, as determined by the department, and one representative of local agency health officers, one representative of urban water wholesalers, one representative from a groundwater management entity, one representative of water districts, one representative from a nonprofit association of public and private members created to further the use of **recycled water**, one representative of commercial real estate, one representative of land development, one representative of industrial interests, and at least two representatives from each of the following as defined in Section 13575:

(A) **Recycled water** producer. (B) **Recycled water** wholesaler. (C) Retail water supplier. (d) The department and the task force shall report to the Legislature not later than July 1, 2003. (e) The department shall carry out the duties of this section only to the extent that funds pursuant to Section 79145, enacted as part of the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (Division 26 (commencing with Section 79000)), are made available for the purposes of this section.

13579. (a) In order to achieve the goals established in Section 13577, retail water suppliers shall identify potential uses for **recycled water** within their service areas, potential customers for **recycled water** service within their service areas, and, within a reasonable time, potential sources of **recycled water**. (b) **Recycled** water producers and **recycled water** wholesalers may also identify potential uses for **recycled water**, and may assist retail water suppliers in identifying potential customers for **recycled water** service within the service areas of those retail water suppliers. (c) **Recycled water** producers, retail water suppliers, and entities responsible for groundwater replenishment may cooperate in joint technical, economic, and environmental studies, as appropriate, to determine the feasibility of providing **recycled water** service and **recycled water** for groundwater replenishment consistent with the criteria set forth in paragraphs (1) to (3), inclusive, of subdivision (a) of Section 13550 and in accordance with Section 60320 of Title 22 of the California Code of Regulations.

13580. (a) A retail water supplier that has identified a potential use or customer pursuant to Section 13579 may apply to a **recycled water** producer or **recycled water** wholesaler for a **recycled water** supply. (b) A **recycled water** producer or **recycled water** wholesaler that has identified a potential use or customer pursuant to Section 13579 may, in writing, request a retail water supplier to enter into an agreement to provide **recycled water** to the potential customer. (c) A customer may request, in writing, a retailer to enter into an agreement to provide **recycled water** to the customer. (d) (1) An entity responsible for groundwater replenishment that is a customer of a retail water supplier and that has identified the potential use of **recycled water** for groundwater replenishment purposes may, in writing, request that retail water supplier to enter into an agreement to provide **recycled water** for that purpose. That entity may not obtain **recycled water** for that purpose from a **recycled water** producer, a **recycled water** wholesaler, or another retail water supplier without the agreement of the entity's retail water supplier. (2) An entity responsible for groundwater replenishment that is not a customer of a retail water supplier and that has identified the potential use of **recycled water** for groundwater replenishment purposes may, in writing, request a retail water supplier, a **recycled water** producer, or a **recycled water** wholesaler to enter into an agreement to provide **recycled water** for that purpose.

13580.5. (a) (1) Subject to subdivision (e) of Section 13580.7, a retail water supplier that receives a request from a customer pursuant to subdivision (c) of Section 13580 shall enter into an agreement to provide **recycled water**, if **recycled water** is available, or can be made available, to the retail water supplier for sale to the customer. (2) Notwithstanding paragraph (1), in accordance with a written agreement between a **recycled water** producer or a **recycled water** wholesaler and a retail water supplier, the retail water supplier may delegate to a **recycled water** producer or a **recycled water** wholesaler its responsibility under this section to provide **recycled water**. (b) A customer may not obtain **recycled water** from a **recycled water** producer, a **recycled water** wholesaler, or a retail water supplier that is not the retailer without the agreement of the retailer. (c) If either a **recycled water** producer or a **recycled water** wholesaler provides a customer of a retail water supplier with a written statement that it can and will provide **recycled water** to the retailer, the retail water supplier shall, not later than 120 days from the date on which the retail water supplier receives the written statement from the customer, by certified mail, return receipt requested, submit a written offer to the customer. A determination of availability pursuant to Section 13550 is not required. (d) If the state board pursuant to Section 13550 makes a determination that there is available **recycled water** to serve a customer of a retail water supplier, the retail water supplier, not later than 120 days from the date on which the retail water supplier receives a copy of that determination from the customer, by certified mail, return receipt requested, shall submit a written offer to the customer.

13580.7. (a) This section applies only to a retail water supplier that is a public agency. (b) A customer may request, in writing, a retail water supplier to enter into an agreement or adopt **recycled water** rates in order to provide **recycled water** service to the customer. The retail water supplier, by certified mail return receipt requested, shall submit a written offer to the customer not later than 120 days from the date on which the retail water supplier receives the written request from the customer. (c) If no rate is in effect for **recycled water** service within the service area of a retail water supplier, the rate and conditions for **recycled water** service shall be established by contract between the retail water supplier and the customer, not later than 120 days from the

date on which the customer requests a contract, or, by resolution or ordinance by the retail water supplier, not later than 120 days from the date on which the retail water supplier receives the customer's written request for an ordinance or resolution. (d) A rate for **recycled water** service established by contract, ordinance, or resolution, shall reflect a reasonable relationship between the amount of the rate and the retail cost of obtaining or producing the **recycled water**, the cost of conveying the **recycled water**, and overhead expenses for providing **recycled water** service. Capital costs of facilities required to serve the customer shall be amortized over the economic life of the facility, or the length of time the customer agrees to purchase **recycled water**, whichever is less. The rate shall not exceed the estimated reasonable cost of providing the service, and any additional costs agreed to by the customer for **recycled water** supplemental treatment. (e) The rate for **recycled water** shall be comparable to, or less than, the retail water supplier's rate for potable water. If **recycled water** service cannot be provided at a rate comparable to, or less than, the rate for potable water, the retail water supplier is not required to provide the **recycled water** service, unless the customer agrees to pay a rate that reimburses the retail water supplier for the costs described in subdivision (c). (f) The offer required by subdivisions (c) and (d) of Section 13580.5 shall identify all of the following: (1) The source for the **recycled water**. (2) The method of conveying the **recycled water**. (3) A schedule for delivery of the **recycled water**. (4) The terms of service. (5) The rate for the **recycled water**, including the per-unit cost for that water. (6) The costs necessary to provide service and the basis for determining those costs. (g) This section does not apply to **recycled water** service rates established before January 1, 1999, or any amendments to those rates.

13580.8. (a) This section applies only to a retail water supplier that is regulated by the Public Utilities Commission. (b) Rates for **recycled water** that is provided to the customer by a retail water supplier regulated by the Public Utilities Commission shall be established by the commission pursuant to Section 455.1 of the Public Utilities Code. A regulated water utility may request the commission to establish the rate or rates for the delivery of **recycled** or nonpotable water, with the objective of providing, where practicable, a reasonable economic incentive for the customer to purchase **recycled** or nonpotable water in place of potable water. (c) A regulated water utility may propose a rate or rates for **recycled** or nonpotable water by tariff or by contract between the retail water supplier and the customer. Where the rate or rates are set by contract, the water utility and its customer shall meet, confer, and negotiate in good faith to establish a contract rate. (d) The commission shall, as appropriate, provide a discount from the general metered rate of the water utility for potable water by either of the following means: (1) Passing through to the customer the net reduction in cost to the water utility in purchasing and delivering **recycled** or nonpotable water as compared to the cost of purchasing and delivering potable water. (2) Granting to the customer a uniform discount from the water utility's general metered potable water rate when the discount in paragraph (1) is determined to be an insufficient incentive for the customer to convert to the use of **recycled** or nonpotable water. If the commission provides for a discount pursuant to this paragraph that is greater than the water utility's reduction in cost, the commission shall authorize the water utility to include the aggregate amount of that discount in its revenue requirements to be applied to, and recovered in, rates that are applicable to all general metered customers.

13580.9. (a) Notwithstanding any other provision of law, and except as otherwise previously provided for in a contract agreed to by the customer and the City of West Covina, if the purchaser, contractor, or lessee of, or successor to, all or a portion of the water utility owned by the City of West Covina is a retail water supplier that is regulated by the Public Utilities Commission, rates for **recycled** or nonpotable water service to a closed hazardous waste and solid waste facility located within the boundaries of the City of West Covina for the purposes of irrigation, recreation, or dust suppression or any other use at that facility shall be established in accordance with subdivisions (a) to (e), inclusive, of Section 13580.7, and if there is a failure to agree on the terms and conditions of a **recycled** or nonpotable water supply agreement for the delivery of water for those purposes by that purchaser, contractor, lessee, or successor, Section 13581 shall apply. (b) For the purpose of this section, nonpotable water that is not the result of the treatment of waste shall be treated as the equivalent of **recycled water** if it is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefor considered a valuable resource, if the use of that water will not adversely affect downstream water rights, degrade water quality, or be injurious to plant life, fish, or wildlife, as provided by statute or by regulations of the State Department of Health Services and the state board or a regional board, as appropriate.

13581. (a) If there is a failure to agree on terms and conditions of a **recycled water** supply agreement involving a retail water supplier that is a public agency within 180 days from the date of the receipt of a request for **recycled water** pursuant to subdivision (c) of Section 13580, a written statement pursuant to subdivision (c) of

Section 13580.5, or a determination of availability pursuant to subdivision (d) of Section 13580.5, any party may request a formal mediation process. The parties shall commence mediation within 60 days after the mediation request is made. If the parties cannot agree on a mediator, the director shall appoint a mediator. The mediator may recommend to the parties appropriate terms and conditions applicable to the service of **recycled water**. The cost for the services of the mediator shall be divided equally among the parties to the mediation and shall not exceed twenty thousand dollars ($20,000). (b) If the parties in mediation reach agreement, both parties together shall draft the contract for the **recycled water** service. The parties shall sign the contract within 30 days. (c) If the parties in mediation fail to reach agreement, the affected retail water supplier shall, within 30 days, by resolution or ordinance, adopt a rate for **recycled water** service. The agency action shall be subject to validating proceedings pursuant to Chapter 9 (commencing with Section 860) of Part 2 of Title 10 of the Code of Civil Procedure, except that there shall not be a presumption in favor of the retail water supplier under the action taken to set the rate for **recycled water** service. The mediator shall file a report with the superior court setting forth the recommendations provided to the parties regarding appropriate terms and conditions applicable to the service of **recycled water**. Each party shall bear its own costs and attorney's fees.

13581.2. If the retail water supplier is regulated by the Public Utilities Commission, and there is a failure to agree on terms and conditions of a **recycled** water supply agreement with a customer within 180 days from the date of the receipt of a request for **recycled water** pursuant to subdivision (c) of Section 13580, a written statement pursuant to subdivision (c) of Section 13580.5, or a determination of availability pursuant to subdivision (d) of Section 13580.5, the matter shall be submitted to the Public Utilities Commission for resolution, and the commission shall determine a contract rate or rates for **recycled water** as provided in Section 13580.8.

13582. This chapter is not intended to alter either of the following: (a) Any rights, remedies, or obligations which may exist pursuant to Article 1.5 (commencing with Section 1210) of Chapter 1 of Part 2 of Division 2 of this code or Chapter 8.5 (commencing with Section 1501) of Part 1 of Division 1 of the Public Utilities Code. (b) Any rates established or contracts entered into prior to January 1, 1999.

13583. (a) If a retail water supplier that is a public agency does not comply with this chapter, the customer may petition a court for a writ of mandate pursuant to Chapter 2 (commencing with Section 1084) of Title 1 of Part 3 of the Code of Civil Procedure. (b) If a retail water supplier is regulated by the Public Utilities Commission and does not comply with this chapter, the Public Utilities Commission may order the retailer to comply with this chapter after receiving a petition from the customer specifying the provisions of this chapter with which the retailer has failed to comply.

Recycled Water and Water Supply Augmentation

WATER CODE SECTIONS 13510-13512

13510. It is hereby declared that the people of the state have a primary interest in the development of facilities to **recycle** water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the state.

13511. The Legislature finds and declares that a substantial portion of the future water requirements of this state may be economically met by beneficial use of **recycled water**. The Legislature further finds and declares that the utilization of **recycled water** by local communities for domestic, agricultural, industrial, recreational, and fish and wildlife purposes will contribute to the peace, health, safety and welfare of the people of the state. Use of **recycled water** constitutes the development of "new basic water supplies" as that term is used in Chapter 5 (commencing with Section 12880) of Part 6 of Division 6.

13512. It is the intention of the Legislature that the state undertake all possible steps to encourage development of **water recycling** facilities so that **recycled water** may be made available to help meet the growing water requirements of the state.

WATER CODE SECTION 13142.5

(e) (1) Adequately treated **recycled water** should, where feasible, be made available to supplement existing surface and underground supplies and to assist in meeting future water requirements of the coastal zone, and consideration, in statewide programs of financial assistance for water pollution or water quality control, shall be given to providing optimum **water recycling** and use of **recycled water**.

WATER CODE SECTIONS 78500-78500.2

78500. This division shall be known and may be cited as the Safe, Clean, Reliable Water Supply Act.

78500.2. In placing this measure before the voters, the Legislature hereby finds and declares all of the following: (a) The state faces a water crisis that threatens our economy and environment. (b) The state's growing population has increasing needs for safe water supplies which are essential to the public health, safety, and welfare. (c) It is of paramount importance that the limited water resources of the state be protected from pollution, and conserved and **recycled** whenever economically, environmentally, and technically feasible. (d) The state should plan to meet the water supply needs of all beneficial uses of water, including urban, agricultural, and environmental, utilizing a wide range of strategies including water conservation and **recycling**, conjunctive use of surface and groundwater supplies, water transfers, and improvements in the state' s water storage and delivery systems to meet the growing water needs of the state. (e) This measure is a necessary first step toward providing for the state's long-term water supply requirements through a number of water management strategies. (f) The San Francisco Bay/Sacramento San Joaquin Delta Estuary (the Bay-Delta) is of statewide and national importance. The Bay-Delta provides habitat for more than 120 species of fish and wildlife and serves as a major link in our water delivery system for businesses and farms statewide and more than 22 million residents. (g) The state has signed an historic accord with federal officials and statewide water interests that calls for the development of a comprehensive and long-term solution for the water supply reliability, water quality, and environmental problems of the Bay-Delta. (h) Federal and state representatives have initiated a program known as CALFED, to develop a comprehensive and long-term solution to the problems associated with the Bay-Delta, including an equitable allocation of program costs among beneficiary groups. The success of the CALFED program is vital to the environmental and economic well-being of the state.

HEALTH AND SAFETY CODE SECTION 116551

The department shall not issue a permit to a public water system or amend a valid existing permit for the use of a reservoir as a source of supply that is directly augmented with **recycled water**, as defined in subdivision (n) of Section 13050 of the Water Code, unless the department does all of the following: (a) Performs an engineering evaluation that evaluates the proposed treatment technology and finds that the proposed technology will ensure that the **recycled water** meets or exceeds all applicable primary and secondary drinking water standards and poses no significant threat to public health. (b) Holds at least three duly noticed public hearings in the area where the **recycled water** is proposed to be used or supplied for human consumption to receive public testimony on that proposed use. The department shall make available to the public, not less than 10 days prior to the date of the first hearing held pursuant to this subdivision, the evaluations and findings made pursuant to subdivision (a).

TITLE 22 CODE OF REGULATIONS - SECTION 60320

60320. Groundwater recharge - (a) **Reclaimed water** used for groundwater recharge of domestic water supply aquifers by surface spreading shall be at all times of a quality that fully protects public health. The State Department of Health Services' recommendations to the Regional Water Quality Control Boards for proposed groundwater recharge projects and for expansion of existing projects will be made on an individual case basis where the use of **reclaimed water** involves a potential risk to public health. (b) The State Department of Health Services' recommendations will be based on all relevant aspects of each project, including the following factors: treatment provided; effluent quality and quantity; spreading area operations; soil characteristics; hydrogeology; residence time; and distance to withdrawal. (c) The State Department of Health Services will hold a public hearing prior to making the final determination regarding the public health aspects of each groundwater recharge project. Final recommendations will be submitted to the Regional Water Quality Control Board in an expeditious manner.

Recycled Water and Water Management Planning

WATER CODE SECTIONS 10610-10610.2

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following: (1) The waters of the state are a limited and renewable resource subject to ever-increasing demands. (2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level. (3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate. (4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years. (5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies. (6) Implementing effective water management strategies, including groundwater storage projects and **recycled water** projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of **recycled water**. (7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities. (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability. (9) The quality of source supplies can have a significant impact on water management strategies and supply reliability. (b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

WATER CODE SECTION 10630

It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

WATER CODE SECTION 10631

A plan shall be adopted in accordance with this chapter …

WATER CODE SECTION 10633

The plan shall provide, to the extent available, information on **recycled water** and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following: (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal. (b) A description of the quantity of treated wastewater that meets **recycled water** standards, is being discharged, and is otherwise available for use in a **recycled water** project. (c) A description of the **recycled water** currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use. (d) A description and quantification of the potential uses of **recycled water**, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial **reuse**, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses. (e) The projected use of **recycled water** within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of **recycled water** in comparison to uses previously projected pursuant to this subdivision. (f) A description of actions, including financial incentives, which may be taken to encourage the use of **recycled water**, and the projected results of these actions in terms of acre-feet of **recycled water** used per year. (g) A plan for optimizing the use of **recycled water** in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets **recycled water** standards, and to overcome any obstacles to achieving that increased use.

Recycled Water and California Water Plan Update

WATER CODE SECTIONS 10004-10004.6

10004. (a) The plan for the orderly and coordinated control, protection, conservation, development, and utilization of the water resources of the state which is set forth and described in Bulletin No. 1 of the State Water Resources Board entitled "Water Resources of California," Bulletin No. 2 of the State Water Resources Board entitled, "Water Utilization and Requirements of California," and Bulletin No. 3 of the department entitled, "The California Water Plan," with any necessary amendments, supplements, and additions to the plan, shall be known as "The California Water Plan." (b) (1) The department shall update The California Water Plan on or before December 31, 2003, and every five years thereafter. The department shall report the amendments, supplements, and additions included in the updates of The California Water Plan, together with a summary of the department's conclusions and recommendations, to the Legislature in the session in which the updated plan is issued. (2) The department shall establish an advisory committee, comprised of representatives of agricultural and urban water suppliers, local government, business, production agriculture, and environmental interests, and other interested parties, to assist the department in the updating of The California Water Plan. The department shall consult with the advisory committee in carrying out this section. The department shall provide written notice of meetings of the advisory committee to any interested person or entity that request the notice. The meetings shall be open to the public. (3) The department shall release a preliminary draft of The California Water Plan, as updated, upon request, to interested persons and entities throughout the state for their review and comments. The department shall provide these persons and entities an opportunity to present written or oral comments on the preliminary draft. The department shall consider these comments in the preparation of the final publication of The California Water Plan, as updated.

10004.5. As part of the requirement of the department to update The California Water Plan pursuant to subdivision (b) of Section 10004, the department shall include in the plan a discussion of various strategies, including, but not limited to, those relating to the development of new water storage facilities, water conservation, **water recycling**, desalination, conjunctive use, and water transfers that may be pursued in order to meet the future **water** needs of the state. The department shall also include a discussion of the potential for alternative **water** pricing policies to change current and projected uses. The department shall include in the plan a discussion of the potential advantages and disadvantages of each strategy and an identification of all federal and state permits, approvals, or entitlements that are anticipated to be required in order to implement the various components of the strategy.

10004.6. (a) As part of updating The California Water Plan every five years pursuant to subdivision (b) of Section 10004, the department shall conduct a study to determine the amount of water needed to meet the state's future needs and to recommend programs, policies, and facilities to meet those needs. (b) The department shall consult with the advisory committee established pursuant to subdivision (b) of Section 10004 in carrying out this section. (c) On or before January 1, 2002, and one year prior to issuing each successive update to The California Water Plan, the department shall release a preliminary draft of the assumptions and other estimates upon which the study will be based, to interested persons and entities throughout the state for their review and comments. The department shall provide these persons and entities an opportunity to present written or oral comments on the preliminary draft. The department shall consider these documents when adopting the final assumptions and estimates for the study. For the purpose of carrying out this subdivision, the department shall release, at a minimum, assumptions and other estimates relating to all of the following: (1) Basin hydrology, including annual rainfall, estimated unimpaired stream flow, depletions, and consumptive uses. (2) Groundwater supplies, including estimates of sustainable yield, supplies necessary to recover overdraft basins, and supplies lost due to pollution and other groundwater contaminants. (3) Current and projected land use patterns, including the mix of residential, commercial, industrial, agricultural, and undeveloped lands. (4) Environmental water needs, including regulatory instream flow requirements, nonregulated instream uses, and water needs by wetlands, preserves, refuges, and other managed and unmanaged natural resource lands. (5) Current and projected population. (6) Current and projected water use for all of the following: (A) Interior uses in a single-family dwelling. (B) Exterior uses in a single-family dwelling. (C) All uses in a multifamily dwelling. (D) Commercial uses. (E) Industrial uses. (F) Parks and open spaces. (7) Evapotranspiration rates for major crop types, including estimates of evaporative losses by irrigation practice and the extent to which evaporation reduces transpiration.

(8) Current and projected adoption of urban and agricultural conservation practices. (9) Current and projected supplies of water provided by **water recycling** and **reuse**. (d) The department shall include a discussion of the potential for alternative water pricing policies to change current and projected water uses identified pursuant to paragraph (6) of subdivision (c). (e) Nothing in this section requires or prohibits the department from updating any data necessary to update The California Water Plan pursuant to subdivision (b) of Section 10004.

Recycled Water / Water Quality Control

WATER CODE SECTIONS 13142 - 13142.5

13142. State policy for water quality control shall consist of all or any of the following: (a) Water quality principles and guidelines for long-range resource planning, including ground **water** and surface water management programs and control and use of **recycled water**. (b) Water quality objectives at key locations for planning and operation of water resource development projects and for water quality control activities. (c) Other principles and guidelines deemed essential by the state board for water quality control. The principles, guidelines, and objectives shall be consistent with the state goal of providing a decent home and suitable living environment for every Californian.

13142.5. In addition to any other policies established pursuant to this division, the policies of the state with respect to water quality as it relates to the coastal marine environment are that: (a) Wastewater discharges shall be treated to protect present and future beneficial uses, and, where feasible, to restore past beneficial uses of the receiving waters. Highest priority shall be given to improving or eliminating discharges that adversely affect any of the following: (1) Wetlands, estuaries, and other biologically sensitive sites. (2) Areas important for water contact sports. (3) Areas that produce shellfish for human consumption. (4) Ocean areas subject to massive waste discharge. Ocean chemistry and mixing processes, marine life conditions, other present or proposed outfalls in the vicinity, and relevant aspects of areawide waste treatment management plans and programs, but not of convenience to the discharger, shall for the purposes of this section, be considered in determining the effects of such discharges. Toxic and hard-to-treat substances should be pretreated at the source if such substances would be incompatible with effective and economical treatment in municipal treatment plants. (b) For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life. (c) Where otherwise permitted, new warmed or cooled water discharges into coastal wetlands or into areas of special biological importance, including marine reserves and kelp beds, shall not significantly alter the overall ecological balance of the receiving area. (d) Independent baseline studies of the existing marine system should be conducted in the area that could be affected by a new or expanded industrial facility using seawater in advance of the carrying out of the development. (e) (1) Adequately treated **recycled water** should, where feasible, be made available to supplement existing surface and underground supplies and to assist in meeting future water requirements of the coastal zone, and consideration, in statewide programs of financial assistance for water pollution or water quality control, shall be given to providing optimum **water recycling** and use of **recycled water**. (2) If **recycled water** is available for industrial use, any discharge to waters in the coastal zone, including the San Francisco Bay, after industrial use, may be authorized if all of the following conditions are met: (A) The discharge will not unreasonably affect beneficial uses. (B) The discharge is consistent with applicable water quality control plans and state policy for water quality control. (C) The use of **recycled water** is consistent with Chapter 7 (commencing with Section 13500). (D) The discharge is consistent with all applicable requirements of Chapter 5.5 (commencing with Section 13370). (E) The discharge is to the same general receiving water location as that to which the wastewater would be discharged if not reused. (3) Any requirement imposed pursuant to Section 13263 or 13377 shall be adjusted to reflect a credit for waste present in the **recycled water** before **reuse**. The credit shall be limited to the difference between the amount of waste present in the nonrecycled water supply otherwise available to the industry and the amount of waste present in the **recycled water**. (4) If the amount of waste in the discharge exceeds prescribed requirements because the amount of waste in the **recycled water** is in excess of that agreed to be furnished by the supplier to the discharger, no enforcement action shall be taken against the discharger unless both of the following statements apply: (A) The supplier of the **recycled water** fails to correct the problem within 30 days after the cause of the problem is identified, or within any greater period of time agreed to by the appropriate regional board. (B) The discharger continues to receive the **recycled water** from the supplier. (f) This section shall not apply to industrial discharges into publicly owned treatment works.

Recycled Water and Conservation / Unreasonable Use of Water

WATER CODE SECTION 461

It is hereby declared that the primary interest of the people of the state in the conservation of all available water resources requires the maximum **reuse** of **reclaimed water** in the satisfaction of requirements for beneficial uses of water.

WATER CODE SECTIONS 13550-13556

13550. (a) The Legislature hereby finds and declares that the use of potable domestic water for nonpotable uses, including, but not limited to, cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if **recycled water** is available which meets all of the following conditions, as determined by the state board, after notice to any person or entity who may be ordered to use **recycled water** or to cease using potable water and a hearing held pursuant to Article 2 (commencing with Section 648) of Chapter 1.5 of Division 3 of Title 23 of the California Code of Regulations: (1) The source of **recycled water** is of adequate quality for these uses and is available for these uses. In determining adequate quality, the state board shall consider all relevant factors, including, but not limited to, food and employee safety, and level and types of specific constituents in the **recycled water** affecting these uses, on a user-by-user basis. In addition, the state board shall consider the effect of the use of **recycled water** in lieu of potable water on the generation of hazardous waste and on the quality of wastewater discharges subject to regional, state, or federal permits. (2) The **recycled water** may be furnished for these uses at a reasonable cost to the user. In determining reasonable cost, the state board shall consider all relevant factors, including, but not limited to, the present and projected costs of supplying, delivering, and treating potable domestic water for these uses and the present and projected costs of supplying and delivering **recycled water** for these uses, and shall find that the cost of supplying the treated **recycled water** is comparable to, or less than, the cost of supplying potable domestic water. (3) After concurrence with the State Department of Health Services, the use of **recycled water** from the proposed source will not be detrimental to public health. (4) The use of **recycled water** for these uses will not adversely affect downstream water rights, will not degrade water quality, and is determined not to be injurious to plantlife, fish, and wildlife. (b) In making the determination pursuant to subdivision (a), the state board shall consider the impact of the cost and quality of the nonpotable water on each individual user. (c) The state board may require a public agency or person subject to this article to furnish information which the state board determines to be relevant to making the determination required in subdivision (a).

13551. A person or public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, shall not use water from any source of quality suitable for potable domestic use for nonpotable uses, including cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses if suitable **recycled water** is available as provided in Section 13550; however, any use of **recycled water** in lieu of water suitable for potable domestic use shall, to the extent of the **recycled water** so used, be deemed to constitute a reasonable beneficial use of that water and the use of **recycled water** shall not cause any loss or diminution of any existing water right.

13552. The amendments to Sections 13550 and 13551 of the Water Code made during the first year of the 1991-92 Regular Session are not intended to alter any rights, remedies, or obligations which may exist prior to January 1, 1992, pursuant to, but not limited to, those sections or Chapter 8.5 (commencing with Section 1501) of Part 1 of Division 1 of the Public Utilities Code.

13552.2. (a) The Legislature hereby finds and declares that the use of potable domestic water for the irrigation of residential landscaping is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water**, for this use, is available to the residents and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (b) The state board may require a public agency or person subject to this section to submit information that the state board determines may be relevant in making the determination required in subdivision (a).

13552.4. (a) Any public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, may require the use of **recycled water** for irrigation of residential landscaping, if all of the following requirements are met: (1) **Recycled water**, for this use, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (2) The use of **recycled water** does not cause any loss or diminution of any existing water right. (3) The irrigation systems are constructed in accordance with Chapter 3 (commencing with Section 60301) of Division 4 of Title 22 of the California Code Regulations. (b) This section applies to both of the following: (1) New subdivisions for which the building permit is issued on or after March 15, 1994, or, if a building permit is not required, new structures for which construction begins on or after March 15, 1994, for which the State Department of Health Services has approved the use of **recycled water**. (2) Any residence that is retrofitted to permit the use of **recycled water** for landscape irrigation and for which the State Department of Health Services has approved the use of **recycled water**. (c) (1) Division 13 (commencing with Section 21000) of the Public Resources Code does not apply to any project which only involves the repiping, redesign, or use of **recycled water** for irrigation of residential landscaping necessary to comply with a requirement prescribed by a public agency under subdivision (a). (2) The exemption in paragraph (1) does not apply to any project to develop **recycled water**, to construct conveyance facilities for **recycled water**, or any other project not specified in this subdivision.

13552.6. (a) The Legislature hereby finds and declares that the use of potable domestic water for floor trap priming, cooling towers, and air-conditioning devices is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water**, for these uses, is available to the user, and the water meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (b) The state board may require a public agency or person subject to this section to submit information that the state board determines may be relevant in making the determination required in subdivision (a).

13552.8. (a) Any public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, may require the use of **recycled water** in floor trap priming, cooling towers, and air-conditioning devices, if all of the following requirements are met: (1) **Recycled water**, for these uses, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (2) The use of **recycled water** does not cause any loss or diminution of any existing water right. (3) If public exposure to aerosols, mist, or spray may occur, appropriate mist mitigation or mist control is provided, such as the use of mist arrestors or the addition of biocides to the water in accordance with criteria established pursuant to Section 13521. (4) The person intending to use **recycled water** has prepared an engineering report pursuant to Section 60323 of Title 22 of the California Code of Regulations that includes plumbing design, cross-connection control, and monitoring requirements for the public agency, which are in compliance with criteria established pursuant to Section 13521. (b) This section applies to both of the following: (1) New industrial facilities and subdivisions for which the building permit is issued on or after March 15, 1994, or, if a building permit is not required, new structures for which construction begins on or after March 15, 1994, for which the State Department of Health Services has approved the use of **recycled water**. (2) Any structure that is retrofitted to permit the use of **recycled water** for floor traps, cooling towers, or air-conditioning devices, for which the State Department of Health Services has approved the use of **recycled water**. (c) (1) Division 13 (commencing with Section 21000) of the Public Resources Code does not apply to any project which only involves the repiping, redesign, or use of **recycled water** for floor trap priming, cooling towers, or air-conditioning devices necessary to comply with a requirement prescribed by a public agency under subdivision (a). (2) The exemption in paragraph (1) does not apply to any project to develop **recycled water**, to construct conveyance facilities for **recycled water**, or any other project not specified in this subdivision.

13553. (a) The Legislature hereby finds and declares that the use of potable domestic water for toilet and urinal flushing in structures is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water**, for these uses, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (b) The state board may require a public agency or person subject to this section to furnish whatever information may be relevant to making the determination required in subdivision (a). (c) For the purposes of this section and Section 13554, “structure” or “structures” means commercial, retail, and office buildings, theaters, auditoriums, schools, hotels, apartments, barracks, dormitories, jails, prisons, and reformatories, and other structures as determined by the

State Department of Health Services. (d) Nothing in this section or Section 13554 applies to a pilot program adopted pursuant to Section 13553.1.

13553.1. (a) The Legislature hereby finds and declares that certain coastal areas of the state have been using sea water to flush toilets and urinals as a means of conserving potable water; that this practice precludes the beneficial **reuse** of treated wastewater and has had a deleterious effect on the proper wastewater treatment process, and has led to corrosion of the sea water distribution pipelines and wastewater collection systems; and that this situation must be changed. (b) There is a need for a pilot program to demonstrate that conversion to the use of **recycled water** in residential buildings for toilet and urinal flushing does not pose a threat to public health and safety. (c) A city that is providing a separate distribution system for sea water for use in flushing toilets and urinals in residential structures may, by ordinance, authorize the use of **recycled water** for the flushing of toilets and urinals in residential structures if the level of treatment and the use of the **recycled water** meets the criteria set by the State Department of Health Services.

13554. (a) Any public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, may require the use of **recycled water** for toilet and urinal flushing in structures, except a mental hospital or other facility operated by a public agency for the treatment of persons with mental disorders, if all of the following requirements are met: (1) **Recycled water**, for these uses, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (2) The use of **recycled water** does not cause any loss or diminution of any existing water right. (3) The public agency has prepared an engineering report pursuant to Section 60323 of Title 22 of the California Code of Regulations that includes plumbing design, cross-connection control, and monitoring requirements for the use site, which are in compliance with criteria established pursuant to Section 13521. (b) This section applies only to either of the following: (1) New structures for which the building permit is issued on or after March 15, 1992, or, if a building permit is not required, new structures for which construction begins on or after March 15, 1992. (2) Any construction pursuant to subdivision (a) for which the State Department of Health Services has, prior to January 1, 1992, approved the use of **recycled water**. (c) Division 13 (commencing with Section 21000) of the Public Resources Code does not apply to any project which only involves the repiping, redesign, or use of **recycled water** by a structure necessary to comply with a requirement issued by a public agency under subdivision (a). This exemption does not apply to any project to develop **recycled water**, to construct conveyance facilities for **recycled water**, or any other project not specified in this subdivision.

13554.2. (a) Any person or entity proposing the use of **recycled water** shall reimburse the State Department of Health Services for reasonable costs that department actually incurs in performing duties pursuant to this chapter. (b) (1) Upon a request from the person or entity proposing the use of **recycled water**, the State Department of Health Services shall, within a reasonable time after the receipt of the request, provide an estimate of the costs that it will reasonably incur in the performance of its duties pursuant to this chapter. (2) For purposes of implementing subdivision (a), that department shall maintain a record of its costs. In determining those costs, that department may consider costs that include, but are not limited to, costs relating to personnel requirements, materials, travel, and office overhead. The amount of reimbursement shall be equal to, and may not exceed, that department's actual costs. (c) With the consent of the person or entity proposing the use of **recycled water**, the State Department of Health Services may delegate all or part of the duties that department performs pursuant to this chapter within a county to a local health agency authorized by the board of supervisors to assume these duties, if, in the judgment of that department, the local health agency can perform these duties. Any person or entity proposing the use of **recycled water** shall reimburse the local health agency for reasonable costs that the local health agency actually incurs in the performance of its duties delegated pursuant to this subdivision. (d) (1) Upon a request from the person or entity proposing the use of **recycled water**, the local health agency shall, within a reasonable time after the receipt of the request, provide an estimate of the cost it will reasonably incur in the performance of its duties delegated under subdivision (c). (2) The local health agency, if delegated duties pursuant to subdivision (c), shall maintain a record of its costs that include, but is not limited to, costs relating to personnel requirements, materials, travel, and office overhead. The amount of reimbursement shall be equal to, and may not exceed, the local health agency's actual costs. (e) The State Department of Health Services or local health agency shall complete its review of a proposed use of **recycled water** within a reasonable period of time. That department shall submit to the person or entity proposing the use of **recycled water** a written determination as to whether the proposal submitted is complete for purposes of review within 30 days from the date of receipt of the proposal and shall approve or disapprove the proposed use within 30 days from the date on which that

department determines that the proposal is complete. (f) An invoice for reimbursement of services rendered shall be submitted to the person or entity proposing the use of **recycled water** subsequent to completion of review of the proposed use, or other services rendered, that specifies the number of hours spent by the State Department of Health Services or local health agency, specific tasks performed, and other costs actually incurred. Supporting documentation, including receipts, logs, timesheets, and other standard accounting documents, shall be maintained by that department or local health agency and copies, upon request, shall be provided to the person or entity proposing the use of **recycled water**. (g) For the purposes of this section, "person or entity proposing the use of **recycled water**" means the producer or distributor of **recycled water** submitting a proposal to the department.

13554.3. The State Water Resources Control Board may establish a reasonable schedule of fees by which it is reimbursed for the costs it incurs pursuant to Sections 13553 and 13554.

13555.2. The Legislature hereby finds and declares that many local agencies deliver **recycled water** for nonpotable uses and that the use of **recycled water** is an effective means of meeting the demands for new water caused by drought conditions or population increases in the state. It is the intent of the Legislature to encourage the design and construction of water delivery systems on private property that deliver water for both potable and nonpotable uses in separate pipelines.

13555.3. (a) Water delivery systems on private property that could deliver **recycled water** for nonpotable uses described in Section 13550, that are constructed on and after January 1, 1993, shall be designed to ensure that the water to be used for only potable domestic uses is delivered, from the point of entry to the private property to be served, in a separate pipeline which is not used to deliver the **recycled water**. (b) This section applies to water delivery systems on private property constructed within either of the following jurisdictions: (1) One that has an urban water management plan that includes the intent to develop **recycled water** use. (2) One that does not have an urban **water** management plan that includes **recycled water** use, but that is within five miles of a jurisdiction that does have an urban water management plan that includes **recycled water** use, and has indicated a willingness to serve the water delivery system. (c) This section does not preempt local regulation of the delivery of water for potable and nonpotable uses and any local governing body may adopt requirements which are more restrictive than the requirements of this section.

13556. In addition to any other authority provided in law, any water supplier described in subdivision (b) of Section 1745 may acquire, store, provide, sell, and deliver **recycled water** for any beneficial use, including, but not limited to, municipal, industrial, domestic, and irrigation uses, if the water use is in accordance with statewide **recycling** criteria and regulations established pursuant to this chapter.

STREETS AND HIGHWAYS CODE SECTION 92.3

(a) The department shall do both of the following: (1) Discontinue further water intensive freeway landscaping and use drought resistant landscaping whenever feasible, taking into consideration such factors as erosion control and fire retardant needs. (2) Eliminate any dependency on imported water for landscaping as soon as practicable.

(b) The department shall require the use of **recycled water** for the irrigation of freeway landscaping when it finds and determines that all of the following conditions exist: (1) The **recycled water** is of adequate quality and is available in adequate quantity for the proposed use. (2) The proposed use of the **recycled water** is approved by the California regional water quality control board having jurisdiction. (3) There is a direct benefit to the state highway program for the proposed use of **recycled** water. (4) The **recycled water** is supplied by a local public agency or water public utility able to contract for delivery of water and the installation, maintenance, and repair of facilities to deliver the water. (5) The installation of the water delivery facilities does not unreasonably increase any hazard to vehicles on the freeway or create unreasonable problems of highway maintenance and repair.

(c) In cooperation with local public agencies and water public utilities, the department shall permit local public agencies and water public utilities to place transmission lines for **recycled water** in freeway rights-of-way for use by the local public agencies and water public utilities to transmit **recycled water** to others, when to do so will promote a beneficial use of **recycled water** and that transmission does not unreasonably interfere

with use of the freeway or unreasonably increase any hazard to vehicles on the freeway, subject to paragraphs (1) to (5), inclusive, of subdivision (b) and the following additional requirements: (1) The local public agency or water public utility holds the department harmless for any liability caused by a disruption of service to other users of the **recycled water** and will defend the department in any resulting legal action and pay any damages awarded as a result of that disruption. (2) The department, in cooperation with the local public agency or water public utility, may temporarily interrupt service in order to add to or modify its facilities without liability, as specified in paragraph (1). (3) The local public agency or water public utility obtains and furnishes the department an agreement by all other users of **recycled water** from the transmission system holding the department harmless for any disruption in service. (4) The local public agency or water public utility has furnished the department a list of other **recycled water** users and information on any backup system or other source of water available for use in case of a service disruption. (5) The local public agency is responsible for the initial cost or any relocation cost of the **recycled water** transmission lines for service to other users in the right-of-way and waives its rights to require the department to pay the relocation costs pursuant to Sections 702 and 704. (6) The local public agency or water public utility maintains the water transmission system subject to reasonable access for maintenance purposes to be negotiated between the department and the local public agency or water public utility. (7) The department has first priority with respect to the **recycled water** supply contracted for by the department. (8) The local public agency or water public utility installs an automatic control system which will allow the water transmission system to be shut down in case of an emergency. The department shall have access to all parts of the transmission system for purposes of the agreement. (9) All transmission lines are placed underground and as close as possible to the freeway right-of-way boundary or at other locations authorized by the department. (10) The plans and specifications for the **recycled water** transmission facilities have been approved by the department prior to construction.

(d) As used in this section: (1) "Local public agency" means any local public agency which transmits or supplies **recycled water** to others. (2) "Water public utility" means any privately owned water corporation which is subject to the jurisdiction and control of the Public Utilities Commission.

Recycled Water - Water Recycling in Landscaping Act

GOVERNMENT CODE SECTIONS 65601-65607

65601. This article shall be known and may be cited as the **Water Recycling** in Landscaping Act.

65602. The Legislature finds and declares all of the following: (a) The waters of the state are of limited supply and are subject to ever-increasing demands. (b) The continuation of California's economic prosperity is dependent on adequate supplies of water being available for future uses. (c) It is the policy of the state to promote the efficient use of water through the development of **water recycling** facilities. (d) Landscape design, installation, and maintenance can and should be water efficient. (e) The use of potable domestic water for landscaped areas is considered a waste or unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water** is available that meets the conditions described in Section 13550 of the Water Code.

65603. Unless the context requires otherwise, the definitions used in this section govern the construction of this article: (a) "Designated **recycled water** use area" means areas within the boundaries of the local agency that can or may in the future be served with **recycled water** in lieu of potable water and are so designated by the local agency. (b) "Local agency" means any city, county, or city and county. (c) "**Recycled water** producer" means any local public or private entity that produces **recycled water** in accordance with the conditions described in Section 13550 of the Water Code.

65604. If a **recycled water** producer determines that within 10 years the **recycled water** producer will provide **recycled water** within the boundaries of a local agency that meets all of the conditions described in Section 13550 of the Water Code, the **recycled water** producer shall notify the local agency of that fact and shall identify in the notice the area that is eligible to receive the **recycled water**, and the necessary infrastructure that the **recycled water** producer or retail water supplier will provide to support delivery of the **recycled water**.

65605. (a) Within 180 days of receipt of notification from a **recycled water** producer pursuant to Section 65604, the local agency shall adopt and enforce a **recycled water** ordinance pursuant to this article. (b) The ordinance shall include, but not be limited to, provisions that do all of the following: (1) State that it is the policy of the local agency that **recycled water** determined to be available pursuant to Section 13550 of the Water Code shall be used for nonpotable uses within the designated **recycled water** use area set forth by the local agency when the local agency determines that there is not an alternative higher or better use for the **recycled water**, its use is economically justified, and its use is financially and technically feasible for projects under consideration by the local agency. (2) Designate the areas within the boundaries of the local agency that can or may in the future use **recycled water**, including, but not limited to, existing urban areas in lieu of potable water. (3) Establish general rules and regulations governing the use and distribution of **recycled water** in accordance with applicable laws and regulations. (4) Establish that the use of the **recycled water** is determined to be available pursuant to Section 13550 of the Water Code in new industrial, commercial, or residential subdivisions located within the designated **recycled water** use areas for which a tentative map or parcel map is required pursuant to Section 66426. These provisions shall require a separate plumbing system to serve nonpotable uses in the common areas of the subdivision, including, but not limited to, golf courses, parks, greenbelts, landscaped streets, and landscaped medians. The separate plumbing system to serve nonpotable uses shall be independent of the plumbing system provided to serve domestic, residential, and other potable water uses in the subdivision. (5) Require that **recycled water** service shall not commence within the designated **recycled water** use area in any service area of a private utility, as defined in Section 1502 of the Public Utilities Code, or to any service area of a public agency retail water supplier that is not a local agency, as defined in subdivision (b) of Section 65603, except in accordance with a written agreement between the **recycled water** producer and the private utility or public agency retail water supplier that shall be made available in a timely manner by the **recycled water** producer to the local agency adopting the ordinance pursuant to this article.

65606. The **recycled water** ordinance adopted by a local agency pursuant to Section 65605 shall not apply to either of the following: (a) A tentative map as defined in Section 66424.5, or a development, as defined in Section 65927, that was approved by the local agency prior to the receipt of notification from a **recycled water** producer pursuant to Section 65604. (b) A subdivision map application that is deemed complete pursuant to Section 65943 prior to the local agency's receipt of a notice from a **recycled water** producer pursuant to Section 65604.

65607. (a) This article shall not apply to any local agency that adopted a **recycled water** ordinance or other regulation requiring the use of **recycled water** in its jurisdiction prior to January 1, 2001. (b) This article does not alter any rights, remedies, or obligations that may exist pursuant to Chapter 7 (commencing with Section 13500) of Division 7 of the Water Code. (c) This article does not alter any rights, remedies, or obligations that may exist pursuant to Chapter 8.5 (commencing with Section 1501) of Part 1 of Division 1 of the Public Utilities Code.

Recycled Water - Different Uses

TITLE 22 CODE OF REGULATIONS SECTIONS 60303-60310

60303. Exceptions -The requirements set forth in this chapter shall not apply to the use of **recycled water** onsite at a **water recycling** plant, or wastewater treatment plant, provided access by the public to the area of onsite **recycled water** use is restricted.

60304. Use of **recycled water** for irrigation - (a) **Recycled water** used for the surface irrigation of the following shall be a disinfected tertiary **recycled water**, except that for filtration pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes: (1) Food crops, including all edible root crops, where the **recycled water** comes into contact with the edible portion of the crop, (2) Parks and playgrounds, (3) School yards, (4) Residential landscaping, (5) Unrestricted access golf courses, and (6) Any other irrigation use not specified in this section and not prohibited by other sections of the California Code of Regulations. (b) **Recycled water** used for the

surface irrigation of food crops where the edible portion is produced above ground and not contacted by the **recycled water** shall be at least disinfected secondary-2.2 **recycled water**. (c) **Recycled water** used for the surface irrigation of the following shall be at least disinfected secondary-23 **recycled water**: (1) Cemeteries, (2) Freeway landscaping, (3) Restricted access golf courses, (4) Ornamental nursery stock and sod farms where access by the general public is not restricted, (5) Pasture for animals producing milk for human consumption, and (6) Any nonedible vegetation where access is controlled so that the irrigated area cannot be used as if it were part of a park, playground or school yard (d) **Recycled wastewater** used for the surface irrigation of the following shall be at least undisinfected **secondary recycled water**: (1) Orchards where the **recycled water** does not come into contact with the edible portion of the crop, (2) Vineyards where the **recycled water** does not come into contact with the edible portion of the crop, (3) Non food-bearing trees (Christmas tree farms are included in this category provided no irrigation with **recycled water** occurs for a period of 14 days prior to harvesting or allowing access by the general public), (4) Fodder and fiber crops and pasture for animals not producing milk for human consumption, (5) Seed crops not eaten by humans, (6) Food crops that must undergo commercial pathogen-destroying processing before being consumed by humans, and (7) Ornamental nursery stock and sod farms provided no irrigation with **recycled water** occurs for a period of 14 days prior to harvesting, retail sale, or allowing access by the general public. (e) No **recycled water** used for irrigation, or soil that has been irrigated with **recycled water**, shall come into contact with the edible portion of food crops eaten raw by humans unless the **recycled water** complies with subsection (a).

60305. Use of **recycled water** for impoundments - (a) Except as provided in subsection (b), **recycled water** used as a source of water supply for nonrestricted recreational impoundments shall be disinfected tertiary **recycled water** that has been subjected to conventional treatment. (b) Disinfected tertiary **recycled water** that has not received conventional treatment may be used for nonrestricted recreational impoundments provided the **recycled water** is monitored for the presence of pathogenic organisms in accordance with the following: (1) During the first 12 months of operation and use the **recycled water** shall be sampled and analyzed monthly for Giardia, enteric viruses, and Cryptosporidium. Following the first 12 months of use, the **recycled water** shall be sampled and analyzed quarterly for Giardia, enteric viruses, and Cryptosporidium. The ongoing monitoring may be discontinued after the first two years of operation with the approval of the department. This monitoring shall be in addition to the monitoring set forth in section 60321. (2) The samples shall be taken at a point following disinfection and prior to the point where the **recycled water** enters the use impoundment. The samples shall be analyzed by an approved laboratory and the results submitted quarterly to the regulatory agency. (c) The total coliform bacteria concentrations in **recycled water** used for nonrestricted recreational impoundments, measured at a point between the disinfection process and the point of entry to the use impoundment, shall comply with the criteria specified in section 60301.230 (b) for disinfected tertiary **recycled water**. (d) **Recycled water** used as a source of supply for restricted recreational impoundments and for any publicly accessible impoundments at fish hatcheries shall be at least disinfected secondary-2.2 **recycled water**. (e) **Recycled water** used as a source of supply for landscape impoundments that do not utilize decorative fountains shall be at least disinfected secondary-23 **recycled water**.

60306. **Use of recycled water** for cooling - (a) **Recycled water** used for industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist shall be a disinfected tertiary **recycled water**. (b) Use of **recycled water** for industrial or commercial cooling or air conditioning that does not involve the use of a cooling tower, evaporative condenser, spraying, or any mechanism that creates a mist shall be at least disinfected secondary-23 **recycled water**. (c) Whenever a cooling system, using **recycled water** in conjunction with an air conditioning facility, utilizes a cooling tower or otherwise creates a mist that could come into contact with employees or members of the public, the cooling system shall comply with the following: (1) A drift eliminator shall be used whenever the cooling system is in operation. (2) A chlorine, 54 or other, biocide shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other microorganisms.

60307. Use of **recycled water** for other purposes - (a) **Recycled water** used for the following shall be disinfected tertiary **recycled water**, except that for filtration being provided pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5

NTU for more than 15 minutes: (1) Flushing toilets and urinals, (2) Priming drain traps, (3) Industrial process water that may come into contact with workers, (4) Structural fire fighting, (5) Decorative fountains, (6) Commercial laundries, (7) Consolidation of backfill around potable water pipelines, (8) Artificial snow making for commercial outdoor use, and (9) Commercial car washes, including hand washes if the **recycled water** is not heated, where the general public is excluded from the washing process. (b) **Recycled water** used for the following uses shall be at least disinfected secondary-23 **recycled water**: (1) Industrial boiler feed, (2) Nonstructural fire fighting, (3) Backfill consolidation around nonpotable piping, (4) Soil compaction, (5) Mixing concrete, (6) Dust control on roads and streets, (7) Cleaning roads, sidewalks and outdoor work areas and (8) Industrial process water that will not come into contact with workers. (c) **Recycled water** used for flushing sanitary sewers shall be at least undisinfected secondary **recycled water**.

60310. Use area requirements - (a) No irrigation with disinfected tertiary **recycled water** shall take place within 50 feet of any domestic water supply well unless all of the following conditions have been met: (1) A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface. (2) The well contains an annular seal that extends from the surface into the aquitard. (3) The well is housed to prevent any **recycled water** spray from coming into contact with the wellhead facilities. (4) The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well. (5) The owner of the well approves of the elimination of the buffer zone requirement. (b) No impoundment of disinfected tertiary **recycled water** shall occur within 100 feet of any domestic water supply well. (c) No irrigation with, or impoundment of, disinfected secondary-2.2 or disinfected secondary-23 **recycled water** shall take place within 100 feet of any domestic water supply well. (d) No irrigation with, or impoundment of, undisinfected secondary **recycled water** shall take place within 150 feet of any domestic water supply well. (e) Any use of **recycled water** shall comply with the following: (1) Any irrigation runoff shall be confined to the **recycled water** use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency. (2) Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities. (3) Drinking water fountains shall be protected against contact with **recycled water** spray, mist, or runoff. (f) No spray irrigation of any **recycled water**, other than disinfected tertiary **recycled water**, shall take place within 100 feet of a residence or a place where public exposure could be similar to that of a park, playground, or school yard. (g) All use areas where **recycled water** is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following wording : "**RECYCLED WATER** - DO NOT DRINK". Each sign shall display an international symbol similar to that shown in figure 60310-A. The Department may accept alternative signage and wording, or an educational program, provided the applicant demonstrates to the Department that the alternative approach will assure an equivalent degree of public notification. (h) Except as allowed under section 7604 of title 17, California Code of Regulations, no physical connection shall be made or allowed to exist between any **recycled water** system and any separate system conveying potable water. (i) The portions of the **recycled water** piping system that are in areas subject to access by the general public shall not include any hose bibbs. Only quick couplers that differ from those used on the potable water system shall be used on the portions of the **recycled water** piping system in areas subject to public access.

Recycled Water and Wetlands / Environmental Restoration

FISH AND GAME CODE SECTION 1421

When creating new wetlands, the board shall give preference to lands most suitable for this purpose due to elevations, existence of levees, proximity to existing wetlands that are protected, and potential sources of water. These potential sources of water are limited to all of the following: (a) Water rights which are attached to the land to be restored including groundwater associated with the property. (b) Water willingly made available for a wetlands conservation project through water conservation. (c) **Recycled water**. (d) Undeveloped water supplies of the state. (e) Water marketed for wetlands purposes by a willing seller. (f) Water otherwise made available for wetlands purposes by private, nonprofit, local, and regional entities.

Recycled Water and Water Rights

WATER CODE SECTION 1010

(a) (1) The cessation of, or reduction in, the use of water under any existing right regardless of the basis of right, as the result of the use of **recycled water**, desalinated water, or water polluted by waste to a degree which unreasonably affects the water for other beneficial uses, is deemed equivalent to, and for purposes of maintaining any right shall be construed to constitute, a reasonable beneficial use of water to the extent and in the amount that the **recycled**, desalinated, or polluted water is being used not exceeding, however, the amount of such reduction. (2) No lapse, reduction, or loss of any existing right shall occur under a cessation of, or reduction in, the use of water pursuant to this subdivision, and, to the extent and in the amount that **recycled**, desalinated, or polluted water is used in lieu of water appropriated by a permittee pursuant to Chapter 6 (commencing with Section 1375) of Part 2, the board shall not reduce the appropriation authorized in the user's permit. (3) The use of **recycled**, desalinated, or polluted water constitutes good cause under Section 1398 to extend the period specified in a permit for application of appropriated water to beneficial use to the extent and in the amount that **recycled**, desalinated, or polluted water is used. The extension by the board shall be granted upon the same terms as are set forth in the user's permit, and for a period sufficient to enable the permittee to perfect his appropriation, while continuing to use **recycled**, desalinated, or polluted water. (4) The board, in issuing a license pursuant to Article 3 (commencing with Section 1610) of Chapter 9 of Part 2, shall not reduce the appropriation authorized by permit, to the extent and in the amount that reduction in a permittee's use, during the perfection period, including any extension as provided in this section, has resulted from the use of **recycled**, desalinated, or polluted water in lieu of the permittee's authorized appropriation. (5) The board may require any user of water who seeks the benefit of this section to file periodic reports describing the extent and amount of the use of **recycled**, desalinated, or polluted water. To the maximum extent possible, the reports shall be made a part of other reports required by the board relating to the use of water. (6) For purposes of this section, the term "**recycled water**" has the same meaning as in Division 7 (commencing with Section 13000).

(b) Water, or the right to the use of water, the use of which has ceased or been reduced as the result of the use of **recycled**, desalinated, or polluted water as described in subdivision (a), may be sold, leased, exchanged, or otherwise transferred pursuant to any provision of law relating to the transfer of water or water rights, including, but not limited to, provisions of law governing any change in point of diversion, place of use, and purpose of use due to the transfer.

GOVERNMENT CODE SECTIONS 25701-25703

25701. The board of supervisors may enter into contracts with municipalities, sanitation districts, sanitary districts or other incorporated bodies within the county, providing for the delivery to the county of sewage, or other waste water, or both, produced by or coming from such incorporated bodies.

25702. The board of supervisors may acquire, construct, repair, manage, and maintain all works necessary or proper for the treatment, purification, and **reclamation of water** from sewage or other waste waters, or both, and may **reclaim** any sewage or other waste water obtained pursuant to contracts entered into pursuant to this article, or obtained otherwise.

25703. The board of supervisors may dispose of **recycled water** and any byproducts of that **recycling**, pursuant to this article, in any one or more of the following ways: (a) Sale to the county and the inhabitants thereof. (b) Sale to any public entity or water corporation. (c) Replenishment of the underground water supplies anywhere within the county. (d) Sale to any city or, with the consent of the city legislative body expressed by ordinance, to the inhabitants thereof.

Recycled Water - Delivery / Piping

HEALTH AND SAFETY CODE SECTION 116815

(a) All pipes installed above or below the ground, on and after June 1, 1993, that are designed to carry **recycled water**, shall be colored purple or distinctively wrapped with purple tape.

(b) Subdivision (a) shall apply only in areas served by a water supplier delivering water for municipal and industrial purposes, and in no event shall apply to any of the following: (1) Municipal or industrial facilities that have established a labeling or marking system for **recycled water** on their premises, as otherwise required by a local agency, that clearly distinguishes **recycled water** from potable water. (2) Water delivered for agricultural use. (c) For purposes of this section, "**recycled water**" has the same meaning as defined in subdivision (n) of Section 13050 of the Water Code.

WATER CODE SECTION 13555.3

(a) Water delivery systems on private property that could deliver **recycled water** for nonpotable uses described in Section 13550, that are constructed on and after January 1, 1993, shall be designed to ensure that the water to be used for only potable domestic uses is delivered, from the point of entry to the private property to be served, in a separate pipeline which is not used to deliver the **recycled water**.

(b) This section applies to water delivery systems on private property constructed within either of the following jurisdictions: (1) One that has an urban water management plan that includes the intent to develop **recycled** water use. (2) One that does not have an urban water management plan that includes **recycled water** use, but that is within five miles of a jurisdiction that does have an urban water management plan that includes **recycled water** use, and has indicated a willingness to serve the water delivery system.

(c) This section does not preempt local regulation of the delivery of water for potable and nonpotable uses and any local governing body may adopt requirements which are more restrictive than the requirements of this section.

TITLE 22 CODE OF REGULATIONS - SECTIONS 60313-60316

60313. General requirements - (a) No person other than a **recycled water** agency shall deliver **recycled water** to a dual-plumbed facility. (b) No **recycled water** agency shall deliver **recycled water** for any internal use to any individually-owned residential units including free-standing structures, multiplexes, or condominiums. (c) No **recycled water** agency shall deliver **recycled water** for internal use except for fire suppression systems, to any facility that produces or processes food products or beverages. For purposes of this Subsection, cafeterias or snack bars in a facility whose primary function does not involve the production or processing of foods or beverages are not considered facilities that produce or process foods or beverages. (d) No **recycled water** agency shall deliver **recycled water** to a facility using a dual plumbed system unless the report required pursuant to section 13522.5 of the Water Code, and which meets the requirements set forth in section 60314, has been submitted to, and approved by, the regulatory agency.

60314. Report submittal - (a) For dual-plumbed **recycled water** systems, the report submitted pursuant to section 13522.5 of the Water Code shall contain the following information in addition to the information required by section 60323: (1) A detailed description of the intended use area identifying the following: (A) The number, location, and type of facilities within the use area proposing to use dual plumbed systems, (B) The average number of persons estimated to be served by each facility on a daily basis, (C) The specific boundaries of the proposed use area including a map showing the location of each facility to be served, (D) The person or persons responsible for operation of the dual plumbed system at each facility, and (E) The specific use to be made of the **recycled water** at each facility. (2) Plans and specifications describing the following: (A) Proposed piping system to be used, (B) Pipe locations of both the **recycled** and potable systems, (C) Type and location of the outlets and plumbing fixtures that will be accessible to the public, and (D) The methods and devices to be used to prevent backflow of **recycled water** into the public water system. (3) The methods to be used by the **recycled water** agency to assure that the installation and operation of the dual plumbed system will not result in cross connections between the **recycled water** piping system and the potable water piping system. This shall include a description of pressure, dye or other test methods to be used to test the system every four years. (b) A master plan report that covers more than one facility or use site may be submitted provided the report includes the information required by this section. Plans and specifications for individual facilities covered by the report may be submitted at any time prior to the delivery of **recycled water** to the facility.

60315. Design requirements - The public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed **recycled water** system unless the connection between the two systems is protected by

an air gap separation which complies with the requirements of sections 7602 (a) and 7603 (a) of title 17, California Code of Regulations, and the approval of the public water system has been obtained.

60316. Operation requirements - (a) Prior to the initial operation of the dual-plumbed **recycled water** system and annually thereafter, the **Recycled Water** Agency shall ensure that the dual plumbed system within each facility and use area is inspected for possible cross connections with the potable water system. The **recycled water** system shall also be tested for possible cross connections at least once every four years. The testing shall be conducted in accordance with the method described in the report submitted pursuant to section 60314. The inspections and the testing shall be performed by a cross connection control specialist certified by the California-Nevada section of the American Water Works Association or an organization with equivalent certification requirements. A written report documenting the result of the inspection or testing for the prior year shall be submitted to the department within 30 days following completion of the inspection or testing. (b) The **recycled water** agency shall notify the department of any incidence of backflow from the dual-plumbed **recycled water** system into the potable water system within 24 hours of the discovery of the incident. (c) Any backflow prevention device installed to protect the public water system serving the dual-plumbed **recycled water** system shall be inspected and maintained in accordance with section 7605 of Title 17, California Code of Regulations.

TITLE 22 CODE OF REGULATIONS - SECTION 60323

60323. Engineering report - (a) No person shall produce or supply **reclaimed water** for direct **reuse** from a proposed **water reclamation** plant unless he files an engineering report. (b) The report shall be prepared by a properly qualified engineer registered in California and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed **reclamation** system. The report shall clearly indicate the means for compliance with these regulations and any other features specified by the regulatory agency. (c) The report shall contain a contingency plan which will assure that no untreated or inadequately treated wastewater will be delivered to the use area.

Appendix D

Proposed California Version of Appendix J of the Uniform Plumbing Code

Appendix D

Proposed California Version of Appendix J
Recycled Water Systems of the Plumbing Code

DRAFT FOR THE CALIFORNIA PLUMBING CODE TO REPLACE
APPENDIX J OF THE UNIFORM PLUMBING CODE

J1 Recycled Water Systems - General

(a) This appendix applies to the installation, construction, alteration, and repair of recycled water systems intended to supply toilets (water closets), urinals, and trap primers for floor drains and floor sinks. The recycled water system shall not have any connections to the potable water system.

(b) No permit shall be issued until complete plumbing plans have been submitted and approved by the Administrative Authority. No changes to the recycled water system or potable water system may be made without first obtaining permits and approval from the Administrative Authority.

(c)

(d) Before the building may be occupied, the installer shall perform an initial cross-connection test using a temporary connection to a potable water source and the test shall be ruled successful before the recycled water supply can be connected. This testing shall be conducted in the presence of the Administrative Authority or other authorities that have jurisdiction. See Section J8 for further details.

J2 Definitions

The terms “reclaimed water” and “recycled water” have the same meaning and either may be used in place of the other. The more modern term is “recycled water”, and is the term used throughout this Code.

J3 Permit

It is unlawful to construct, repair, or modify a recycled water system without first obtaining a permit to do such work from the Administrative Authority.

J4 Drawings and Specifications

(a) Drawings and specifications for recycled water systems shall be in accordance with the requirements identified in Chapter 1, Administration, of the California Plumbing Code.

(b) The drawings and specifications shall provide sufficient detail to determine compliance with the requirements of this Appendix and the California Plumbing Code.

J5 Pipe Material / Pipe Identification

(a) Recycled water piping and fittings shall be as required in the California Plumbing Code.

(b) All recycled water pipe shall be permanently marked to identify that it contains recycled water. This may be accomplished by labeling piping using purple adhesive plastic tape along the entire length of the pipe or using non-metallic pipe manufactured with purple color integral to the material. For either pipe material, the identification system shall be clearly legible and installed so that the following wording is clearly visible: “Caution: Recycled Water – Do Not Drink”.

J6 Installation

(a) The portions of the recycled water piping system in areas subject to access by the general public shall not include any hose bibbs. Only quick couplers that differ from those used on the potable water system shall be used on the portions of the recycled water piping system in areas subject to public access.

(b) The recycled water system and the potable water system within the building shall be provided with the required appurtenances (valves, air vacuum relief valves, etc.) to allow for testing as required by Section J8 of this appendix.

J7 Signs

(a) Within each bathroom or restroom facility where recycled water is used, a sign shall be installed with the following wording:

TO CONSERVE WATER,
THIS BUILDING USES RECYCLED WATER TO FLUSH TOILETS AND URINALS

(b) Each equipment room containing recycled water equipment shall have a sign posted with the following wording in one (1) inch (25.4 mm) letters on a purple background:

CAUTION
RECYCLED WATER, DO NOT DRINK.
DO NOT CONNECT TO DRINKING WATER SYSTEM.
NOTICE
CONTACT BUILDING MANAGEMENT BEFORE
PERFORMING ANY WORK ON THIS WATER SYSTEM.

This sign shall be posted in a location that is visible to anyone working on or near recycled water equipment.

(c) Where tank-type toilets (water closets) are flushed with recycled water a permanent sign (such as plastic or stainless steel) shall be installed inside the tank to warn that the water within the tank is not a suitable emergency water supply. The sign wording shall be: RECYCLED WATER – DO NOT DRINK.

(d) Each recycled water valve within a wall shall have its access door into the wall equipped with a warning sign approximately six (6) inches by six (6) inches (152.4 mm x 152.4 mm) with wording in one half (1/2) inch (12.7 mm) letters on a purple background. The size, shape and format of the sign shall be substantially the same as that specified in subsection (b) above. The signs shall be attached inside the access door frame and shall hang in the center of the access door frame. This sign requirement shall be applicable to any and all access doors, hatches, etc. that provide access to recycled water piping and appurtenances.

(e) Valve Seals. The master recycled water shut-off valve and/or the recycled water meter curb cock and each valve within a wall shall be sealed so as to prevent operation without breaking the seal after the recycled water system has been approved, and placed into operation. These seals shall either be a crimped lead wire seal, or a plastic breakaway seal which, if broken after system approval shall be deemed conclusive evidence that the recycled water system has been accessed. The seals shall be purple and sequentially numbered with the words "RECYCLED WATER", and shall be supplied by the recycled water purveyor, or by other arrangements acceptable to the Administrative Authority.

J 8 Inspection and Testing

(a) Recycled water piping shall be tested as outlined in this Code for testing of potable water piping.

(b) An initial Cross-Connection Test and subsequent Annual Visual System Inspection shall be performed as follows:

(1) Annual Visual System Inspection. A visual system inspection shall be conducted annually by the Administrative Authority or other authorities having jurisdiction.

(i) Meter locations of the recycled water and potable water lines shall be checked to verify that no modifications were made, or cross-connections are visible.

(ii) All pumps and equipment, equipment room signs, and exposed piping in equipment room shall be checked.

(iii) All valves shall be checked to insure that valve lock seals are still in place and intact. All valve access door signs shall be checked to verify that no signs have been removed.

(iv) If the visual test indicates that the recycled plumbing has been modified, a Cross-Connection Test is required.

(2) Cross-Connection Test. The applicant shall perform the following test before the building may be occupied or at other times when there is material reason to believe that the system separation has been compromised. The test shall be conducted in the presence of the Administrative Authority or other authorities having jurisdiction to determine if a cross-connection has occurred.

Cross-connection testing, following the procedures listed below, shall not be required, unless the results of the visual inspection indicate it is needed. Alternate inspection and testing requirements may be allowed by the Administrative Authority for institutional or industrial buildings where

shutting off the water is not practical. The recycled water purveyor, or other designated appointee may substitute for the Administrative Authority in the above-mentioned inspection and tests unless the Administrative Authority objects.

(i) The potable water system shall be activated and pressurized. The recycled water system shall be shut down and completely depressurized.

(ii) The potable water system shall remain pressurized while the recycled water system is depressurized. The minimum period the recycled water system is to remain depressurized shall be determined on a case-by-case basis, taking into account the size and complexity of the potable and recycled water distribution systems.

(iii) All fixtures, potable and recycled, shall be tested and inspected for flow. Flow from any recycled water system outlet shall indicate a cross-connection. No flow from a potable water outlet would indicate that it may be connected to the recycled water system.

(iv) The drain on the recycled water system shall be checked for flow during the test and at the end of the period.

(v) The potable water system shall then be completely depressurized.

(vi) The recycled water system shall then be activated and pressurized. For the initial test, a temporary connection to a potable water supply will be required to test the recycled water system plumbing.

(vii) The recycled water system shall remain pressurized while the potable water system is depressurized. The minimum period the potable water system is to remain depressurized shall be determined on a case-by-case basis.

(viii) All fixtures, potable and recycled shall be tested and inspected for flow. Flow from any potable water system outlet shall indicate a cross-connection. No flow from a recycled water outlet would indicate that it may be connected to the potable water system.

(ix) The drain on the potable water system shall be checked for flow during the test and at the end of the period.

(x) If there is no flow detected in any of the fixtures which would have indicated a cross-connection, the potable water system shall be repressurized.

(3) In the event that a cross-connection is discovered, the following procedure shall be activated immediately:

(i) Recycled water piping to the building shall be shut down at the meter, and the recycled water system shall be drained at the riser.

(ii) Potable water piping to the building shall be shut down at the meter.

(iii) The cross-connection shall be uncovered and disconnected.

(iv) The building shall be retested following procedures listed in subsections (b)(1) and (b)(2) above.

(v) The potable water system shall be chlorinated with fifty (50) parts per million (ppm) chlorine for twenty-four (24) hours.

(vi) The potable water system shall be flushed after twenty-four (24) hours, and a standard bacteriological test shall be performed. If test results are acceptable, the potable water system may be recharged.

J 9 Sizing

Recycled water piping shall be sized as outlined in the California Plumbing Code for sizing potable water piping.

Appendix E

Abbreviations

Appendix E

Abbreviations and Acronyms

A

AB Assembly Bill
AB 331 Assembly Bill No. 331 (Goldberg), 2000-2001 Legislative Session
ACWA Association of California Water Agencies
af Acre-foot or acre-feet
AFY Acre-feet per year

B

BARWRP Bay Area Regional Water Recycling Program
BAT Best available technology
BDAC Bay-Delta Advisory Council
BDPAC California Bay-Delta Public Advisory Committee
B/C Benefit-to-cost (ratio)
BMP Best management practice

C

Cal/EPA California Environmental Protection Agency
CALFED State (CAL) and federal (FED) agencies participating in Bay-Delta Accord
CASA California Association of Sanitation Agencies
CBDA California Bay-Delta Authority
CBSC California Building Standards Commission
CCR California Code of Regulations
CEQA California Environmental Quality Act
cfs Cubic feet per second
CPC California Plumbing Code
CSU California State University
CWA Clean Water Act
CWC California Water Commission

D

DBP Disinfection by-products
DFA California Department of Food and Agriculture
DFG California Department of Fish and Game
DHS California Department of Health Services
DWR California Department of Water Resources

E

EDCs Endocrine disrupting compounds
EIR Environmental impact report
EIS Environmental impact statement
EPA U.S. Environmental Protection Agency

F

FY Fiscal year

G

gpm Gallons per minute

gpd Gallons per day

H

HCD Department of Housing and Community Development

I

IAPMO International Association of Plumbing and Mechanical Officials

K

kWh Kilowatt hour

M

m Meter
maf Million acre-feet
MCL Maximum contaminant level
MF Microfiltration
mgd Million gallons per day
mg/L Milligrams per liter
MOA Memorandum of agreement
MOU Memorandum of understanding
MUD Municipal utility district
MWD Municipal water district

N

NDMA N-NitrosoDiMethylAmine
NEPA National Environmental Policy Act
NF Nanofiltration
NGO Non-governmental organization
NPDES National pollutant discharge elimination system
NPDWR National primary drinking water regulations
NRC National Research Council

P

PCP Personal care product
PhAC Pharmaceutically active compound
ppb Parts per billion
ppm Parts per million
ppt Parts per trillion or parts per thousand
psi Pounds per square inch

R

RO Reverse osmosis
RWQCB Regional Water Quality Control Board

S

SB Senate Bill
SCCWRRS Southern California Comprehensive Water Reclamation and Reuse Study
SDWA Safe Drinking Water Act or South Delta Water Agency
SWP State Water Project
SWRCB State Water Resources Control Board

T

taf Thousand acre-feet
Task Force: 2002 Recycled Water Task Force, also known as the Recycled Water Task Force.

TDS Total dissolved solids
TOC Total organic carbon

U

UC University of California
UPC Uniform Plumbing Code
USBR U.S. Bureau of Reclamation
USEPA U.S. Environmental Protection Agency
USFWS U.S. Fish and Wildlife Service
USGS U.S. Geological Survey
UV Ultraviolet

W

WTP Water treatment plant
WWTP Wastewater treatment plant

Appendix F

Glossary

Appendix F

Glossary

A

Acre-Foot (AF) — A unit commonly used for measuring the volume of water; equal to the quantity of water required to cover one acre (43,560 square feet or 4,047 square meters) to a depth of 1 foot (0.30 meter) and equal to 43,560 cubic feet (1,234 cubic meters), or 325,851 gallons. (An acre-foot of water is considered enough water to meet the needs of two families of four for a year.)

Action Level — The level of a contaminant in drinking water that is considered not to pose a significant health risk to people ingesting that water on a daily basis. Action Levels (ALs) are health-based advisory levels established by DHS for chemicals in drinking water that lack *Maximum Contaminant Levels (MCLs)*.

Activated Sludge Process — A treatment process that removes (by biological assimilation and decomposition) organic matter from wastewater using a biologic floc in an aerobic environment.

Advanced Treatment — Additional treatment provided to remove suspended and dissolved substances after conventional secondary treatment. Often this term is used to mean additional treatment after tertiary filtration and disinfection treatment for the purpose of further removing contaminants of public health or other water quality concern. This may include membrane filtration and advanced oxidation.

Agricultural Drainage — (1) the process of directing excess water away from root zones by natural or artificial means, such as by using a system of drains placed below ground surface level; also called subsurface drainage; (2) the water drained away from irrigated farmland.

Air Gap — An open vertical gap or empty space that separates a drinking water supply to be protected from another water system in a treatment plant or other location. The open gap protects the drinking water from contamination by *backflow*.

Aquifer — A geologic formation that stores water and yields significant quantities of water to wells or springs.

Arid — A term describing a climate or region in which precipitation is so deficient in quantity or occurs so infrequently that intensive agricultural production is not possible without irrigation.

Artificial Recharge — (1) the addition of surface water to a groundwater reservoir by human activity, such as putting surface water into a Spreading Basin. (2) The designed (as per human activities as opposed to the natural or incidental) replenishment of ground water storage from surface water supplies such as irrigation or induced infiltration from streams or wells.

B

Backflow — (1) The backing up of water through a conduit or channel in the direction opposite to normal flow. (2) The undesirable flow of water from a plumbing system back into the community potable water supply. (3) A reverse flow condition created by a difference in water pressures that causes water to flow back into the distribution pipes of a drinking water supply from any source other than the intended one. Backflow prevention assemblies prevent contamination and are required by city and state laws. Also referred to as back *s*iphonage.

Backflow Preventer — A device that allows liquids to flow in only one direction in a pipe. Backflow preventers are used on sewer pipes to prevent a reverse flow during flooding situations. They are also used at connections to drinking water systems to prevent potentially contaminated water from flowing into drinking water supplies. One type of Backflow Preventer is a *Check Valve*.

Bacteria (Singular: Bacterium) — (1) Microscopic one-celled organisms, which live everywhere and perform a variety of functions. While decomposing organic matter in water, bacteria can greatly reduce the amount of oxygen in the water. They also can make water unsafe to drink. (2) Microscopic unicellular organisms, typically spherical, rod-like, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials, for example, decomposing organic matter into a form available for reuse by plants. Some forms of bacteria are used to stabilize organic wastes in wastewater treatment plants, oil spills, or other pollutants. Disease-causing forms of bacteria are termed "pathogenic." Some forms of bacteria harmful to humans include:

[1] ***Total Coliform Bacteria*** – A particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 3 C. In the laboratory these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35 C plus or minus 1.0 C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as numbers of colonies per 100 milliliter (mL) of sample.

[2] ***Fecal Coliform Bacteria*** – Bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all the organisms that produce blue colonies within 24 hours when incubated at 44.5 C plus or minus 0.2 C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as numbers of colonies per 100 mL of sample.

[3] ***Fecal Streptococcal Bacteria*** – Bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms that produce colonies which produce red or pink colonies within 24 hours at 35 C plus or minus 1.0 C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as numbers of colonies per 100 mL of sample.

Beneficial Use (of Water) — A use of water resulting in appreciable gain or benefit to the user, consistent with state law, which varies from one state to another. In California, beneficial uses of waters of the state that may be protected against quality degradation include, but are not necessarily limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. (Water Code, Section 13050(f))

Best Management Practices (BMP) — (1) A generally accepted practice for some aspect of natural resources management to protect or achieve the best use of the resources, such as water conservation measures, drainage management measures, or erosion control measures. Typically incorporates conservation criteria. (2) A set of field activities that provide the most effective means for reducing pollution from a nonpoint source.

Biochemical Oxidation — The process by which bacteria and other microorganisms feed on complex organic materials and decompose them. Self-purification of waterways and activated sludge and trickling filter wastewater treatment processes depend on this principle.

Biochemical Oxygen Demand (BOD) — (1) A measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria. (2) A measure of the amount of oxygen removed from aquatic environments by aerobic micro-organisms for their metabolic requirements. Measurement of BOD is used to determine the level of organic pollution of a stream or lake. The greater the BOD, the greater the degree of water pollution. Also referred to as *Biological Oxygen Demand (BOD)*.

Biochemical Oxygen Demand (BOD) Loading —The BOD content, commonly expressed in pounds/day, of wastewater passing into a waste treatment system or a body of water. The greater the BOD content, the greater the degree of pollution.

Biodegradation — The metabolic breakdown of materials into simpler components by living organisms. A more specific form of biotransformation.

Biofouling — The gradual accumulation of waterborne organisms (as bacteria and protozoa) on the surfaces of engineering structures in water that contributes to corrosion of the structures and to a decrease in the efficiency of moving parts. Biofouling contributes also to the clogging of membranes and filters.

Biogas — Methane gas produced during the anaerobic decomposition of the remains of plants or animal wastes by bacteria.

Biological Oxidation — Decomposition of complex organic materials by microorganisms. Occurs in the selfpurification of water bodies and in activated sludge wastewater treatment processes.

Biological Oxygen Demand (BOD) — (1) The amount of oxygen required to stabilize decomposable matter by aerobic action. (2) An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste. Also see *BOD5*. Also referred to as *Biochemical Oxygen Demand (BOD)*.

Biological Wastewater Treatment — The use of bacteria to degrade and decompose organic materials in wastewater.

Biosolids — A nutrient-rich organic material that is a byproduct or waste resulting from the treatment of wastewater. Biosolids contain nitrogen and phosphorus along with other supplementary nutrients in smaller doses, such as potassium, sulfur, magnesium, calcium, copper and zinc. Soil that is lacking in these substances can be reclaimed with biosolids use. The application of biosolids to land improves soil properties and plant productivity, and reduces dependence on inorganic fertilizers. The terms biosolids, *Sludge*, and Sewage Sludge can be used interchangeably.

Blackwater — Water that contains animal, human, or food wastes; wastewater from toilet, latrine, and agua privy flushing and sinks used for food preparation. Compare to *Graywater*.

Blending — The mixing or combination of one water source with another, typically a finished source of water with raw water to reuse water while still satisfying water quality standards, for example, mixing of product water from a desalting plant with conventional water to obtain a desired dissolved solids content, or mixing brine effluents with sewage treatment plant effluents in order to reduce evaporation pond size.

BOD — See *Biochemical Oxygen Demand* (*Biological Oxygen Demand*).

BOD5 — The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter. This is the common standard of measurement of BOD. Also see *Biological Oxygen Demand (BOD)*.

Brackish Water — Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses but that are less than sea water. Typically, water containing from 1,000 to 10,000 mg/L of dissolved solids.

C

Carbon Filtration —The passage of treated wastewater or domestic water supplies through activated charcoal to remove low concentrations of dissolved chemicals.

Carcinogen — A cancer-causing substance or agent.

Carcinogenic — Cancer causing.

CFS (Cubic Foot per Second) — A unit of measurement of flowing liquid equal to a rate of one cubic foot per second past a given section. A rate of flow equivalent to 448.83 gallons per minute. Also called Second-Foot. Also written as C.F.S. and cfs.

Check Valve — A type of *Backflow Preventer*.

Chemical Oxygen Demand (COD) — (1) A measure of the chemically oxidizable material in water, which provides an approximation of the amount of organic and inorganic oxygen reducing material present. The determined value may correlate with *Biochemical Oxygen Demand (BOD)* or with carbonaceous organic pollution from sewage or industrial wastes. Nonbiodegradable and recalcitrant (slowly degrading) compounds, which are not detected by the test for BOD, are included in this measurement.

Chlorination — The application of chlorine or one of its compounds to water or wastewater, often for disinfection or oxidation purposes.

Chlorine Residual — The concentration of chlorine remaining in water or wastewater at the end of a specified contact period that will react chemically and biologically. May be present as either combined or free chlorine, or both.

Clarification — A process or combination of processes where the primary purpose is to reduce the concentration of suspended matter in a liquid.

Clarifier — A device or tank in which wastewater is held to allow the settling of particulate matter.

Coagulant — (1) An agent that causes a liquid or solid to coagulate. (2) A chemical compound, such as Alum (aluminum sulfate), used to produce coagulation.

Coagulation — The process of destabilization and initial aggregation of colloidal and finely divided suspended matter by the addition of a floc-forming chemical (coagulant) or by biological processes.

Coliform (Bacteria) — A group of bacteria (Colon bacilli) predominantly inhabiting the intestines of humans or animals but also found in soil. While typically harmless themselves, coliform bacteria are commonly used as indicators of the possible presence of pathogenic organisms or fecal material. Generally reported as colonies per 100 milliliters (mL) of sample.

Coliform Index — An index of the bacteriological quality of water, based on a count of the numbers of coliform bacteria.

Collector Sewers — Pipes used to collect and carry wastewater from individual sources to an interceptor sewer that will carry it to a treatment facility.

Community — Public at large including, but not limited to, local ethnic groups, political/social/economic groups, environmental justice advocates and environmentalists.

Composite Sample —A representative water or wastewater sample made up of individual smaller samples taken at periodic intervals.

Constituents — Any of the chemical substances found in water. Typically, measurements of such constituents in sampled drinking water may consist of *Total Dissolved Solids (TDS)*, Hardness (concentrations of Calcium and Magnesium, specifically), Sodium, Potassium, Sulfate, Chloride, Nitrate, Alkalinity, Bicarbonate, Carbonate, Fluoride, Arsenic, Iron, Manganese, Copper, Zinc, Barium, Boron, and Silica.

Contact Recreation (Water) — Recreational activities involving a significant risk of ingestion of water, including wading by children, swimming, water skiing, diving and surfing.

Contaminant — (1) In a broad sense any physical, chemical, biological, or radiological substance or matter in the environment. (2) In more restricted usage, a substance in water of public health or welfare concern. Also, an

undesirable substance not normally present, or an unusually high concentration of a naturally occurring substance, in water, soil, or other environmental medium.

Contamination (Water) — Impairment of the quality of water sources by sewage, industrial waste, or other matters to a degree that creates a hazard to public health. Also, the degradation of the natural quality of water as a result of human activities. There is no implication of any specific limits because the degree of permissible contamination depends upon the intended end use, or uses, of the water.

Controlled Reuse — The use of recycled water under legal and physical control or restraint even though the recycled water may be co-mingled with water in a natural water body.

Cooling Tower — A large tower or stack that is used for cooling water by falling water being cooled by upward-flowing air and by evaporation of water. The cooled water is collected at the bottom of the tower and may be used again or discharged. A small amount of water is lost (consumed) through evaporation in this process.

Cooling Water — Water used for cooling purposes by electric generators, steam condensers, large machinery or products at industrial plants, and nuclear reactors. Water used for cooling purposes can be fresh, recycled, or saline water and may be used only once or recirculated multiple times. Also see *Cooling Tower*.

Cross-Connection — A physical connection between two water systems, typically between a potable water system and any source or system of water or other substance that is not approved for drinking.

D

Desalting (or Desalination) — A process to reduce the salt concentration of sea water or brackish water.

Detention Time — (1) The theoretical calculated time required for a small amount of water to pass through a tank at a given rate of flow. (2) The actual time that a small amount of water is in a settling basin, flocculating basin, or rapid-mix chamber. (3) In storage reservoirs, the length of time water will be held before being used.

Digester —In a *Wastewater Treatment Plant*, a closed tank that decreases the volume of and stabilizes raw *biosolids* or *sludge* by bacterial action.

Digester Gas — The gas produced as a result of the microbial decomposition of particulate organic matter under anaerobic conditions. Methane and hydrogen are major components.

Digestion —The biochemical decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization of pollutants. In wastewater treatment, the biological decomposition of organic matter in sludge. See *Digester*.

Dilution — The reduction of the concentration of a substance in air or water by mixing with additional air or water.

Direct Reuse — The use of recycled water that has been transported from a wastewater treatment plant to a reuse site without passing through a natural body of either surface or ground water.

Discharge — (1) The volume of water (or more broadly, the volume of fluid including solid- and dissolved-phase material) that passes a given point in a given period of time. (2) The flow of water from an opening into another body of water, as the release of treated wastewater from a treatment plant into a stream or the ocean. The flow of surface water in a stream or the flow of groundwater from a spring, ditch, or flowing artesian well. (3) (Hydraulics) The rate of flow, especially fluid flow; the volume of fluid passing a point per unit time, commonly expressed as cubic feet per second, million gallons per day, gallons per minute, or cubic meters per second.

Discharge Period — The period of time during which effluent is discharged or allowed to be discharged.

Discharge Permit — A permit issued by the state to discharge effluent into waters of the state.

Discharge Point — A location at which effluent is released into a receiving stream or body of water.

Disinfection —The process of killing a large portion of microorganisms in or on a substance, but not bacterial spores. The primary objective of disinfection in water and wastewater treatment is to kill or render harmless microbiological organisms that cause disease. *Chlorination* is the most prevalent disinfection option However, other viable disinfection processes include ozonation and ultraviolet radiation (UV).

Disinfection By-Products — (1) Chemicals that are formed when a disinfectant such as chlorine is added to water that contains organic matter, usually from decaying plant or animal material. (2) Compounds that form when chlorine combines with naturally occurring or pollution-derived organic, carbon-based materials, such as the acids from soils or decaying vegetation and bromide (salt). Some of such by-products are suspected to be human *Carcinogens*. One typical such disinfection by-product for which the U.S. Environmental Protection Agency (EPA) has established *Maximum Contaminant Levels (MCLs)* as part of its enforcement of the *Safe Drinking Water Act (SDWA)* are total Trihalomethanes (TTHMs).

Dissolved Organic Carbon (DOC) — A measure of the organic compounds that are dissolved in water. In the analytical test for DOC, a water sample is first filtered to remove particulate material, and the organic compounds that pass through the filter are chemically converted to carbon dioxide, which is then measured to compute the amount of organic material dissolved in the water.

Dissolved Oxygen (DO) — (1) Concentration of oxygen dissolved in water and readily available to fish and other aquatic organisms. (2) The amount of free (not chemically combined) oxygen dissolved in water, wastewater, or other liquid, usually expressed in milligrams per liter, parts per million, or percent of saturation. The content of water in equilibrium with air is a function of atmospheric pressure, temperature, and dissolved-solids concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved solids, with small temperature changes having the more significant offset. Photosynthesis and respiration may cause diurnal variations in dissolved-oxygen concentration in water from some streams. Adequate concentrations of dissolved oxygen are necessary for the life of fish and other aquatic organisms and the prevention of offensive odors. Dissolved oxygen levels are considered the most important and commonly employed measurement of water quality and indicator of a water body's ability to support desirable aquatic life. The ideal dissolved oxygen level for fish is between 7 and 9 milligrams per liter (mg/L); most fish cannot survive at levels below 3 mg/L of dissolved oxygen. Secondary and advanced wastewater treatment techniques are generally designed to ensure adequate dissolved oxygen in waste-receiving waters.

Dissolved Solids — (1) Minerals, chemical compounds, and organic mater dissolved in water. They form the residue that remains after evaporation and drying. Excessive amounts of dissolved solids make water unfit to drink or use in industrial processes.

DO — See *Dissolved Oxygen (DO)*.

DOC — See *Dissolved Organic Carbon (DOC)*.

Domestic Sewage — Wastewater and solid waste that is characteristic of the flow from toilets, sinks, showers, and tubs in a household. Also referred to as domestic waste.

Domestic Wastewater Facility — Refers to those facilities that receive or dispose of wastewater derived principally from residential dwellings, business or commercial buildings, institutions, and the like. May also include some wastewater derived from industrial facilities. Also referred to as *Municipal Wastewater Facility*.

Downstream — Any point beyond a reference point in the direction of the current of a stream.

Drinking Water — Water that does not contain objectionable pollution, contamination, minerals, or infective agents and is considered satisfactory for domestic consumption (drinking). The term is used synonymously with *Potable Water* and refers to water that meets federal drinking water standards of the *Safe Drinking Water Act [SDWA] (Public Law 93–523)* as well as state and local water quality standards and is considered safe for human consumption. Freshwater that exceeds established standards for chloride content and dissolved solids limits is often referred to as slightly saline, brackish, or nonpotable water and is either diluted with fresher water or treated through a desalination process to meet drinking-water standards for public supply.

Drinking Water Standards — Drinking water standards established by state agencies and the U.S. Environmental Protection Agency (EPA) for drinking water.

Drinking Water Supply — Water provided for use in households. The most common sources are from surface supplies (rivers, lakes, and reservoirs) or subsurface supplies (aquifers). The distribution of water to households is regulated under the *Safe Drinking Water Act (SDWA)* of 1974, as amended, as well as State regulations.

Drought — Hydrologic conditions during a defined period when rainfall and runoff are much less than average.

Dual-Distribution Piping (or Dual Plumbing)— The plumbing of a facility to provide two sources of water in separate piping systems, for example, a water distribution system that uses one set of pipes for the distribution of potable water and a separate set for the distribution of *Reclaimed Water*.

E

E. Coli (Escherichia Coli) — A bacterial species which inhabits the intestinal tract of man and other warm-blooded animals. Although it poses no threat to human health, its presence in drinking water does indicate the potential presence of other, more dangerous bacteria. Also see *Bacteria*.

Economic Analysis — The procedure to determine the total monetary costs and benefits of all the resources committed to a project regardless of who in the society contributes them or who in the society receives the benefits.

Ecosystem Restoration — Actions taken to modify an ecosystem for the purpose of re-establishing and maintaining desired ecological structures and processes.

Effluent — Wastewater or other liquid, treated or in its natural state, flowing from a treatment plant or process.

Effluent Limitation — An amount or concentration of a water pollutant that can be legally discharged into a water body by a point source, expressed as the maximum daily discharge, the maximum discharge per amount of product, and/or the concentration limit in the wastewater stream, as a 24–hour or 30–day average.

Endocrine Disrupting Compounds (EDCs) — Chemicals that can interfere with the normal hormone function in humans and animals, controlling metabolism, growth and reproduction

Environmental Justice (EJ) — The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies or the planning and implementation of projects that affect the environment.

Environmental Water — The water for wetlands, the instream flow for a major river that is based on the largest flow specified in an entire reach of that river for maintenance of fish or, for wild and scenic rivers, the amount of water based on unimpaired natural flow. Also referred to as dedicated natural flows.

F

Feedwater —Water input into a desalting or water treatment plant or an industrial water-using facility.

Filtration — A process in which suspended matter is removed from a liquid through a medium which is permeable to the liquid but not to the suspended material. The medium may be sand or a human-made filter. The objective is often to remove particles that contain *Pathogens*.

Flow Augmentation — The addition of water to a stream especially to meet instream flow needs.

Fresh Water — Water that is not brackish or saline and is obtained from rainwater, surface waters such as lakes and streams, and groundwater.

G

Giardia Lamblia — A flagellate protozoan that causes the severe gastrointestinal illness giardiasis when it contaminates drinking water.

GPD — Gallons per day, a measure of the rate of flow or the rate of water withdrawal from a well. Typically used when the rate of flow in cubic feet per second (cfs) is too low to be useful.

Graywater (Gray Water or Greywater) — Wastewater from a household or small commercial establishment that does not include water from a toilet, kitchen sink, dishwasher, or water used for washing diapers.

Groundwater — Water that occurs beneath the land surface and fills the pore spaces of the alluvium, soil, or rock formation in which it is situated.

Groundwater Basin — A groundwater reservoir, defined by an overlying land surface and the underlying aquifers that contain water stored in the reservoir. In some cases, the boundaries of successively deeper aquifers may differ and make it difficult to define the limits of the basin.

Groundwater Overdraft — The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions.

Groundwater Recharge — The natural or artificial infiltration of surface water or injection of water into the zone of saturation (i.e., into groundwater aquifer).

Groundwater Table — The upper surface of the zone of saturation in an unconfined aquifer.

H

Hydraulic Barrier — A barrier developed in an estuary by release of fresh water from upstream reservoirs to prevent intrusion of seawater into the body of fresh water. Also, a barrier created by injecting fresh or recycled water to control seawater intrusion in an aquifer, or created by water injection to control migration of contaminants in an aquifer.

I

Impoundment — A natural or artificial collection or storage of water, as a pond, reservoir, pit, dugout, or sump confined by a dam, dike, floodgate or other barrier. An impoundment may be used to collect and store water for future use or may function as an aesthetic feature in a landscape.

Incidental Reuse — Unplanned use of treated wastewater *effluent* after disposal.

Incidental Runoff — Unintended, but perhaps unavoidable, runoff of water from a site where water is used, such as overspray from sprinkler irrigation.

Influent — Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

Indirect Reuse — The use of reclaimed water indirectly after it has passed through a natural body of water after discharge from a wastewater treatment plant.

Issue area — As used in this report, a cluster of similar issues into a broader issue area to facilitate the analysis by workgroups of the Recycled Water Task Force and for organization of issues in the discussion in this report.

K

Key Recommendation — Recommendation addressing an issue of high priority to the Task Force.

L

Land Application — The reuse of reclaimed water or the utilization or disposal of effluents on, above, or into the surface of the ground through spray fields or other methods.

Landscape Impoundment — A body of water which is used for aesthetic enjoyment or which otherwise serves a function not intended to include contact recreation.

M

Maximum Contaminant Level (MCL) — The highest drinking water contaminant concentration allowed under federal and State Safe Drinking Water Act regulations.

Municipal Discharge — The discharge of effluent from wastewater treatment plants which receive wastewater from households, commercial establishment, and industries. Wastewater from combined sewers carrying both wastewater and collected stormwater is included in this category.

Municipal Sewage — Sewage (mostly liquid) originating from a community, which is composed of domestic sewage and possibly commercial and industrial wastewater.

Municipal Wastewater Facility — A facility that receives and treats wastewater derived principally from residential dwellings, business or commercial buildings, institutions, and the like. May also include some wastewater derived from industrial facilities. Also referred to as *Domestic Wastewater Facility*.

N

National Pollutant Discharge Elimination System (NPDES) — The program established by the federal Clean Water Act (CWA) that requires all point sources of pollution discharging into any "waters of the United States" to obtain a permit issued by the U.S. Environmental Protection Agency (EPA) or a state agency authorized by the federal agency. The NPDES permit lists permissible discharges and/or the level of cleanup technology required for wastewater.

New Water — The water yield from a new water project or water management action that provides a net augmentation of supply to the State.

Non-Contact Cooling Water — Water used for cooling that does not come into direct contact with any raw material, product, byproduct, or waste.

Non-Contact Recreation — Recreational pursuits not involving a significant risk of water ingestion, including fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity.

Nonpotable Water — Water that is not suitable for drinking because it contains pollutants, contaminants, minerals, or infective agents.

NPDES — See *National Pollutant Discharge Elimination System (NPDES)*.

NPDES Permit — A permit issued under the *National Pollutant Discharge Elimination System (NPDES)* for discharging pollutants directly into the waters of the United States.

O

Overdraft — see *Groundwater Overdraft*.

Outfall — The place where a sewer, drain, or stream discharges; the outlet or structure leaving a treatment plant through which reclaimed water or treated effluent is finally discharged to a receiving water body.

P

Particle Count —Results of a microscopic examination of treated water with a special "particle counter" that classifies suspended particles by number and size.

Pathogen — A disease-producing agent; usually referring to a living organism (i.e., biological). Generally, any viruses, bacteria, or fungi that cause disease.

Planned Reuse — The deliberate *direct* or *indirect* use of recycled water without relinquishing control over the water during its delivery.

Pollution — An alteration of the quality of waters of the State by wastes to a degree which unreasonably affects: (1) such waters for beneficial use or (2) facilities which serve such beneficial uses. Pollution may include *contamination*.

Potable Water — Water that is drinkable. Specifically, freshwater that generally meets the standards in quality as established in the U.S. Environmental Protection Agency (EPA) Drinking Water Standards for drinking water throughout the United States. Potable water is considered safe for human consumption and is often referred to as Drinking Water.

Primary Wastewater Treatment —The removal of particulate materials from domestic wastewater, usually done by allowing the solid materials to settle as a result of gravity. Typically, the first major stage of treatment encountered by domestic wastewater as it enters a treatment facility. The wastewater is allowed to stand in large tanks, termed *Clarifiers* or Primary Settling Tanks. Primary treatment plants generally remove 25 to 35 percent of the *Biological Oxygen Demand (BOD)* and 45 to 65 percent of the total suspended matter. Also, any process used for the decomposition, stabilization, or disposal of sludge produced by settling. The water from which solids have been removed is then subjected to *Secondary Wastewater Treatment* and possibly *Tertiary Wastewater Treatment*.

Purification (Water) — Steps taken to eliminate impurities and pollution from water.

R

Reclaimed Water or Reclaimed Wastewater – See *Recycled Water*.

Recycled Water or Reclaimed Water — Wastewater that is suitable for a beneficial use as a result of treatment. The degree of treatment provided for recycled water depends on the quality of water needed for the specific beneficial use and for public health protection and may include effluent from *Primary Wastewater Treatment*, *Secondary Wastewater Treatment*, *Tertiary Wastewater Treatment*, or *Advanced Treatment*.

Replenishment — The act of replenishing an aquifer, usually through artificial recharge, to offset excess groundwater pumping.

Repurified Water — As this term has been used in California, repurified water means recycled water that is used to augment water supplies by discharging advanced treated recycled water into a surface water reservoir that supplies water directly to a water treatment facility for a water supply system that serves domestic uses, including human ingestion. Typically, such waters would undergo extensive *Tertiary and Advanced Wastewater Treatment,* be stored in a reservoir for a specified minimum time (for example, one year), be blended with fresh water within the reservoir, then undergo further treatment and disinfection through a conventional surface water treatment plant before being distributed in the potable distribution system.

Reservoir (Water) — A pond, lake, or basin, either natural or artificial, for the storage, regulation, and control of water.

Reuse — The additional use of previously used water. As used in this report, it means the use of recycled water (wastewater that has been treated for beneficial use at a wastewater treatment plant).

Reverse Osmosis (RO) — A method to remove salts and other constituents from water by forcing water through membranes.

Riparian — Pertaining to the banks of a river, stream, waterway, or other, typically, flowing body of water as well as to plant and animal communities along such bodies of water. This term is also commonly used for other bodies of water, e.g., ponds and lakes.

Runoff — The volume of surface flow from an area.

S

Safe Drinking Water Act [SDWA] (Public Law 93–523) — A federal law, which is an amendment to the *Public Health Service Act* which established primary and secondary quality standards for drinking water. The SDWA was passed in 1976 to protect public health by establishing uniform drinking water standards for the nation. In 1986 SDWA Amendments were passed that mandated the U.S. Environmental Protection Agency (EPA) to establish standards for 83 drinking water contaminants by 1992 and identify an additional 25 contaminants for regulation every 3 years thereafter.

Salinity — (1) The concentration of dissolved salts in water or soil water. Salinity may be expressed in terms of a concentration or as an electrical conductivity. When describing salinity influenced by seawater, salinity often refers to the concentration of chlorides in the water. (2) The relative concentration of salts, usually sodium chloride, in a given water sample. It is usually expressed in terms of the number of parts per thousand (‰) or parts per million (ppm) of chloride (Cl). Although the measurement takes into account all of the dissolved salts, sodium chloride (NaCl) normally constitutes the primary salt being measured. Salinity can harm many plants, causing leaves to scorch and turn yellow and stunting plant growth. As a reference, the salinity of seawater is approximately 35‰ or 35,000 ppm. Also see *Total Dissolved Solids*.

Salt Sink — A body of water too salty for most freshwater uses.

Salt-Water or Seawater Intrusion — The invasion of a body of fresh water by a body of salt water. This usually occurs due to a hydraulic gradient resulting from a higher water surface elevation or higher water pressure in the salt-water zone than in the fresh water zone. It can occur either in surface or groundwater bodies. The term is applied to the flooding of freshwater marshes by seawater, the migration of seawater up rivers and navigation channels, and the movement of seawater into freshwater aquifers along coastal regions.

Secondary Wastewater Treatment — Treatment (following *Primary Wastewater Treatment*) involving the biological process of reducing suspended, colloidal, and dissolved organic matter in effluent from primary treatment systems and which generally removes 80 to 95 percent of the *Biochemical Oxygen Demand (BOD)* and suspended matter. Secondary wastewater treatment may be accomplished by biological or chemical-physical methods. Activated sludge and trickling filters are two of the most common means of secondary treatment. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. This treatment removes floating and settleable solids and about 90 percent of the oxygen-demanding substances and suspended solids. Disinfection is usually the final stage of secondary treatment. Also see *Primary Treatment* and *Tertiary Wastewater Treatment*.

Sewage — The spent water of a community, now usually referred to as *Wastewater* but it has the further implication of wastewater containing domestic waste.

Shutdown Test — A test to determine whether there is a *Cross-Connection* between a potable water system and a water system that is not approved for drinking water, such as a recycled water system. The test consists of alternately shutting off pressure from the potable water system and the nonpotable water system and detecting loss of pressure in the pressurized system, which might indicate a cross-connection.

Sludge — (1) Semisolid material such as the type precipitated by a *Wastewater Treatment Plant*. The terms *Biosolids*, sludge, and sewage sludge can be used interchangeably. (2) Mud, mire, or ooze covering the ground or forming a deposit, as on a riverbed. (3) Finely broken or half-formed ice on a body of water, especially the sea.

Stakeholders — Individuals and organizations who are involved in or may be affected by a proposed action, such as construction and operation of a water recycling project.

Suspended Solids (SS) — Solids that either float on the surface of, or are in suspension in, water, wastewater, or other liquid and which can be largely removed by laboratory filtering. Such suspended solids usually contribute directly to turbidity. Defined in waste management, these are small particles of solid pollutants that resist separation from the wastewater. Suspended solids (along with *Biochemical Oxygen Demand — BOD*) is a measurement of water quality and an indicator of treatment plant efficiency.

T

TDS (Total Dissolved Solids) — All the solids (usually mineral salts) that are dissolved in water. Used to evaluate water quality.

Tertiary Wastewater Treatment — Biological, physical, and chemical treatment processes that follow *Secondary Wastewater Treatment*.The most common *Tertiary Wastewater Treatment* process consists of flocculation basins, clarifiers, filters, and disinfection processes. The term Tertiary (Wastewater) Treatment is also used to include *Advanced Treatment* beyond filters.

Total Coliform — The *Escherica coli* and similar gram negative bacteria that are normal inhabitants of fecal discharges and soils. The total coliform group is recognized in the drinking water standards of public health criteria.

Total Coliform Bacteria — A particular group of bacteria that is used as an indicator of possible sewage pollution. This group includes coliforms that inhabit the intestine of warm-blooded animals and those that inhabit soils. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35 degrees centigrade. In the laboratory, these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35 degrees centigrade plus or minus 1 degree centigrade on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as the number of colonies per 100 mL of sample.

Total Dissolved Solids (TDS) —A measure of the amount of material dissolved in water (mostly inorganic salts). Typically aggregates of carbonates, bicarbonates, chlorides, sulfates, phosphates, nitrates, etc. of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts. The inorganic salts are measured by filtering a water sample to remove any suspended particulate material, evaporating the water, and weighing the solids that remain. An important use of the measure involves the examination of the quality of drinking water. Water that has a high content of inorganic material frequently has taste problems and/or water hardness problems. As an example, water that contains an excessive amount of dissolved salt (sodium chloride) is not suitable for drinking. High TDS solutions have the capability of changing the chemical nature of water. High TDS concentrations exert varying degrees of osmotic pressures and often become lethal to the biological inhabitants of an aquatic environment. The common and synonymously used term for TDS is “salt”. Usually expressed in milligrams per liter.

Total Maximum Daily Load (TMDL) —The maximum quantity of a particular water pollutant that can be discharged into a body of water without violating a water quality standard. The amount of pollutant is set by the U.S. Environmental Protection Agency (EPA) when it determines that existing, technology-based effluent standards on the water pollution sources in the area will not achieve one or more ambient water quality standards. The process results in the allocation of the TMDL to the various point sources of pollutants in the area.

Total Organic Carbon (TOC) — A measure of organic matter, which contains carbon, in water. Because many organic (carbon containing) compounds can be detrimental to human health, the measurement of TOC is a useful indicator of the quality of recycled water.

Treated (Wastewater) Effluent — Water that has received primary, secondary, or advanced treatment to reduce its pollution or health hazards and is subsequently released from a wastewater facility after treatment.

Treatment — Any method, technique, or process designed to remove solids and/or pollutants from water or wastewater. Also see *Primary Wastewater Treatment*, *Secondary Wastewater Treatment*, and *Tertiary Wastewater Treatment*.

Treatment Plant — A structure built to treat water or wastewater before using the water, discharging wastewater into the environment, or reusing the treated wastewater (*Recycled Water*).

Turbidity — (1) A measure of the reduced transparency of water due to suspended material. The term "turbid" is applied to waters containing suspended matter that interferes with the passage of light through the water or in which visual depth is restricted. The turbidity may be caused by a wide variety of suspended materials, such as clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, plankton and other microscopic organisms and similar substances. Turbidity in water has public health implications due to the possibilities of pathogenic bacteria encased in the particles and thus escaping disinfection processes. Turbidity interferes with water treatment (filtration), and affects aquatic life. Excessive amounts of turbidity also make water aesthetically objectionable. The degree of the turbidity of water is measured by a turbidimeter. (2) The collective optical properties of a water sample that cause light to be scattered and absorbed rather than transmitted in straight lines; the higher the intensity of scattered light, the higher the turbidity. Turbidity is expressed in nephelometric turbidity units (NTU) or Formazin turbidity units (FTU) depending on the method and equipment used.

U

Unplanned Reuse — Unplanned use of treated wastewater *effluent* after disposal. Also called *Incidental Reuse*. Many communities already unintentionally practice such unplanned reuse by withdrawing water from rivers containing treated wastewater discharged upstream.

Upstream — From a reference point in the direction toward the source or upper part of a stream; against the current. In relation to water rights, the term refers to water uses or locations that affect water quality or quantity of downstream water uses or locations.

V

Virus — The smallest (10–300 µm in diameter) life form capable of producing infection or diseases in man or other larger species. Complex macromolecules which are able to reproduce themselves only in living cells and are capable of producing infection and diseases.

W

Wastewater — (1) A combination of liquid and water-carried pollutants from homes, businesses, industries, or farms; a mixture of water and dissolved or suspended solids. (2) That water for which, because of quality, quantity, or time of occurrence, disposal is more economical than use at the time and point of its occurrence. Wastewater to one user may be a desirable supply to the same or another user at a different location. Also referred to as Domestic Wastewater or *Sewage* if it contains domestic waste.

Wastewater Reclamation — The planned reuse of waste water for specific beneficial purposes.

Wastewater Treatment — Any of the mechanical or chemical processes used to modify the quality of waste water in order to make it more compatible or acceptable to humans and the environment.

Wastewater Treatment Plant — A *Treatment Plant* containing a series of tanks, screens, filters and other mechanical, biological, and chemical processes by which pollutants are removed from wastewater. Less frequently referred to as *Waste Treatment Plant*.

Water Purveyor — Anyone who sells water to the public, usually the owner of a public water supply system; a public utility, mutual water company, county water district, or municipality that delivers water to customers.

Water Quality — (1) A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose, such as beneficial use or discharge to the environment.

Water Reclamation — (1) The treatment of water of impaired quality, including brackish water and seawater, to produce a water of suitable quality for the intended use. (2) A term synonymous to *Water Recycling*.

Water Recycling — (1) The process of treating wastewater for beneficial use, storing and distributing recycled water, and the actual use of recycled water. (2) The reuse of water through the same series of processes, pipes, or vessels more than once by one user, wherein the effluent from one use is captured and redirected back into the same use or directed to another use within the same facility of the user. This form of recycling, often without treatment between uses, is common in industrial facilities, such as cooling towers.

Water Softener — A pressurized water treatment device in which hard water is passed through a bed of cation exchange media for the purpose of exchanging calcium and magnesium ions for sodium or potassium ions, thus producing a softened water that is more desirable for laundering, bathing, and dishwashing.

Water Transfers — Marketing arrangements that can include the permanent sale of a water right by the water right holder; a lease of the right to use water from the water right holder; the sale or lease of a contractual right to water supply.

Wetland — An area that is periodically inundated or saturated by surface or groundwater on an annual or seasonal basis, that displays hydric soils, and that typically supports or is capable of supporting hydrophytic vegetation.

Z

Zero Discharge — The goal, in the preamble to the federal Clean Water Act (CWA), of zero pollutants in water discharges.

References:

Water Words Dictionary, Nevada Division of Water Planning, Department of Conservation and Natural Resources, 2000.

Bulletin 160-98: California Water Plan, California Department of Water Resources, 1998.

Bulletin 189: Waste Water Reclamation - State of the Art, California Department of Water Resources, March 1973.

California Municipal Wastewater Reclamation in 1987, California State Water Resources Control Board, June 1990.

Glossary: Water and Wastewater Control Engineering, published by American Public Health Association, American Society of Civil Engineers, American Water Works Association, and Water Pollution Control Federation, 1969.

Appendix G

Public Comments

Appendix G

Public Comments

WATEREUSE ASSOCIATION

California Section

March 29, 2002

Luana E. Kiger, Chief
Department of Water Resources
Office of Water Use Efficiency
901 P Street, Third Floor
PO Box 942836
Sacramento, CA 94236-0001

Dear Ms. Kiger:

The California Section of the WateReuse Association (WateReuse) is part of a national organization dedicated to increasing the beneficial use of recycled water. WateReuse has grown rapidly and is effective because of its diverse membership consisting of public agencies, water and wastewater utilities, local, state and federal governmental agencies, consultants, industries and individuals who, either work in the field of water recycling or support its use. The organization's success is the direct result of the combined strength of its membership and their shared vision that recycled water needs to increase dramatically if we are to have a sustainable future water supply throughout California.

The California members of WateReuse have recognized the importance of recycled water and many of the barriers against implementation. Our organization sponsored AB 331 to create a high level task force to address the issues regarding recycled water. We are pleased that Governor Davis and the California Legislature share that vision as they voted unanimously to create the 2002 Recycled Water Task Force for the purpose of investigating opportunities and identifying impediments and constraints to increasing the use of recycled water.

In an effort to minimize the potential for public health risks, California regulators have enacted the most stringent water quality requirements for recycled water in the world. A comparison of various States' criteria for "unrestricted urban reuse", where recycled water is applied in areas used by the public is presented in the following table.

Recycling Water to Meet the World's Needs
915 L Street, Suite 1000, Sacramento, California 95814-3701 • 916-442-2746 • 916-442-0382 (fax)
www.watereuse.org

State	Clarity	Total Coliform (per 100 ml)	Fecal Coliform (per 100 ml)
Arizona	5 NTU turbidity	No Limit	23 median / 75 max
California	2 NTU turbidity	2.2 median / 23 max	2.2 median / 23 max
Florida	5 mg/L suspended solids	No Limit	2 (75%) / 25 max
New Mexico	No Limit	No Limit	100 median / 100 max
Texas	3 NTU turbidity	No Limit	75 median / 75 max

Since California has the most stringent recycled water quality criteria, one would think the regulations and practices for distribution of that water would reflect its high quality. Unfortunately, this is not the case. Codes and regulations for water recycling systems are far more restrictive in California than in other states. In addition, local county health regulators often raise the bar higher yet resulting in provincial obstacles and impediments that discourage recycling projects or add to their already high cost.

What should be our regulatory goals? With recycled water quality that is superior to other states, California should strive for friendlier, simpler, regulations and code requirements that have proven to be protective of public health and the environment in other states.

Most Important Issues for the 2002 Recycled Water Task Force

The California Section of WateReuse has received comments from its members about impediments and obstacles to water recycling. We also expect that comments and ideas will continue to grow as news of the 2002 Recycled Water Task Force spreads. Based on the input available now, in addition to those provisions contained in AB 331, the following are the main topics that we suggest the Task Force explore in detail:

- Plumbing Code Issues
- Cross Connection Control and Backflow Prevention Regulations
- Uniform Statewide Water Recycling Standards
- Recycled Water Discharge Issues
- Groundwater Recharge (or Potable Reuse)
- State Financial Assistance
- CALFED
- Agricultural Use of Recycled Water
- Jurisdictional Disputes
- Water Credits

Plumbing Code Issues

Dual plumbing of non-residential buildings is an important component of increasing recycling because over 80% of the water used within a typical office building is for toilet and urinal flushing.

In 1991, AB 1698 was passed which authorized public agencies to require the use of recycled water for flushing toilets and urinals in non-residential buildings. In 1992, the California Ad Hoc Dual Plumbing Committee was formed to develop plumbing code requirements for dual plumbing buildings with recycled water. The Committee was co-chaired by the California Departments of Water Resources (DWR) and Health Services (DHS) and the letter inviting people to serve on this committee included the following goals cited by then Governor Wilson:

- "Ensure that new developments make maximum use of recycled water."
- "Remove the obstacles to reclamation activities."
- "Create a streamlined process for the construction and operation of both public and private reclamation facilities."

The California Plumbing Code is generally derived from the Uniform Plumbing Code published by a private organization, the International Association of Plumbing and Mechanical Officials (IAPMO). IAPMO adopted Appendix J, Reclaimed Water Systems for Non-Residential Buildings, for incorporation into the 1994 Uniform Plumbing Code. Unfortunately, the 1994 Appendix J did not accomplish any of the three goals cited by Governor Wilson!

In 2001, WateReuse asked the DWR to consider sponsoring changes to the plumbing code citing the following reasons:

- The existing Appendix J conflicts with the latest definitions of tertiary recycled water in Title 22 of the Water Code.
- The existing Appendix J conflicts with Section 13553 of the Water Code due to legislation (AB 1522) enacted in 1997 that expanded the types of structures where recycled water may be used for flushing.
- The prohibition against on-site water recycling systems, such as the enormously successful Water Gardens complex in Santa Monica, should be deleted.
- The requirement for mandatory shutdown testing if other on-site safeguard criteria is met should be eliminated. This would take away a severe

disincentive to use recycled water for facilities that must operate 24 hours a day, such as industrial plants, jails, hotels, and similar operations.

In early 2002, WateReuse discovered that IAPMO Appendix J was never adopted into the California Plumbing Code. This was quite a surprise, but represents an opportunity to adopt a code that does accomplish the Governor's original goals. The WateReuse Legislative/Regulatory Committee has developed language for the plumbing code and recommends that it be adopted in California through the California Building Standards Commission. The proposed code language is appended to this letter.

Prior to the creation of the IAPMO Appendix J, the *National Plumbing Code* had already created *Appendix C – Gray Water Recycling Systems* that covered dual plumbing systems for graywater or recycled water in buildings. This code is now part of the *International Plumbing Code* used in 25 states. In contrast to both the IAPMO Appendix J and even the proposed WateReuse improvements, the International Plumbing Code Appendix C is simple and requires only that the pipe systems be marked and the potable and non-potable systems are not interconnected. This is an example of how other states regulate recycled water without the complexity and impediments that unfortunately have become the California style.

Cross Connection Control and Backflow Prevention Requirements

Recycled water has been used successfully to replace drinking water for a variety of commercial and industrial applications such as concrete mixing, commercial and industrial cooling towers, carpet manufacturing, electronics manufacturing, toilet flushing, car washes, commercial laundries, and others.

Before the introduction of recycled water, almost all of these facilities had other piping systems that contained pumped and pressurized liquids that ranged in hazard from simply *non-potable* to the *acutely toxic*. Despite the presence of these toxins, the California regulatory and industry paradigm for prevention of cross connections to on-site drinking water piping systems is to expect the property owner to exercise due diligence and not interconnect potable and non-potable piping. On a national basis, the commercial and industrial experience has been that simple labeling of the piping provides adequate protection against accidental cross connections. This practice is reflected in the various building codes applicable to these facilities, none of which requires any involvement or post-construction inspections by public health regulators.

However, upon the introduction of recycled water, new regulations are imposed that require annual inspections and testing and may require shutdown of the water systems even if visual inspections indicate that no cross connections exist. For owners of facilities that operate on a 24/7 schedule, this requirement is a severe economic disincentive to use recycled water. In addition, either the property owner or

water supplier may be expected to pay hourly charges for state and local health regulators to witness these inspections.

The following steps are recommended to improve the regulations involving use of recycled water in commercial and industrial settings:

- The DHS has recently initiated draft amendments of Titles 17 and 22, the state regulations governing water recycling, cross connection control, and backflow prevention. This presents a timely opportunity to incorporate the improvements identified in the 2002 Water Recycling Task Force into these regulation amendments.

- Recommended improvements to the Plumbing Code will also require corresponding changes to Titles 17 and 22.

- Regulatory staff have not recognized or learned about standard industry practices and codes and due to this, have created regulations that are excessive compared to how other risks are managed at commercial and industrial facilities. The solution to this is to include professionals knowledgeable in this area to assist in development of regulations.

- Investigate if the ability to charge for regulatory oversight and inspections provides a financial inducement to create regulations that have lost sight of a reasonable balance between risk management and costs.

Uniform Statewide Water Recycling Standards

Uniform application of Water Recycling Criteria throughout California is critical to the success of the Legislature's goal of achieving one million acre-feet of recycled water use by the year 2010. Some local county health authorities tend to apply more stringent requirements than those in the statewide regulations. These variations cause confusion, uncertainty, and unnecessarily raise the unit cost of production and distribution of recycled water.

The current Water Recycling Criteria in effect in California are arguably the most stringent in the world. Under these criteria, not a single successful case of liability has ever been prosecuted against any water recycling agency. No documented case of illness has been traced to use of recycled water in any way. This record of virtual zero-risk is an indication that the safety factors already incorporated in the regulations go far beyond the normal factors of safety commonly employed in transportation, power supply, structures, and other public infrastructure activities. The costs of complying with these stringent regulations are already so high as to make most recycled water projects infeasible without assistance from State and federal sources. Adding another layer of requirements at the county level is unnecessary, cumbersome, expensive, and contrary to the stated goals of the State legislature.

Expectation of zero-risk goes far beyond the realm of reasonable safety and caution. It is an irrational concept toward which some local public health agencies strive to approach. It can be extremely costly to the very public it intends to protect.

During the Task Force meetings, WateReuse can provide numerous case-studies that describe how well-intended, but misguided regulatory requirements place an unreasonable burden on the recycled water agency and their commercial and industrial recycled water customers.

WateReuse recommends that legislation be enacted to forbid local agencies from restricting recycled water projects in any manner that goes beyond the requirements in state law and regulations. Unless local authorities can document special circumstance that mandate local protections, any such locals standards should be based on technical studies that demonstrate that the enhanced standards will provide "real" protection.

Current Water Recycling Criteria impose not only performance requirements on the quality of the recycled water; they also include prescriptions for treatment technology and conditions under which each process can be utilized. These double requirements are restrictive on use of technology, innovation, process optimization, and operator control over variations in influent quality and other environmental factors. We believe that specifying required water quality and overall capacity requirements is adequate protection and there is no need to restrict design of plants by additionally restrictive technology restrictions.

New technology developments, especially in the areas of filtration and disinfection, offer more effective and more economical treatment options, achieving or even exceeding current standards. To encourage their deployment, and to encourage additional improvements in technology, it is essential that some or all of the existing prescriptive process requirements be eliminated. Some of the specific areas where these prescriptions should be removed include:

- Filtration material
- Filter loading rates
- Chlorine contact time and concentration
- UV intensity

Recycled Water Discharge Issues

In some parts of California, wastewater dischargers have been denied an opportunity to recycle water because the existing wastewater plant discharge is considered beneficial to the aquatic environment of the receiving waters. In other parts of the

state, regulators have taken enforcement action to prohibit extremely minor and incidental discharges of recycled water to receiving waters. In numerous cases, regulators who administer permits for water recycling have developed criteria that have become known as the "one molecule rule". This interpretation of state and federal regulations considers any discharge of rainfall-induced stormwater or incidental runoff that could contain "one molecule" of recycled water as an illegal point discharge of wastewater that requires a point-discharge NPDES permit. What makes this prohibition even more maddening is that in some cases, the prohibited runoff would end up in the very same stream or river that the wastewater treatment plant is allowed to discharge into if there was no reuse!

Another example of regulatory excess is the reaction to the infrequent but unavoidable breaks of recycled water distribution mains (main breaks). Despite the fact that California regulations recognize that tertiary treated recycled water is suitable for full body contact recreation, the regulatory reaction to a recycled water main break from both county environmental health officials and regional boards is to order beach closures and initiate fines to water agencies for illegal discharge of waste. Despite the vast differences in risk to public health between recycled water and sewage, the regulatory reaction often does not seem to recognize – nor wish to recognize – the difference.

WateReuse recommends that the Task Force investigate actual case-studies regarding discharge of recycled water to the environment and identify the areas where regulatory improvements are needed. Uniform implementation of statewide regulations should be a prominent goal of this investigation. Steps to end regional parochial interference by well-intentioned regulators are needed. Legislation should be enacted to forbid local agencies from restricting recycled water projects in any manner that goes beyond the requirements in state law and regulations.

Groundwater Recharge / Indirect Potable Reuse

Groundwater is an essential source of water for many communities. In some cases, it provides 100 percent of the water supply. Groundwater basins need to be replenished with a variety of source waters, including recycled water. Recharge of groundwater basins with recycled water via percolation and/or injection constitutes the largest use of recycled water in Southern California. Therefore, it is absolutely essential and vital that this application continues, and is actually allowed to increase so that the groundwater basins continue to be available as potable water supplies. Over 40 years of monitoring and studies have shown no adverse impacts to public health when groundwater basins are recharged with recycled water. It is prudent and good public policy to increase the use of recycled water for replenishment.

The safety of groundwater recharge projects continues to be raised and evaluated. This is understandable and prudent. The DHS continues to work constructively and

closely with stakeholders involved with groundwater recharge and injection to update regulations that provide adequate protection to public health protection. The 2002 Water Recycling Task Force should look for ways to assist these deliberations and provide mechanisms for financial support to research that can address emerging health concerns.

One key issue to be resolved is the definition of impairment contained in California law. Water Code Section 13540 requires the DHS to determine that injection projects will not impair receiving aquifers used as drinking water supplies. However, it is unclear what is considered impairment. It is a major barrier that has been the subject of extensive discussions and needs to be resolved to allow for new and/or expanded permit pending projects to proceed.

Another issue that is undergoing discussion in both the water and wastewater communities is the use of Action Levels as regulatory/compliance mechanisms. Action Levels are health-based advisory levels established by DHS for chemicals in drinking water that lack maximum contaminant levels. However, while they are not regulations, they have become defacto regulations and in some cases significant barriers to potable water reuse projects. The 2002 Water Recycling Task Force should discuss possible options the DHS could adopt on how to use and/or develop Action Levels.

State Financial Assistance

An obvious impediment to the increased use of recycled water is the insufficient amount of state financing, including loans and grants, for local recycled projects. The California Section of WateReuse is sponsoring AB 2365 (Goldberg), the Water Recycling and Dual Plumbing Bond Act of 2002. This bill would authorize $575,900,000 in general obligation bonds to be placed before the voters in November 2002.

This would be the first bond in California history that seeks voter approval of projects already evaluated as top priority by the State Water Resources Control Board. The projects were submitted to the Board for funding under Proposition 13 and the remaining 59 projects statewide were determined by the Board to meet their "readiness to proceed" test. These projects will create new water supplies, treat groundwater, bring waste discharges into compliance with state and federal law and restore wetlands. Because the projects are ready to proceed, for the first time in history voters will be asked to approve projects where they have an accurate idea of the cost of the projects and the use and the amount of water funded through the bond.

Re-funding the existing grants and loans program in the Water Recycling Loan Account is needed due to the exemplary efforts of the State Water Board to evaluate and approve projects using the over $100 million made available from Proposition 13. The Board received questionnaires from 111 agencies for 248 water recycling

projects with total project costs of $2.9 billion and funding requests totaling $1.4 billion. In addition, agencies reported 169 projects that are in the conceptual or feasibility analysis stages of planning.

The need for funding will grow as impediments to recycled water use are identified and removed and more communities look toward its use to augment their water supplies.

CALFED

The importance of water recycling as a significant water use efficiency option has been recognized throughout the CALFED process. Projections of up to 1.5 million acre-feet of recycled water produced by 2020 have been included in CALFED planning. In California, water recycling is accomplished at the local level through construction and operation of recycling facilities and distribution systems. Regional water suppliers, State agencies and Federal agencies have sometimes provided matching funding to support these projects. However, even with funding assistance, local agencies can face impediments to project construction or assuring beneficial use of the recycled water. The Task Force will be a helpful tool in overcoming these obstacles to implementation.

Additionally, the WateReuse Association, environmental interest groups and others, are participating in a CALFED Water Use Efficiency Public Advisory Committee (WUEPAC.) This WUEPAC is providing policy advice on implementing the water use efficiency portion of the CALFED Record of Decision and supports the work of the 2002 Task Force. The aggressive CALFED goals for recycling can be met only by continued project funding partnerships and efforts like those of the Task Force to remove barriers and increase use of recycled water.

Agricultural Use of Recycled Water

Because agriculture is the largest water user in California, it has the potential to also be the largest user of recycled water. Despite decades of successful irrigation of food crops, including fruits and vegetables that are consumed without cooking, many growers and food processors are reluctant to irrigate with recycled water. This is an area where education and outreach with help from appropriate state agencies could help more people understand that irrigation of food crops with recycled water is safe. This is also an area where uniform implementation of statewide standards has been a problem.

Much of California's Agriculture uses groundwater for irrigation. While this water is typically of very high quality, little monitoring is required. In addition, excess irrigation runoff or drainage water is normally discharged to existing channels and streams without permits or restrictions. While it is understandable that recycled water requires

extensive testing before use, why should the water from recycled water irrigation pipelines require a permit for discharge?

Jurisdictional Disputes

With the multitude of entities (cities, private water companies, water districts, special districts, etc.) that can become recycled water purveyors, many projects require multiple party agreements. While control of this process should primarily remain a local issue, there are instances where a neutral third party could facilitate or mediate the process. Without this, competing local entities may waste excessive time and public funds on legal services and/or litigation. Also, the ability to construct larger and more economical systems may be severely restricted.

Water Credits

In some water short areas, there may be state requirements that mandate developing new sources of water. At the same time, a current user of potable water who decides to convert to recycled may not receive a water credit for his conversion, despite the fact that recycled water is usually more expensive than the cost of existing potable water. The end result is that there is little incentive to develop a recycled water project that would be beneficial in helping to solve the local water shortage.

Thank you for considering our ideas. The California Section of WateReuse is looking forward to working with the Department of Water Resources and other state agencies to develop recommendations to the legislature that will facilitate expansion of water recycling in California.

Sincerely,

Bob Whitley

Bob Whitley, President
California Section of WateReuse

From: Steve Bilson

Sent: Thursday, July 11, 2002 3:04 AM

To: Rich Mills

Subject: Water Recycling Taskforce

Dear Mr. Mills:

I participated in the Science and Technology Committee on June 28 and want to remind everybody on the Water Recycling Taskforce that reclaimed water was first billed as a great new source of irrigation water, and that there would always be demand for it. I believe everybody involved in the making and monitoring of this source of water agrees that these two premises are still perfectly valid.

I also want to remind everybody that irrigation continues to demand ever-larger volumes of fresh water despite tremendous volumes of reclaimed water being available.

I also want to remind everybody that Article X of the California Consititution prohibits the waste of water, that Section 13550 et.seg. of the Water Code classifies reclaimed water as suitable for irrigation, and that SWRCB rulings have increasingly held that wasting opportunities to use reclaimed water where available is not acceptable.

To spend all this time talking about new ways to use reclaimed water, when the old way has not been even close to maximized, is a waste of taxpayers money. To actually go out and spend more money on these new ways is an even more wasteful course of action.

I would like to suggest that more time be spent on enforcing existing water recycling laws.

I trust you will make my comments available to the full Taskforce.

Stephen Wm. Bilson

Chairman & CEO

ReWater Systems, Inc.

ROBERT SIMMONS
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pb. copy and mail to both Science and Health/indirect as well as Public outreach workgroups and Outreach workgroup members. Thanks. F. Karajeh 7/26/02

July 20, 2002

Dr. Fawzi Karajeh
Chief, Water Recycling and Desalination Branch
Office of Water Use Efficiency
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Re. Water Recycling Task Force

Dear Dr. Karajeh:

Science/Health / indirect pot. w/ Reuse workgroup

During the Task Force meeting on 6/28/02, I was asked by the Chair to prepare and send you material on the, now moribund, City of San Diego Repurified Water Project. As you know, this was an indirect potable reuse program and the City's existing North City Reclamation facility that would have treated approximately 22 mgd of wastewater to potable purity and conveyed it to the San Vincente Reservoir to supplement raw water. There, it was to have a resident time of one to two years and then be transported to the City's Alvarado facility, treated again to potable purity, and introduced into the distribution system.

According to the City's water management plan, the project water would complement Title 22, tertiary, water produced at the North City facility and market through existing distribution pipelines for irrigation and other approved uses.

After nearly five years of planning, health effect analyses, evaluations by nationally-recognized experts, and after receiving permits from the Department of Health Services, the project was killed by a majority of City Council members in early 1999. The primary reasons for this action are listed, below, and are relevant to the charge given the Task Force to identify and seek to obviate obstacles to public acceptance of this important type of potable reuse.

The San Diego Chapter of the Sierra Club was a strong proponent of the project and, as its counsel in related Clean Water Act litigation, I participated in many of the public hearings. Thus, I was in a position to see the opposition mount and, ultimately, cause this meritorious project to collapse--with these resulting injuries to the public interest:

--A waste of Federal taxpayer and local ratepayer money used to build and operate a North City facility that has twice the treatment capacity to serve likely tertiary reuse markets for the foreseeable future.

--The daily loss of 22 mgd (approx. 24,000 afy) of potable water beginning in 2003--the start-up year. This

Professor of Law, University of San Diego (Ret.)

represents 13% of the total daily volume of potable water used, indoors, during 2001 (175 mgd) within the San Diego Metro region.

--Loss of the revenue that would have been generated from the sale of 24,000 afy
of the North City water to the San Diego County Water Authority. This agency had contracted with the City to purchase the entire daily product delivered to the reservoir. The revenue would have been applied to pay down the bonded indebtedness and operating costs relating to the project system.

Causes of the Project's Collapse

1. Fears about possible adverse health impacts expressed by a vocal minority of potential users inadequately educated by the project's managers. These were easily inflamed by a small group of local Libertarian Party members and politician incumbents campaigning for re-election.

2. The effective use of the catchphrase, "toilet To Tap". The phrase soon proliferated in the local media and was ineffectually countered by the project managers and its environmental and business proponents.

3. The opposition of an equally-vocal group of prospective Afro-American users--led by a City councilman--that was expressed under the rubric of "racial discrimination". The rationale for the accusation was the fact that all of the reservoir water would be treated at the City's Alvarado plant and distributed to users on the South side of Interstate Route 8. Although it was pointed out at the time that a majority of users would be White or Hispanic, the demonstrators were not appeased until the project was halted.

Suggested Strategies For Surmounting The Hurdles

Based on the San Diego experience, For any planned indirect potable reuse project,I suggest the following strategies designed to neutralize negative opinions stemming from emotions and/or ignorance:

I. Widely distribute and repeatedly disseminate information about a) how the system will work; b) health agency permits and statements; b) Other populations similarly served (e.g., astronauts) c) news and photos of celebrities (local and other) consuming the water; d) opinions of respected water experts attesting to the safety of the product.

II. Lobby all local media, intensively and extensively, for their support.

III. Organize, integrate, and activate, supporting committees comprising natural allies (e.g., Chamber of Commerce, environmental organizations, water agencies other than the project sponsor.

IV. Be prepared to counteract
the inevitable "Toilet to Tap" halitosis phrase. Point out that this is glibness that hides the truth. It is, for example,
as inaccurate, when applied to water reuse, as is the phrase, "Teat to Table", when applied to milk.

V. Stress and quantify the savings, both financial and environmental, attributable to recycling.

(a) Financial: The City of San Diego's North City Reclamation facility, with a treatment capacity of 30 mgd, currently recycles but 5 mgd (6,000 afy) of the influent. The remainder (approximately 22 mgd) is treated to the secondary level and pumped to the City's Point Loma treatment plant. There, it combines with raw wastewater and is treated a second time, then discharged into the ocean. Neither the critics nor the sponsors of the City's Repurified Water Project cited the saved costs to ratepayers of this redundant pumping and treatment.

(b) Environmental: Every drop of San Diego's influent that is recycled is one drop less of effluent that it discharged into the ocean, with its burden of suspended solids, bacteria, and other pathogens.

VI. Argue that maximum feasible reuse of reclaimed wastewater is required by law.

The Clean Water Act, Federal Court decisions, California's Constitution and Water Code, and the City of San Diego's reclamation reuse ordinance, all mandate that as much of a discharger's wastewater, as is feasible, must be reclaimed and applied to beneficial uses (See the attached "Summary of Law"). It is irrefutable that, for each 1 mgd of wastewater the City diverts from its Point Loma facility and outfall to reclamation reuse, there is a corresponding reduction in the facility's influent flow and effluent mass emissions. Thus a diversion of 1 mgd reduces flow by 1/175(2001 daily average). It also will reduce the me by the same decimal (i.e., .006). Applying this decimal to 10,200 metric tons (the total of effluent solids discharged from Point Loma in 2001), each 1 mgd diversion reduces the me by 61 tons. Finally, a diversion by the City of San Diego of just 25 mgd into reclamation reuse would reduce its annual solids emissions by over 1,400 mt/yr.

References

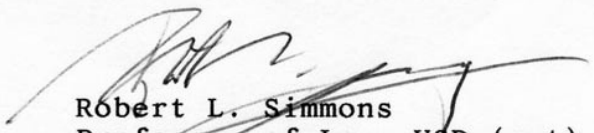
1. Summary of Federal, State, and Local, laws mandating recycling (enclosure).

2. 1998 report of the National Water Research Institute (Fountain Valley, California), entitled, "Findings and Recommendations Relating to the City of San Diego's Water Repurification Project." The report contains this conclusion: "It is the unanimous conclusion of a blue ribbon panel of experts that water repurification, as proposed by the City of San Diego, will provide a safe and appropriate supplemental drinking water supply." (not enclosed)

3. Bulletin from the San Diego Metro Wastewater Department, dated March 13, 1998, describing the project's progress. (enclosed)

4. Letter from the City of San Diego Metro Wastewater Department, dated March 4, 1999, announcing the project's termination. (enclosed)

Best regards,



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Summary of Laws Requiring Reclamation Reuse

(a) Relevant Federal Law

The Federal "Clean Water" Act mandates wastewater reclamation and re-use to the maximum feasible extent, to conserve water and achieve a steady reduction in pollution discharges into the ocean.

The "Clean Water" Act, 33 U.S.C. 1251, et. seq. (hereinafter "Act") ordains a policy of reclaiming waste water and beneficially re-using it (hereinafter "recycling") to both conserve water and reduce pollution discharges into receiving waters. Relative to the latter purpose, the clear and expressed intent of the Act is to steadily reduce and eventually eliminate all polluting discharges into navigable waters. 33 U.S.C. 1251(a)(1); Chevron U.S.A., Inc. v. Hammond, 726 F.2d 483, 489, (9th Cir. 1984).
(NOTE. Other supporting case authorities omitted for this purpose.)

The only practicable way a municipal discharger can satisfy this pollution reduction requirement is by implementing a steadily growing program to recycle its waste water. Recognizing this cause and effect relationship, the Act imposes a recycling duty on the EPA Administrator:

"...(T)he Administrator shall conduct, on a priority basis, an accelerated effort to develop, refine, and achieve practical application of...methods for reclaiming and recycling water and confining pollutants so they will not migrate to cause water or other environmental pollution..." 33 U.S.C. 1255(d)(2).

With these Act provisions in mind, the U.S. District Court for New Jersey held that the "Clean Water" Act requires water recycling in order to achieve a reduction in waste water effluent volumes to the maximum extent feasible, stating "the Clean Water Act was intended to encourage the use of treated waste water - through recycling or reclamation - rather than the mere discharge of the waste water into another body of water." Township of Parsippany-Troy Hills v. Costle, 503 F.Supp 314, 327 (N.J. 1979); aff'd 639 F.2d 776 (3d. Cir. 1980).

In its order renewing respondent's NPDES permit in 1990, this Regional Board expressly required the City to comply not only with all conditions contained in the permit itself, but also to comply with all provisions of the CWA and California's Water Code. (Board Permit Order 90-32, provision 2, at p. 28.)

In a recent Southern District of California "Clean Water" Act case, Federal Judge, Brewster, affirmed the Act's policy concerns with conserving water and the prudent use of waste water in the following Conclusion of Law:

"The reduction of unnecessary consumption of water and the prudent use of waste water in sewage treatment systems are goals of the Act." Conclusion of Law Four, 6/22/91, EPA Administrator v. City of San Diego and Sierra Club, Intervenor, 88-1101 (RMB), citing Act sections 1251 (B) and (G), and 1254 (O).

Title 33 U.S.C. 1251(b) provides, in pertinent part:

"It is the policy of Congress to...plan the development and use (including restoration, preservation, and enhancement) of land and water resources."

Section 1251(g) provides, in pertinent part:

"Federal agencies shall cooperate with State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate, pollution in concert with programs for managing water resources."

(b) RELEVANT STATE LAW

California's "Prudent Use" Laws

Unique among the States, California has elevated its policy requiring all water resources be beneficially used to a constitutional mandate. Article Ten, Section Two, of the California Constitution provides as follows:

"The general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with the view to the reasonable and beneficial use thereof..."

This section imposes a "rule of reasonable use" on all waters of the state. The California Constitution goes on to state that the right to water "does not and shall not extend to the waste and unreasonable use or unreasonable method of use...of water."

Subsequent to this enactment, several important Water Code sections were adopted to implement and enforce it.

California Water Code sections 100 and 275 reemphasize the constitution's prohibition of waste or unreasonable use of water. Section 275 mandates that the Board take all steps necessary to prevent such waste or unreasonable use. Section 100 mandates that careful use of California's water resources is "in the interest of the people and for the public welfare." Cal. Water Code ^U 100 (West 1995). These code sections impose a duty upon the Board to take affirmative action in preventing the waste of water and promoting the public welfare and the future of California's water supply.

In recent years, the California legislature has plainly indicated its belief that waste water reclamation and beneficial re-use are required for the prudent use and conservation of water resources mandated by the Constitution. Water Code Section 13142.5(e) expressly applies to the State's coastal zone and to this case, providing:

"Adequately treated reclaimed water should, where feasible, be made available to supplement existing surface and underground supplies and to assist in meeting future water requirements of the coastal zone..."

As if to make clear the nexus between California's reclaimed water policy mandates and municipal discharge programs such as respondent's, this Board, in "The Matter Of The Sierra Club, San Diego Chapter," Order No. WQ 84-7, 1984 WL 19064.6

(Cal. St. Wat. Res. Bd. (7/18/84), stated the following at page 6:

"In the future, in this case and in all other cases where an applicant in a water-short area proposes a discharge of once-used waste water into the ocean, the report of the discharge should include an explanation WHY THE EFFLUENT IS NOT BEING RECLAIMED FOR FURTHER BENEFICIAL USE. This is consistent with State policy, established by the Legislature in Water Code Section 13142.5(e)."

As recently as 1992, this Board confirmed the link between recycling and the prudent use/waste of water mandates. In decisional order #1630 ("Interim Bay-Delta Standards") appears this language:

"Wherever practicable, all agencies should reduce imported water demands by maximizing water reclamation re-use."

Other Water Code provisions reinforce complainant's position that failure to recycle waste water, where feasible, is a prohibited waste of a water resource.

Chapter 6 of the Water Code, entitled "Waste Water Re-Use", provides that the public interest requires the maximum re-use of waste water. Cal. Water Code ^U 461 (West 1994).

Chapter 7.5 of the Water Code, entitled "Water Recycling Act Of 1991", establishes goals for statewide reclaimed water re-use. Pursuant to section 13577, 700,000 acre feet per year ("afy") must be recycled by the year 2000, and 1,000,000 afy must be recycled by the year 2010.

Water Code Sections 13550 and 13551, as amended, require public and private entities to use reclaimed water for irrigation, industrial, and agricultural uses under conditions of availability, quality and cost, conditions that could be fully met by the City of San Diego. These statutes proclaim that the use of potable domestic water for irrigation, in lieu of reclaimed water, is a waste or unreasonable use of water under the California Constitution.

The intent of the California legislature to force expansion of waste water recycling is vividly shown by its steady enlargement of mandated uses. Water Code Section 13553 requires use of reclaimed water for toilets and urinals in all non-residential structures.

Water Code Sections 13555.2 and 13555.3, effective January 1, 1993, were added to the reclamation and re-use statute. These new provisions require dual plumbing in all new construction within metropolitan San Diego and in many other regions of the State, to accommodate reclaimed water. Under these provisions, all outdoor irrigation in new residential developments, and all new commercial and industrial structures, must use reclaimed water when it is available.

CITY OF SAN DIEGO WATER RECYCLING ORDINANCE

(c) Relevant Local Law

Expressing a recognition that San Diego's 90% dependence on imported potable water dictated an aggressive water reclamation and re-use program, San Diego city Council adopted a Water Reclamation ordinance in 1989 (#64.081, et. seq.). Among other things, the ordinance announced a goal of wastewater recycling (reclaiming and re-using) 70,000 acre feet per year (afy) of its Metro wastewater by the year 2010. The ordinance also mandated use of reclaimed water in place of potable water throughout the City and imposed criminal and civil penalties for violations.

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March 4, 1999

Robert Simmons
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Dear Mr. Simmons:

As we begin a new year at Metro Wastewater, some significant changes have taken place regarding our proposed Water Repurification Project. Because of your interest in this program, I want to make sure that you understand exactly where we are and what direction we have been given by the City's policy makers.

At a meeting in January, the City Council instructed the City Manager that no further funds were to be expended on the Water Repurification Project. Recent public reaction seems to have caused the majority of the Council to withdraw their support for repurification.

We have instructed staff and consultants to stop all work on the project. The years of research and development we have put into repurification have been extremely helpful and I have no doubt that this technology will be used in the future. For the time being, however, we are examining other ways to beneficially reuse the effluent from the North City Water Reclamation Plant. A hearing will be held on this topic by the Council's Natural Resources and Culture Committee on March 31, 1999.

The City's Water Department continues to sign up new customers served by the reclaimed water backbone system. Projections are that we will be able to meet the requirements for water reuse through the year 2003 with the current distribution system.

I want to let you know that we have appreciated your interest in the Water Repurification Project and that we will continue to keep you informed of any changes in policy or direction about this effort. If you have any questions, please give me a call.

Sincerely

SAN DIEGO METRO REPURIFIED WATER PROGRAM APPROVED

March 13, 1998 (619) 235-1932

SAN DIEGO The City of San Diego's proposed Water Repurification Project conforms to all recommendations outlined in the recently released National Research Council report for indirect potable reuse projects, and may set the standard for such projects nationwide. San Diego's proposed project includes a treatment process composed of multiple, redundant barriers as recommended by the NRC, as well as a monitoring and testing program to ensure system reliability.

Indirect potable reuse is the term which describes the introduction of reclaimed water which has been treated to an advanced level into a community's raw water supply, such as a lake, water supply reservoir or underground aquifer. The mix of this reclaimed water and raw water is then subjected to conventional water treatment before entering the community's distribution system. The report focuses on planned indirect potable reuse, as opposed to the unplanned reuse that occurs daily on many river systems throughout the country.

"We are pleased to have this panel of renowned national experts confirm the conservative processes and procedures we have taken to provide an additional local source of safe, reliable water for the San Diego region," said Dave Schlesinger, Director of the City of San Diego Metropolitan Wastewater Department. "The Water Repurification Project's use of state-of-the-art technology win set the standard for future projects of this kind."

The NRC report acknowledges that scarce new water sources and population increases throughout the world have encouraged innovative water management measures to meet the demand for fresh water. The best available current information suggests that the risk from indirect potable reuse is less than or comparable to the risks associated with conventional water supplies in many communities. No significant health risks have been identified in the years of testing where reclaimed water has been used to augment drinking water supplies.

Water Repurification

Feasibility Study

Executive Summary
July 1994

San Diego County Water Authority

Table of Contents
Water Repurification Feasibility Study
Executive Summary
July 1994

Water Repurification Feasibility Study
Executive Summary
July 1994

I. INTRODUCTION/PROJECT DESCRIPTION

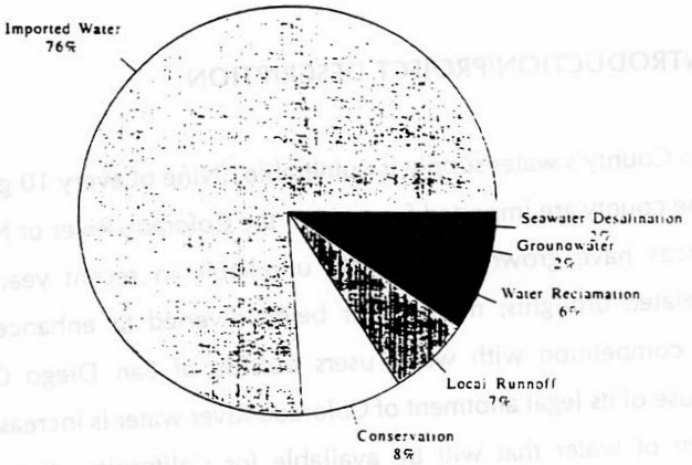
San Diego County's water supply is vulnerable. Nine of every 10 gallons of water typically used in the county are imported from either the Colorado River or Northern California. But both sources have grown increasingly unreliable in recent years because of periodic, weather-related droughts; more water being diverted to enhance species habitats; and increased competition with water users outside of San Diego County. For example, Arizona's use of its legal allotment of Colorado River water is increasing over time, reducing the amount of water that will be available for California. In addition, environmental degradation of Northern California fisheries caused by operation of the massive federal and state water projects must be addressed by diversions of water to support threatened and endangered species in the Sacramento-San Joaquin-San Francisco Bay Delta. And finally, Southern California's population continues to increase dramatically placing an ever-increasing burden on the limited existing water supply.

The California Department of Water Resources (DWR), in its most recent update of the California Water Plan, states that by 2020 shortages of between 2.2 million and 4.2 million acre-feet of water will be experienced statewide in a non-drought year. To reduce the county's reliance on limited imported water supplies and to plan for this projected shortfall, the San Diego County Water Authority (Authority) and its member agencies have embarked on aggressive programs to develop new sources of local water in San Diego County. These include development of local groundwater, improvements in conveyance and storage facilities, seawater desalination and water reclamation.

Figure 1

Water Resource Options

San Diego County



Water reclamation involves the recovery and treatment of wastewater to a quality suitable for irrigation of parks, landscaping, crops and other non-potable applications. This practice is rapidly becoming an indispensable element of the region's water supply. Water repurification, an extension of these highly successful water reclamation programs, involves further treatment of the reclaimed water to a level suitable for blending in a local water supply reservoir. Water repurification is used in other areas of the United States, most notably Water Factory 21 operated by the Orange County (California) Water District since 1978. Water Factory 21 uses repurified water for replenishment of a local groundwater supply.

The City of San Diego has actively investigated water repurification since the late 1970s. In 1983, the city, in conjunction with the U.S. Environmental Protection Agency, embarked on an extensive research and development program directed at evaluating the capability of water repurification technology to comply with drinking water standards.

Figure 2

Water Repurification

Chronology of Events

- 1970s - Injection of repurified water into potable groundwater basin begins at Water Factory 21 in Orange County
- 1978 - Augmentation of Upper Occoquan Reservoir with repurified water begins in Northern Virginia
- 1980s - Health effects research at San Diego Aqua I and II and City of Denver demonstrates advanced treatment technology and finds no negative health effects
- 1993 - DHS, DWR and WaterReuse Assoc. begin discussions on potable reuse regulations. CWA submits concept report on potential repurification project
- 1994 - Water Repurification Feasibility Study prepared to develop project guidelines

II. ADVANTAGES

The Authority and its member agencies are developing local water sources to offset projected shortfalls in imported water supplies. If regulatory approval can be obtained, water repurification may offer the Authority an additional water supply option. Potential advantages of water repurification include:

- A renewable source of potable water will exist following repurification which will expand our available potable water supply.
- Water repurification facilities can operate on a year-round basis, allowing for the most efficient use of available water resources.
- Only one transmission pipeline will need to be constructed between the facility and the reservoir.

- Up to 40 percent of our existing supplies could potentially be recovered through the repurification process.
- Water repurification technology will produce an extremely high quality water supply.

III. PRELIMINARY CRITERIA

Results from research studies demonstrate that existing repurification technology can produce a safe and reliable water supply. During preliminary discussions with the State of California Department of Health Services (DHS) in 1993, the department identified several general conditions of approval for repurification, including the following:

- Demonstrated Technology. Advanced water treatment facilities must be based on technology demonstrated through comprehensive health studies to produce safe, reliable water.
- Reservoir Retention. To allow for mixing with traditional supplies and provide time for natural purification to take place, the repurified water must be retained in a reservoir prior to withdrawal for potable water treatment and reuse.
- Performance and Reliability. The water repurification project must provide a degree of treatment performance and reliability equivalent to the DHS requirements governing the recharge of potable groundwater basins with reclaimed water.
- Final Potable Water Supply. The final potable supply must conform with applicable state and federal drinking water standards.

IV. FIRST STEPS

The Authority, along with the City of San Diego and the Metropolitan Water District of Southern California (MWD), has developed a water repurification project that is under

review by the DHS. To determine whether the project – and water repurification in general – is viable in San Diego County, the DHS must first identify regulatory requirements and conditions of approval.

Identification of regulatory criteria will allow the Authority to consider the merits of water repurification along side other water supply options. Key considerations include cost, environmental and public acceptability of the concept. If the water repurification concept appears viable, the Regional Water Resources Plan would be amended to accommodate the availability of this new supply option.

For purposes of developing the proposed project, it was assumed that:

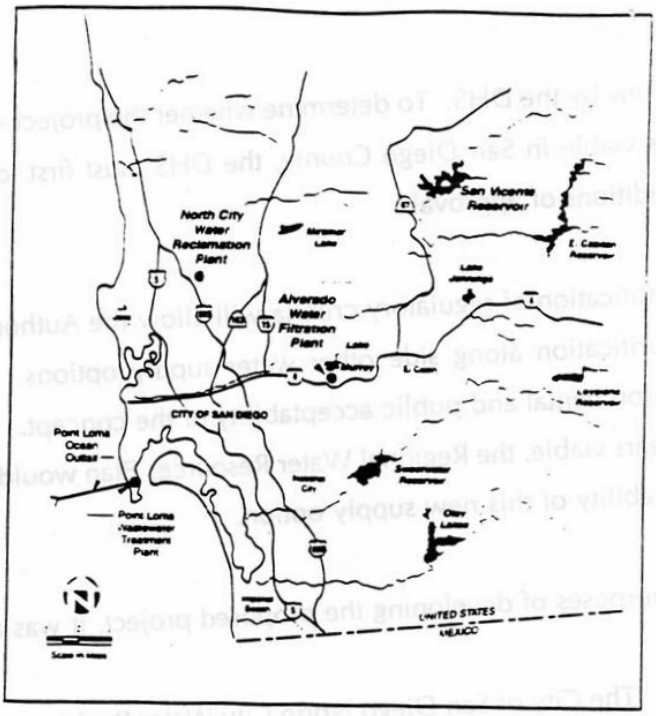
1) The City of San Diego North City Water Reclamation Plant (located on the northeast side of the intersection of Miramar Road and Highway 805) would serve as the source of supply to an advanced water treatment facility.

2) Repurified water would be conveyed about 20 miles to the City of San Diego's San Vicente Reservoir to blend with and supplement local runoff and imported water. Withdrawals from San Vicente Reservoir would be conveyed to the City of San Diego Alvarado Water Filtration Plant for conventional potable treatment and disinfection prior to distribution through the existing potable water system.

Each of these assumptions is subject to change as the water repurification concept is further refined.

Figure 3

Location of Key Project Features



V. OVERSIGHT

The feasibility report was developed under the direction of two oversight committees: the Independent Advisory Panel and the Management Advisory Committee.

The Independent Advisory Panel consisted of independent experts in the water supply and public health fields. These individuals provided technical direction and oversight during preparation of the feasibility report and development of the proposed project. The panel members were individually selected by the DHS and three of the five members have been previously involved in similar feasibility studies. The five Independent Advisory Panel members are recognized experts in the following fields:

- Drinking Water Quality
- Public Health
- Epidemiology
- Advanced Water Treatment
- Reservoir Dynamics

The Independent Advisory Panel reviewed the Water Repurification Feasibility Study and arrived at the following conclusion:

> "In general, the committee supports the technical recommendations of the report and further recommends that additional monitoring requirements be included in the final plan. The panel support is...based on the specific components as outlined in the [June 1994 Water Repurification Feasibility Study]."

The Management Advisory Committee was charged with providing oversight and guidance related to existing and projected water and wastewater facilities, operational considerations and implementation factors. The Management Advisory Committee consisted of selected staff members appointed by the following local water and wastewater agencies:

- San Diego County Water Authority
- City of San Diego Water Utilities Department
- City of San Diego Metropolitan Wastewater Department
- San Diego Area Wastewater Management District
- Metropolitan Water District of Southern California

During development of this feasibility study, each committee conducted three progress review meetings to provide guidance on project direction. The project team presented technical updates focusing on: 1) reservoir dynamics; 2) water quality criteria and treatment; and 3) system facilities, reliability and operations.

1) Reservoir Dynamics

Reservoirs such as San Vicente play an important role in regulating the flow of water in San Diego County. These facilities provide a central collection point to store imported water, local supplies and, perhaps in the future, repurified water. Since the availability of the various water supplies is not always evenly matched with the demands placed on them by the consuming public, reservoirs serve the important function of regulating supply and

demand. Repurified water would be produced at a relatively constant rate throughout the year. Introduction of this supply into San Vicente will allow for blending with imported water and local runoff. Generally, water is retained in the San Vicente Reservoir for several months before being released into the water filtration plant. During the time the blended water supply is retained in the reservoir, natural purification processes continue to occur much as they do in the reservoir today.

2) Water Quality Criteria and Treatment

A water repurification project must comply with both reclaimed water and drinking water regulatory standards. With this in mind, an agency developing a conceptual water repurification project must first assess applicable regulations and policies. After this assessment, the agency then establishes water quality targets for the project. DHS has indicated it will require the proposed repurified water system to provide a degree of treatment performance and reliability equivalent to the department's requirements governing the recharge of potable groundwater basins with reclaimed water.

3) System Facilities, Reliability and Operations

The water repurification facility would employ the most advanced technology for water treatment available today. Initially the water would be filtered through sand and charcoal to remove contaminants visible to the eye. Next, microfiltration would be employed to remove any remaining suspended solids, colloids, bacteria and viral contaminants. Microfiltration would be followed by reverse osmosis. Reverse osmosis treatment removes any remaining bacteria, virus and suspended solids and reduces the dissolved organic and inorganic contaminants well below recognized standards for drinking water. After reverse osmosis, disinfection would be accomplished with ozone, hydrogen peroxide and chlorine. Finally, ion exchange technology would be employed to reduce any remaining nutrients that may otherwise affect water quality in the reservoir. The repurified water, which would now meet federal and state standards for drinking water, would be transferred to San Vicente Reservoir for blending with imported water and local runoff. Eventually, the blended supply

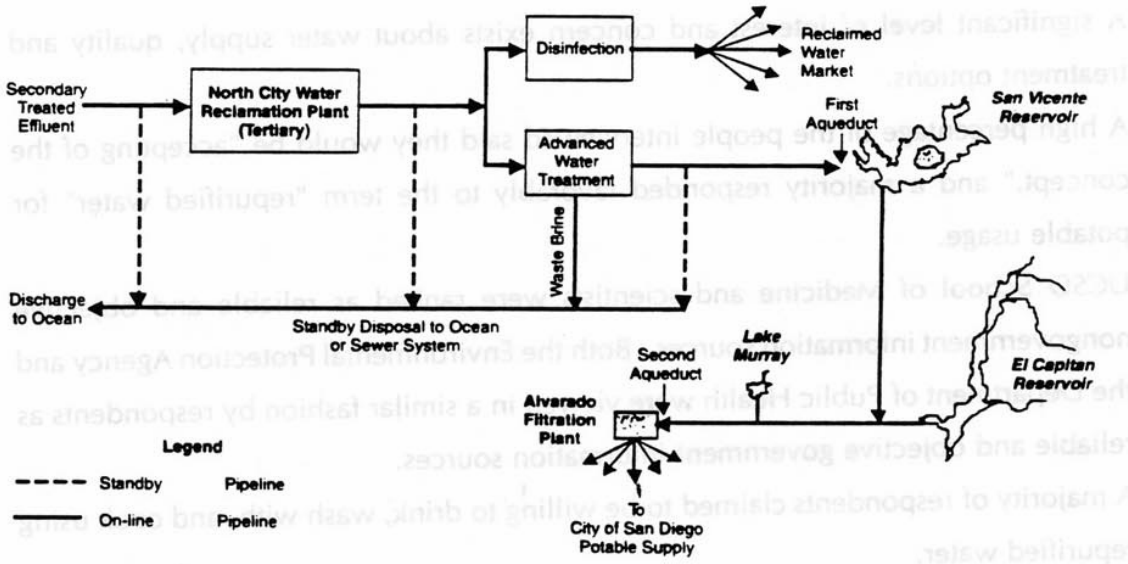
would be released from the reservoir for further filtration and disinfection at the Alvarado Water Treatment Plant.

Extensive monitoring will be included before and after each treatment process to provide instantaneous verification that each component of the treatment system is operating at its maximum efficiency. Any deviation from established standards at any step along the way toward repurification will result in the water supply being diverted out of the system until the problem is corrected.

For instance, potential industrial contaminants will be controlled at the source or pretreated prior to entering the water reclamation facility. A comprehensive monitoring program will confirm that water quality objectives are being met. If a problem occurs, flow diversions built into the system will provide an instantaneous response.

Figure 4

Schematic of Water Repurification Concept



VI. PUBLIC PERCEPTION

The Authority wants to ensure that water repurification is well understood by the public. A comprehensive research and evaluation program was conducted to gain a better understanding of the public's willingness to accept the concept and to identify specific issues that will need to be addressed in the future.

Opinions were sought through public opinion research and direct communication with community leaders, as well as through telephone surveys, focus groups and interviews. The results follow.

Telephone Survey Findings

Approximately 350 City of San Diego residents were surveyed by telephone. Four general areas were tested: level of knowledge about general water issues; how citizens feel about various water recycling options; response to terminology such as "reclaimed water," "recycled water" and "repurified water"; and trustworthiness of potential message carriers. A summary of the findings is as follows:

- A significant level of interest and concern exists about water supply, quality and treatment options.
- A high percentage of the people interviewed said they would be "accepting of the concept," and a majority responded favorably to the term "repurified water" for potable usage.
- UCSD School of Medicine and scientists were ranked as reliable and objective nongovernment information sources. Both the Environmental Protection Agency and the Department of Public Health were viewed in a similar fashion by respondents as reliable and objective government information sources.
- A majority of respondents claimed to be willing to drink, wash with, and cook using repurified water.

Focus Group Findings

Four 90-minute formal focus group sessions were conducted with 10 participants each. The goals were similar to those of the telephone survey: to gauge how citizens felt about various water recycling options and what their level of knowledge was regarding water supply in general. These sessions also sought to identify thresholds at which individuals considered water sufficiently safe for use. The findings were as follows:

- Continued water supply shortages concerned participants. An overwhelming majority indicated that self-reliance and a concern for the environment are advantages of a proposed water repurification project.
- All respondents thought it was possible for humans to copy natural water recycling through technology.
- Participants indicated they would trust third-party independent spokespersons such as scientists or academics to provide objective and independent endorsement of water repurification.

Community Leaders Interview Findings

Over 50 in-depth, one-on-one interviews have been conducted with community leaders and those who have a stake in water supply issues. They were questioned about their thoughts regarding water repurification and related issues. Interviewees included elected officials, opinion leaders, people involved in water and environmental issues, scientists and medical professionals, and business leaders.

- Virtually all community leaders interviewed indicated they thought the technology currently exists to repurify water to drinking level standards.
- Most indicated water repurification for potable purposes was worth further investigation.

- Many community leaders felt public perception will be a significant issue, so a good public education program is critical.
- Many felt the ability to repurify water will increase San Diego's self-sufficiency, reducing our dependence on imported water.

Summary of Public Opinion Research

Recent research strongly suggests that there has been a shift in public acceptance of repurified water usage since initial research results were published in 1985. Negative feelings have moderated, possibly as the result of general recycling and environmental messages over the past decade or the recurrent threat of drought.

The Authority recognizes that a repurified water program will require significant political and public acceptance to be successful. Therefore, the Authority has formed an ad hoc committee to identify community concerns and other issues associated with repurified water. Future research in specific issue areas could be recommended. In addition, the Authority will continue to provide information to local policy makers in an effort to keep them current on issues relating to water supply alternatives.

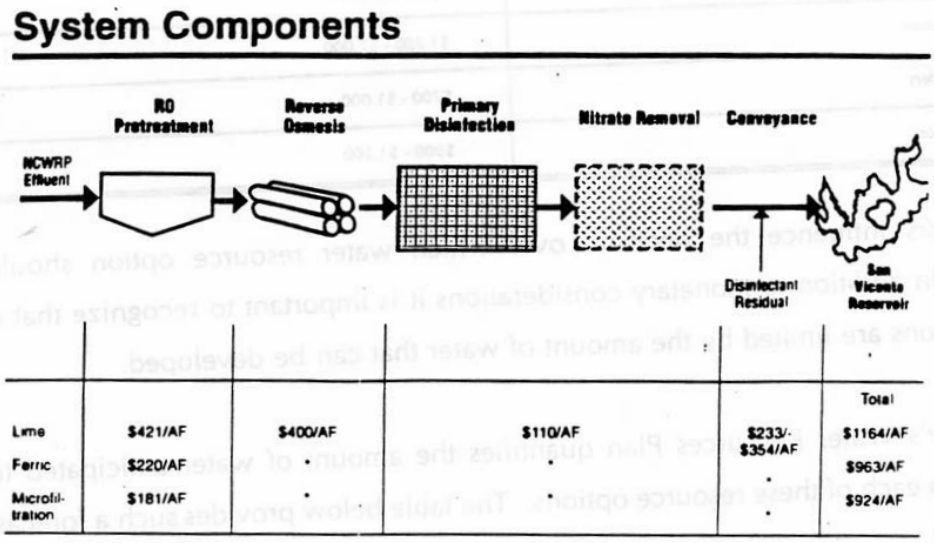
VII. ECONOMICS

Cost Estimation

Capital and Operations and Maintenance (O&M) cost estimates were prepared for a water repurification system providing 20,000 acre-feet per year (7 billion gallons). Several alternative configurations are being considered. Capital costs for these alternatives range from $110 to $150 million. When amortized over 30 years at a seven percent interest rate, this translates to a capital cost of between $9 and $12 million annually. O&M of the repurified system adds between $11 to $15 million per year for a total annual cost ranging

from between $20 to $27 million depending on the alternative selected. Expressed as dollars per acre-foot of water produced, water repurification ranges between $900 to $1,300 per acre-foot.

Figure 5



					Total
Lime	$421/AF	$400/AF	$110/AF	$233/-$354/AF	$1164/AF
Ferric	$220/AF	"	"	"	$963/AF
Microfiltration	$181/AF	"	"	"	$924/AF

Comparative Economics of Water Repurification

The decision to develop a water repurification project is appropriately compared to the costs of developing other sources of water supply. The Authority's Water Resources Plan identified several options to meet growing demand and increase the reliability of the region's water supply. The various water supply options available in San Diego County and their relative costs are presented below. Similar to water repurification, costs for all water resource options are presented as a range because they are dependant upon specific alternatives selected.

Table 1 **WATER RESOURCE OPTIONS**

RESOURCE PROJECT	COST PER ACRE-FOOT
Conservation	$200 - $600
Non-potable Water Reclamation	$700 - $1,500
Groundwater	$500 - $2,000
Seawater Desalination	$1,200 - $2,000
Agricultural Transfers	$700 - $1,000
Water Repurification	$900 - $1,300

Several factors influence the decision over which water resource option should be developed. In addition to monetary considerations it is important to recognize that some resource options are limited by the amount of water that can be developed.

The Authority's Water Resources Plan quantifies the amount of water anticipated to be available from each of these resource options. The table below provides such a forecast for the year 2010.

Table 2 **WATER RESOURCES PLAN**

NORMAL YEAR DEMAND AND SUPPLY FORECASTS - YEAR 2010

	ACRE-FOOT PER YEAR
Normal Year Demand Forecasts	902,000
Dependable Savings through Conservation	70,000
Existing Local Supply (Reservoirs and Groundwater)	60,000
Water Reclamation/Repurification	50,000 - 70,000
New Groundwater Development	15,000
Seawater Desalination	0 - 20,000
Imported Water Supply	687,000

This table reflects the potential for water repurification to increase the amount of water reclamation occurring in San Diego County, thereby decreasing the need for some of the more costly seawater desalination options.

VIII. CONCLUSIONS AND RECOMMENDATIONS

- Concerns about public health protection are of paramount importance to the success of this project.

- Repurified water must exceed both conventional drinking water and surface water quality standards and provide a level of safety and reliability equal to the current water supply.

- The emergence of advanced water treatment processes as "proven technology" has fostered DHS's optimistic support of the water repurification concept.

- Repurified water should receive advanced treatment, including reverse osmosis. In addition, a disinfection step and extensive water quality monitoring at various steps in the repurification process are recommended to provide the highest possible level of water quality assurance.

- The repurified water should be introduced into the water supply system via an upstream reservoir to allow for regulation of flow, blending and natural purification.

- A repurified water supply of up to 20,000 acre-feet per year (7 billion gallons per year) to San Vicente Reservoir appears to be comparable in cost to other water supply options available to the Authority.

- The water repurification project concept developed in this study includes treatment process redundancies to enhance the overall system reliability. Key reliability assurance features of this project include:

  - Industrial contaminant source control
  - Redundant treatment processes for removal of microbiological and organic contaminants
  - Instantaneous monitoring and diversion of product water not meeting specified criteria
  - Comprehensive monitoring of water retained in San Vicente Reservoir
  - Additional filtration, disinfection and monitoring at Alvarado Water Filtration Plant prior to distribution for use

IX. FEASIBILITY REVIEW

The project developed in this study is conceptual. The final report was delivered to the State Department of Health Services in June 1994. Comments are expected back from the DHS within 90 days, after which the San Diego County Water Authority will further consider the feasibility of water repurification in light of the department's comments.

Should the concept prove viable and receive support from the Authority's Board of Directors, a water repurification project of this nature conceivably could be completed by the end of this decade.

Revised July 28, 1994

# # #

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
(619) 338-2222 FAX (619) 338-2088
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RICHARD HAAS
ASSISTANT DIRECTOR

MEMO

To: Takashi Asano

Via: Fawzi Karajeh

From: Richard Carlson

Subj: Science & Health / Indirect Potable Reuse Workgroup

Attached please find the Science Advisory Board County of San Diego 2 January 1999 draft Summary Review & Recommendations for the City of San Diego's repurified water project. Also attached is a list of the Science Advisory Board members. This is the report that effectively killed the indirect potable reuse project of the City of San Diego.

If needed, I can try tracking down the original report. I can be reached by phone at 858-694-2548 or by e-mail at dick.carlson@sdcounty.ca.gov

To be mailed to Prof. Asano and the rest of the Science & Health/Indirect. work group.
8/5/02

DRAFT

Science Advisory Board

COUNTY OF SAN DIEGO

2 January 1999

THE SAN DIEGO WATER RECLAMATION PROJECT SUMMARY REVIEW & RECOMMENDATIONS

The Science Advisory Board (SAB) has reviewed and evaluated the scientific merits of the San Diego Water Reclamation Project (SDWRP) and is herewith stating its conclusions and recommendations to the Chief Administrative Officer (CAO) and to the Board of Supervisors (BOS) of San Diego County.

The SAB began this task at its regular meeting on 11 February 1998, followed by meetings on 22 April 1998 and 10 June 1998 during which time it heard extensive testimony by responsible officials from the San Diego County Water Authority, the City of San Diego Metropolitan Wastewater Department (SDWW), and from R. Rhodes Trussel, Ph.D., Senior V.P. and Director of Corporate Development, Mongomery-Watson, Inc. In addition, SAB members engaged in extensive discussions and reviews of scientific information relating to water reclamation nationwide. The U.S. cities and regions which are now using or planning to use reclaimed water for potable and non-potable use include Atlanta, El Paso, Las Vegas, Orange County, Oxnard, Livermore, Los Angeles, North Virginia, Reno, San Diego and Washington, D.C. Denver abandoned its potable water reuse project after some 20 years of study and $50 million of expense.

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The SAB reviewed conclusions and recommendations from several of these, including the Rand Report prepared for the Water Replenishment District of Southern California entitled *Groundwater Recharge with Reclaimed Water - An Epidemiologic Assessment in Los Angeles County 1987-1991;* the 10 August 1998 report by the Metropolitan Wastewater Department South Bay Community Advisory Group; the National Water Research Institute Blue Ribbon Panel on Water Repurification (1998); The California Potable Reuse Committee (1998), and the National Research Council review entitled "*Issues in Potable Reuse - The Viability of Augmenting Drinking Water Supplies with Reclaimed Water" (1998).*

On 22 April 1998, some members of the SAB made an extended investigative site-visit to the pilot water-reclamation project plant in San Diego County, at the Aqua 2000 Research Center and drank samples of water reclaimed at that facility. The SAB members heard public comments from individuals and groups, including "The Revolting Grandmas" which deposited a number of reports with the SAB, including one entitled "*Remarks before the Environmental Safety and Toxic Materials Committee of the California Assembly concerning the Proposed San Diego Repurification Project*" by Daniel A. Okun, Kenan Professor of Environmental Engineering, Emeritus, University of North Carolina at Chapel Hill (1997), who also communicated with SAB members.

The SAB also solicited advice from a number of prominent specialists, including Joshua Fierer (M.D., Head, Division of Infectious Diseases and Professor of Medicine and Pathology, UCSD School of Medicine), Michele Ginsberg (M.D., Chief of AIDS and Community Epidemiology, Department of Health and Human Services, San Diego County); Ruth Heifetz (M.D., M.P.H., Sr. Lecturer, Department of Family and Preventive Medicine, UCSD School of Medicine), Michael N. Oxman (M.D.,

DRAFT

Professor of Medicine and Pathology, UCSD School of Medicine), and David Schubert (Ph.D. Professor, Salk Institute).

Based on the foregoing information and reviews, the SAB finds as follows:

1. The SDWRP at the pilot-plant level has been pursued by competent scientists and engineers possessing first-rate credentials, and done professionally. The goal of augmenting the San Diego County potable water supply by about 10% merits support if it can be demonstrated that, when scaled up, the SDWRP will produce a potable water supply that is cost-competitive with alternative sources of potable water. However, it has yet to be demonstrated that this project is an acceptable option to the people of San Diego County on the basis of convincing evidence that no avoidable environmental health hazards are introduced.

2. The SDWRP health-effects research has indicated that the multiple-barrier technology used in the water-purification pilot project is based on sound scientific and engineering principles and uses proven and reliable technologies. The multiple-barrier approach is suitable for the removal of pathogenic organisms and of many organic and inorganic contaminants from the source(s) of raw water. Based on available monitoring and on chemical and biochemical analyses, the health-effect-related data that have been collected and analyzed point to the conclusion that the risk to public health of potable water from the pilot plant when it is consistently monitored should be no greater than that of other sources of water.

3. There is a significant burden of material contamination in San Diego County. This results from the high concentration of high-technology research and production facilities which generate a multitude of toxic and often newly developed

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chemicals. These substances ultimately find their way into our waste-water stream. There are few constraints on what may be dumped into this stream. There are considerably greater uncertainties and potential risks concerning these new substances, than about currently recognized infectious and other biologically active agents. This is because there is extensive experience to indicate that a properly functioning system will be able to eliminate them from a potable water supply. By contrast, our knowledge of the health consequences of minute quantities of a multiplicity of chemical contaminants in our potable water is just beginning to evolve. There is not enough information about the identification, monitoring and removal of these contaminants.

4. The SAB believes that before any plans are considered to scale up the SDWRP pilot plant, the cost, safety and long-term reliability of this source of water should be carefully evaluated against other alternatives. The SAB further believes that a long term epidemiological examination and surveillance of potential health impacts of this source of potable water should be carried out.

5. The rapid changes in biological and biochemical environments narrated under section 3 above, make it impossible to guarantee the safety of using treated waste water for potable use.

6. The SAB therefore recommends that a separate system for holding and distributing the purified waste water be considered to supply industrial and landscaping needs. There exists large scale potential users of this system, and new real estate developments can be required to build dual water distribution systems. This recommendation is validated by the existence of several such systems. A number of engineering constructs should be adhered to. Among them, the treated effluent

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impoundment in dual reservoirs, alternated for final assay and use. This design would achieve an environmentally desirable recovery system, if and when needed.

Reviewed and signed on behalf of the Science Advisory Board, County of San Diego, State of California, this 12th day of January 1999:

Elie A. Shneour, SAB Chair

Stanford S. Penner, SAB Member

OFFICE OF TRADE & BUSINESS DEVELOPMENT

COUNTY OF SAN DIEGO WEB SITE

SCIENCE ADVISORY BOARD

SCIENCE ADVISORY BOARD MEMBERS

County of San Diego
(Revised December 28, 1998)

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AMERICA FIRST

REVOLTING GRANDMA'S

Mary Quartiano, Spokesperson
Muriel Watson, Political Adviser

E PLURIBUS UNUM

October 10, 2002

attn: Rick Mills

RECEI

OCT 16

Department of Water Resources
The 2002 Recycled Water Task Force
P.O. Box 942836
Sacramento, CA 94236-0001

Subject: Public Discussion Session
Los Angeles, California
October 10, 2002

Dear Members:

Flush it don't drink it, a viable alternative to drinking sewer water. Enclosed please find part four of Revolting Grandma's White Paper.

We can all agree that California is vulnerable to cyclic drought conditions (and rapid population growth). However, the Grandma's disagree with the mind-set that portrays drinking sewer water as the only solution. **Or, the solution of preference.**

It is not necessary to add sewer water to our drinking water supplies, dual plumbing and dual piping delivery systems have been very successful in about six dozen communities throughout the United States. With the exception of Irvine, California, most of these communities started out by retrofitting.

Initially Irvine built a conventional water distribution system, but in the 1970's incorporated a dual piping system for all new construction. It was the first city to mandate the use of reclaimed sewer water for toilet-flushings and air conditioning in high-rise structures. Irvine has recently found it economical to retrofit the older parts of the city with reclaimed water lines

Although toilet-flushing is just one of many appropriate nonpotable uses of reclaimed sewer water, please take one moment to invision how many toilets there are in just one large hotel, how many times each toilet might be flushed each day, and how many gallons of water are discharged into the sewer with each flush. **Think about it.**

Respectfully submitted.

Mary Quartiano

Mary Quartiano
Muriel Watson

Encl: (2 Pages).

4080 Hancock Street, Suite 4311 * San Diego, CA 92110-6203 * Tel/Fax: (619) 226-6536
The Very Independent Revolting Grandma's

AMERICA FIRST

REVOLTING GRANDMA'S

Mary Quartiano, Spokesperson
Muriel Watson, Political Adviser

E PLURIBUS UNUM

PART FOUR

September-October 2002

TO DRINK OR NOT TO DRINK

Revolting Grandma's White Paper.

Come into my parlor said the spider to the fly. Let me pour you a glass of tiny virises, bacteria, cyptosporidium, girdia, and cancer-producing by-products. You may not die. Then, again, you may. Or, you may get very very sick.....

Please note: The Milwaukee waterborne Cryptosporidium Outbreak in 1993.

The correct term for it is: **"Indirect Potable Reuse"**. What does it mean? It means augmenting our drinking water supplies with treated sewage. In California, some indirect potable reuse projects have been given titles which are, in our opinion, deceptive. For example:

1. The San Gabriel Valley Groundwater Recharge Project.
   Recharged with what?

2. The Clean Water Revival Project. In the Dublin San Ramon District (east of Oakland, California.
   What was it slated to be revived with? Treated effluent?

3. San Diego's Repurification Project.
   When was sewage ever classified as being pure?

4. The Los Angeles East Valley Water Reclamation Project.
   Reclaimed from what, and from where?

Relatively speaking, at the last minute, the public-at-large stopped all four of these projects.

Yes, as we understand it, all of the aforementioned projects were dubbed **toilet-to-tap** by the media and the public-at-large. A term not favored by some politicos and some bureaucrats in the State of California. However, considering its source, you'll have to admit the moniker **toilet-to-tap** is quite appropriate.....

After all, before being slated to reach the taps in our homes, wasn't the reclaimed water they'er talking about **destined to take a tour through the sewer?**

4080 Hancock Street, Suite 4311 * San Diego, CA 92110-6203 * Tel/Fax: (619) 226-6536
The Very Independent Revolting Grandma's

Revolting Grandma"s
September-October 2002
Part Four

In our opinion, whether by omission, deception, or by other means, it would be terribly deceptive, dishonest, and dangerous to pass off treated reclaimed, revived, recharged, or repurified sewage **AS RAW WATER**.

Moreover, in the State of California, it seems that in the opinion of some politicos and some bureaucrats,---the public is an **impediment** and **constraint** regarding the implementation of "Indirect Potable Reuse Projects". **IMPEDIMENT! CONSTRAINT!**

Questions and Concerns:

1. Why is the State of California pushing so hard for these unnecessary, unwanted, and terribly expensive "so-called" **Indirect Potable Reuse Projects?**

2. **Who Benefits?**

3. **Who Profits?**

4. **Who Pays The Ultimate Price?**
   (Both Figuratively and Literally).

In an article written by Michael Gardner and published in the San Diego Union-Tribune on Tuesday, April 2, 2002,--Assemblywoman Jackie Golberg, D-Los Angeles was quoted as stating the following:

> "Toilet-to-tap is going to come," predicted Goldberg. "It won't come in leaps. It will come in steps. First it's toilet-to-toilet."

Please note: Assemblywoman Jackie Goldberg intoduced AB-331 in 2001 and AB-2365 in 2002. In our opinion, both bills are carefully crafted promotional tools for toilet-to-tap projects.

Will Jackie Goldberg's predictions come true? **Not if the grandmas have anything to say about it.**

Respectfully sumitted.

Mary Quartiano
Muriel Watson

TO BE CONTINUED

AMERICA FIRST

REVOLTING GRANDMA'S

Mary Quartiano, Spokesperson
Muriel Watson, Political Adviser

E PLURIBUS UNUM

November 6, 2002 REVISED DRAFT

TO:

The Department of Water Resources
The State Water Resources Control Board
The Department od Health Services
The 2002 Recycled Water Task Force

Revolting Grandma's White Paper

Public Information: Education and Outreach Group

4080 Hancock Street, Suite 4311 * San Diego, CA 92110-6203 * Tel/Fax: (619) 226-6536
The Very Independent Revolting Grandma's

November 6, 2002 REVISED DRAFT
Revolting Grandma's
White Paper

Subject: The San Diego Toilet-To-Tap Experience * Conceptions * Solutions & Recommendations.

It appeared that until around May 1997 San Diego's Toilet-to-tap was a well kept secret. Simply put: It seemed that the public-at-large was left out of the information loop. For example:

a. The absence of Television and Radio Public Servive Announcements was appalling. During this time period, if you were lucky and knew what you were looking for, you might have found something in San Diego's major newspaper.

b. The State Assembly Committee Hearing held in San Diego on December 8, 1987 was a real eye-opener. The following excerpts are from the Hearing Report's Cover Letter:

"San Diego's initial proposal recieved preliminary approval from the Department of Health Services, the agency responsible for insuring that public water is safe to drink. However, San Diego subsequently suggested changes to the initial proposal, in part to reduce costs. It must be certain that low costs do not compromise public health. Moreover, the Department of Health Services has not approved the provisions in the proposal".....

"The project has proceeded with minimum input from the people of San Diego. The public's responce to the Committee's questionnaire about the project has been monumental. It is critical in the concept of a public hearing that the public know this project will be implemented, whether the water will be safe, how much the processed water will cost, and whether there are more desirable alternatives to drinking reclaimed sewage. Moreover, by holding this hearing in San Diego, citizens will be able to directly express their concerns".

Howard Wayne, Assemblyman
78th. Assembly District

November 6, 2002
Revolting Grandma's
White Paper

REVISED DRAFT

Regarding the unappetizing subject matter of toilet-to-tap, early in 1998 Revolting Grandma's stared to do some serious Research and Public Outreach. For Example:

a. We shared our research with City Councils throughout San Diego County, various garden clubs, civic minded grass-root organizations, and ordinary citizens.

b. We attended the City of San Diego's Scientific Blue Ribbon Panel's public hearing held on/or about July 7, 1998. The public's response to their final report was somewhat less than flattering. See our upcoming 11-19-02 correspondence and enclosed White Paper Part Three.

c. When toilet-to-tap was an item on the agenda, we attended, submitted written reports, and spoke at San Diego City Council Meetings.

d. We also contacted members of the San Diego County Board of Supervisors and its Science Advisory Board..... Enclosed please find a copy Chairman Ron Roberts letter, with enclosure, addressed to Revolting Grandma's dated October 1, 2002.

e. Please note: Just several days prior to the July Education and Outreach Group meeting that was held in San Diego, Revolting Grandma's didn't even know that the 2002 Recycled Water Task froce existed.....

Muriel Watson represented Revolting Grandma's at this meeting. She arrived early and walked in on what appeared to be a private meeting not intended for public consumption.

De Ja Vu. The more things change, the more they stay the same. At all levels of government, it seems that those who are responsible for insuring a safe public drinking water supply --- <u>just don't get it</u>.....

Communications from the Task Force itself indicate that the public-at-large throughout the state has rejected the ill-conceived idea of drinking reclaimed, recycled, or repurified sewage. However, it has always been our impression that the public-at-large would accept sensible nonpotable solutions.....

November 6, 2002
Revolting Grandma's
White Paper

REVISED DRAFT

Think about where this reclaimed water comes from. Think about how many people might become ill or die if one major (or minor) mishap occurred. Last, but not least, think about the potential legal ramifications. For example: The 1993 Millwaukee Waterborne Cryptosporidium Crisis.

Solutions & Recommendations:

Regarding the issue of drinking sewage, it is our preception that trying to convience the public-at-large in San Diego would be a hard-sell. For example:

a. The National Research Council in Washington, D.C. recommended Indirect Potable Reuse as an option of last resort.

b. The San diego County Science Advisory Board could not recommend the safety of San Diego's Indirect Potable Reuse Project. However, they did recommend nonpotable reuses.

c. A comprehensive newspaper article headlined "Toilet-to-tap plan worries Salk researcher."

*Source: The San Diego Unionn-Tribune * Sunday, October 18, 1998 * Page B-1.*

Although we may disagree with what seems to be the primary function of the 2002 Recycled Water Task Force, *"promulgation of Indirect Potable Reuse"*, for better public input Revolting Grandma's offer the following recommendations:

a. Wide use of community based public meeting places, such as: Public Libraries and School Auditoriums.

b. Radio, Television, and Local Newspaper Public Interest Notices work very well to bolster public participation.

c. In order to bolster the sagging reputations of Local Water Departments, their public meetings should include viable alternatives to drinking sewage..... Education and public outreach aappears to be a talent they lack.

d. The need to conserve drinking water dictates that the Task Force encourage municipalities to utlize and/or mandate dual plumbing for all new construction sites. Dual plumbing is a proven cost-effective method of conserving potable water for drinking.

Page 4 of 5

November 6, 2002
Revolting Grandma's
White Paper

REVISED DRAFT

e. Our recommendations also include the need for municipalities to utilize recycled water for highway landscaping, parks, flower field irrigation, and basic construction dust control.

Should you need further suggestions regarding nonpotable uses of reclaimed sewge, please do not hesitate to contact us.

Respectfully submitted.

Muriel Watson
619-479-1125

Mary Quartiano
619-226-6536

Encls: (2) Ron Roberts Letter dated 10-01-02.....Pages 2.
San Diego County Science Advisory Board's Draft Recommendations dated 01-02-99..... Pages 5.

cc: Ron Roberts

The following proposal by the California Conference of Directors of Environmental Health was submitted by Jack Miller, San Diego County Department of Environmental Health, 19 November 2002, at Recycled Water Task Force meeting.

2002 Recycled Water Task Force

Proposal for Statewide Regulatory Consistency and Uniformity

November 2002

This proposal will accomplish the following goals:

- Expedite the regulatory oversight of recycled water projects;
- Promote consistency and uniformity of regulatory oversight;
- Develop new certification criteria for local agencies that establishes minimum standards;
- Promote further local agency participation as Certified Program which requires State program audits and allows State to focus on plant certification and mainline distribution systems.

State Responsibilities	Local Agency Responsibilities
Plant Certification	Postmeter Installation
Mainline distribution system	
Unique Uses	

PROPOSED CERTIFIED PROGRAM

- Any local agency that meets the minimum standards may apply to become a Certified Program;
- A Certified Program may seek cost reimbursement through fees for services;
- Creation of local, State and industry forum for the ongoing resolution of barriers to recycled water projects.

Certified Program Requirements

- Program staff meet minimum training and education requirements;
- Provide ongoing training to staff to assure technical expertise and uniform regulatory oversight;
- Meet established minimum staffing levels to meet project demands;
- Meet minimum reporting requirements;
- Conduct plan check and initial shutdown test of new systems and certify their use;
- Conduct ongoing cross connection investigations (currently referred to shut down tests) at a frequency established by the State

State Requirements (acting in Certified Program oversight role)

- Conduct periodic audits of Certified Programs to assure conformance with certification criteria;
- Provide technical guidance to Certified Programs, this may include the development of a procedure manual that could be used by industry;
- Provide technical training at regular intervals to Certified Programs;

- Chair meetings between Certified Programs, State and Industry;
- Conduct Certification of treatment plants;
- Oversee the installation and approval of main distribution lines;
- Assist Certified Programs in difficult and unique projects and issues.

IMPLEMENTATION OF CERTIFIED PROGRAMS

- CCDEH, State and Industry will develop Certification Criteria for regulatory adoption
- State will expedite approval of regulations
- CCDEH will promote members to become certified
- Industry will support the Certification of local agencies with decision makers in those jurisdictions.

Draft Implementation Timeline

Adopt regulations	July 2003
Certify 4 existing programs	January 2004
Certify 10 additional programs	July 2005
Certify 10 additional programs	January 2006

From: Carlson, Dick
Sent: Wednesday, December 11, 2002 1:52 PM
To: Karajeh, Fawzi; Stone, Jeffrey (DHS-DDWEM)
Cc: Mills, Rich@WRCB; Miller, Jack; Erbeck, Gary
Subject: RE: January 2003 RW Task Force Timeline

Re the white papers, will the support letter from the California Conference of Directors of Environmental Health (CCDEH) concerning the support for recycled water shut down testing (attached) and the CCDEH supported regulatory proposal presented at the Anaheim meeting (attached) be included in the white papers?

CALIFORNIA CONFERENCE OF DIRECTORS OF ENVIRONMENTAL HEALTH RECYCLED WATER USE SITE SHUT DOWN TESTING; STATEMENT OF SUPPORT

California Conference of Directors of Environmental Health

October 31, 2002

BACKGROUND

Title 22,Calfiornia Code of Regulations (CCR) Section 60316 requires shut down testing to demonstrate the complete separation of the potable water system and the recycled water system on sites that are dual plumbed. Dual plumbed refers only to plumbing outlets inside buildings and landscape irrigation at individual residences (Section 60301.250). There is no reference in Title 22 to shut down testing of recycled water irrigation and other recycled water use systems at use sites such as schools, parks, golf courses medical facilities, commercial centers, etc.

Title 17, CCR, Section 7604 has the following regulation concerning sites containing both potable and recycled water. An air gap (AG) is required at the potable water service meter. A waiver granted by the health agency and water supplier allows the substitution of a reduced pressure principle backflow prevention device (RP) for the AG if there are no interconnections between the potable water system and the recycled water system.

The only way to demonstrate that there is no interconnection between the recycled water and potable water systems is to conduct a shut down test. Since the use of the RP is the result of a waiver, to keep the waiver in force the shut down test should be repeated at regular intervals. The repeat of the shut down test is important because of the authorized and unauthorized repair and modification of the on-site recycled irrigation systems and potable systems, posing a risk of cross-connections.

Title 17, CCR addresses potable water service meter protection. Section 116800, California Health and Safety Code addresses post meter cross-connection protection. In part, this section states, “Local health officers may maintain programs for the control of cross-connections by water users, within the users’ premises, where public exposure to drinking water contaminated by backflow may occur.”

STATEMENT OF SUPPORT

To protect the health and safety of the citizens of California, the California Conference of Directors of Environmental Health support the shut down testing of all sites containing both a potable water distribution system and a recycled water distribution system.

Signed by Mel Knight

Mel Knight, President
California Conference of Directors of Environmental Health

From: Daniel Okun
Sent: Wednesday, January 08, 2003 11:17 PM
To: Karajeh, Fawzi
Subject: White Paper

At Tak Asano's recommendation I am attaching a copy of my comments on the draft White Paper (Nov 17, 2002 version) produced by the 2002 Recycled Water Task Force. California is by far the most advanced state in the management of both potable and nonpotable water reclamation and reuse projects and what is done in California has considerable impact on policies in other states. I first became involved in water reclamation for nonpotable reuse in Florida in the early 1970s but then was much more involved in California as a consultant to many state and local agencies to this date. I am professionally interested in having any reports that eminate from the Task Force be something that I can use elsewhere. For example, I am making a presentation on the subject to the World Bank in March and I will be making available to them materials that I believe will be helpful. A document such as the White Paper, if sound, would be useful.

My remarks were prepared by me alone without any sponsorship in the interest of helping produce a useful document. I was a member of the panels created by the three California agencies that examined groundwater recharge in 1975 and 1987 and participated in the writing of the two editions of the EPA Guidelines for Water Reuse and the AWWA Manual on Dual Systems and am involved in the work on the next edition of the EPA Guidelines.

If I can be of any assistance, please let me know. Water reclamation is exceedingly important in the future management of water supply and wastewater collection and disposal.

Sincerely,
Dan Okun
--
Daniel A. Okun
Kenan Professor of Environmental Engineering, Emeritus
University of North Carolina
Chapel Hill, NC 27599-7431

Comments on State of California White Paper of 2002 Recycled Water Task Force – Draft of November 17, 2002

by

Daniel A. Okun, Kenan Professor of Environmental Engineering, Emeritus
University of North Carolina, Chapel Hill, NC 27599-7431
Phone: ; Email:

The three water-related California State agencies (Department of Water Resources, State Water Resources Control Board, and the Department of Health Services) that are responsible for creating the 2002 Recycled Water Task Force that prepared the White paper are the same agencies that convened a Consulting Panel in 1975 and later a Scientific Advisory Panel that published a report on "Groundwater Recharge with Reclaimed Wastewater" in 1987. The reports that emanated from these bodies were scientific in content and professional in nature. This White paper is neither. It is devoid of science and exhibits an unprofessional bias that provides little basis for making judgments related to the reclamation of wastewater for reuse for either potable or nonpotable uses. It does not build on what has preceded in California before the formation of the Task Force. It provides little guidance for the future other than maintaining that the people who would be obliged to drink water into which wastewater is purposely introduced are being misled in their opposition to the practice, principally by the phrase "Toilet to Tap." The conclusion is that "education" and "public relations" are the needs for the future.

The White Paper suffers from a failure to distinguish between potable and nonpotable reuse in general statements where the comments do not apply to both. This stands out in the second paragraph of Chapter 1 which reads as follows:

"Description
Over 200 water recycling projects operate in California today. This high count illustrates the public's acceptance and support for water recycling. Despite this, some major projects have failed to be implemented in the past decade due to some form of public or political opposition."

A reader might be led to wonder about this. Why be concerned if a few projects out of 200 are rejected? The problem is that almost, if not all, of the 200 projects are for nonpotable reuse and the few that have been rejected are the proposed potable reuse projects. No mystery!

Another example is also in Chapter 1, the first sentence under the heading Water Quality and Health, where it is stated "Public health issues should continue to be the top concern in dealing with recycled water." This is misleading; water quality is a top concern if the reclaimed water is to be used for drinking. It is a minor concern if the reclaimed water is to be used for nonpotable purposes. An example is the difficulty in getting language dealing with potable reuse accepted for revision of Title 22. This deals with groundwater recharge for potable reuse. All the rest of Title 22, which is concerned with nonpotable reuse, is acceptable.

I have been involved in water reclamation and reuse for more than 30 years, most of it in California, where I was a consultant to the California Department of Health Services in the 1970s and to many related agencies and utilities. These comments are directed at considering the health risks associated with potable reuse. I am not opposed to potable reuse In instances where no other options are feasible, and wastewaters are the only source of additional water, potable reuse may be necessary. However in such instances, the treatment of the wastewaters needs to be the very best that is technically available, generally, at least RO membrane treatment.

At the outset, I must point out that, increasingly, urban wastewaters are found to contain contaminants that have been present for years but have not been recognized. A report by the National Research Council estimates the number of potential contaminants in drinking water as "…close to 100,000…" (NRC, 1999). Fewer than 100 contaminants are being monitored. The problems created when considering potable reuse are the following:

- Fewer than 100 contaminants are now being regulated.
- The concentration of many of the contaminants not yet regulated is so low as to defy easy recognition; determining their health effects is almost impossible.

- They have been found to be toxic at extremely low levels, especially when being ingested over long periods of time.

- A substantial fraction of the population exposed is more vulnerable to these contaminants than the general population.

- We have Maximum Contaminant Levels (MCLs) for each contaminant but no MCL for the presence of more than one contaminant and mixtures of many contaminants is the general situation..

- Conventional wastewater treatment, even at the tertiary level with disinfection, does not address these contaminants, many of which are synthetic organic chemical compounds (SOCs).

- Conventional drinking water treatment, coagulation, sedimentation, rapid sand filtration and disinfection does not address the SOCs nor the microbial contaminants such as viruses, crytosporidiosis, and many emerging pathogens.

- Emerging microbial diseases are a problem that is calling upon constantly changing methods for disinfection, many of which have been found to be inadequate.

- While it has always been assumed that dilution of the contaminants would address the problem, it has recently been found that many hormone-disrupting chemicals are more potent at low levels than at higher levels (EHP, 2001).

The current state of our knowledge of risks from waters that are drawn from sources that contain urban wastewaters is far from adequate to assure freedom from harmful effects. The fact that people have been exposed to such waters when they are drawn from run-of-river sources for many years does not provide assurance that there have not been health effects. It is certainly no comfort to prospective customers of reclaimed water to know that many people have been consuming such waters for years. Cities on the major rivers in the U.S. have obliged themselves for generations to use such waters but with little knowledge of the health effects. The Safe Drinking Water Act was passed in 1974 because there was a hint of increased cancer in the population of New Orleans drawing water from the Mississippi River as compared with a population in the vicinity drawing water from underground.

Case Studies

The White Paper makes much of the case studies of instances where proposals for potable reuse projects were rejected, laying the reasons entirely on the slogan "Toilet to Tap." The rejections can be shown to be based on factors important to those who would be obliged to use the water, with substantiation in the increasing number of people who turn to bottled water and point of use treatment devices. (When the San Diego repurification hearing was first broached to the public in 1997, with support of the local "establishment," the stock prices of bottled water enterprises rose sharply.)

Whittier Narrows, County Sanitation Districts of Los Angeles County

Much is made of the fact that the Whittier Narrows reclamation facility has been recharging the groundwater in the Montebello Forebay since 1962, whence it is withdrawn for potable reuse, as if the years justify the practice. It was built before state regulations had been adopted. When Title 22 regulations were prepared, groundwater recharge for potable aquifers was not addressed, it being left to project by project review and site specific hearings. To address this issue, the three state water-related agencies that created the Task Force that is responsible for the White Paper, created a Consulting Panel on Health Aspects of Wastewater Reclamation for Groundwater Recharge. A distinguished group met over a period of two years and its 1976 report recommended a Health Effects Study of the Whittier Narrows facility. This was duly established by the six water supply and wastewater authorities in Orange and Los Angeles Counties (OLAC). The results of the Health Effects Study, published in 1984, included epidemiological, toxicological, chemical, and microbiological issues. In 1986, a Scientific Advisory Panel on Groundwater Recharge with Reclaimed Water, again a distinguished group, was created by the same state water

agencies, to review the Health Effects Study along with other developments emerging at the time, and issued its report in 1987.

The first paragraph of its "Conclusions and Recommendations" sums up the outcome of their effort:

"As a general guideline, the Panel believes the best available quality water in an area should be reserved for drinking water use. Other factors not withstanding, wastewater should not be used as a source unless it can be demonstrated that natural and engineered treatment can be expected to produce consistently a better quality of water than other alternatives. Accordingly, before recharge projects are undertaken, other alternatives such as nonpotable reuse, conservation, other nonstructural measures, and modifications to water rights regulations should be thoroughly evaluated." (Emphasis added.}

While the Panel endorsed continuation of the operation at Whittier Narrows, it could not recommend regulations to guide future recharge projects. Title 22, which except for groundwater recharge, is devoted to nonpotable reuse, was last modified in 1978. Many efforts since then have been made to draft language for regulation of groundwater recharge for potable reuse. To this date, nothing has been found acceptable. So much for the assurances of the State Department of Health Services that potable wastewater reuse projects are acceptable. Projects still need to be considered on a case by case basis.

The problem with the Health Effects Study is that the science of epidemiology is not sufficiently robust to draw conclusions about health effects from the potable reuse of reclaimed water. Exposures of the population at the Montebello Forebay at the time were less than 20 years and health effects are based on 70-year exposures. Populations are mobile, exposures to the reclaimed water are difficult to establish, movement of water underground is uncertain, the numbers of contaminants that can be monitored are limited etc. Lastly, it is almost impossible to prove a negative. "The absence of evidence is not evidence of absence."

So the fact that Whittier Narrows has been operating for forty years is not testimony that it is a suitable model for similar projects. The data did reveal that wells drawing from the reclaimed water generally produced water of poorer quality than groundwater not exposed to reclaimed water but that is not sufficient to make a finding and is why the Panel's recommendation did not endorse extending the practice.

San Diego Repurification Project.

I was employed by the Chair of a committee of the State Assembly responsible for such matters, a resident of San Diego, to testify at the committee's public hearing in San Diego and I explained my opposition to this project. It was not based upon the wastewater treatment proposed for this project which was entirely acceptable. However, that is no reason to expose the population to additional public health risks which are present when a wastewater is used for drinking. All treatment is subject to failure from technological and human frailties. The EPA Drinking Water Regulations state "…priority should be given to selecting the purest source…." My objections were based upon my opinion that potable reuse was not demonstrated to be necessary.

- The project was stimulated by the Environmental Protection Agency as part of an agreement to waive secondary treatment of San Diego's wastewaters if the rate of discharges of wastewaters to the sea could be reduced by about 45 million gallons per day (mgd). About 25 mgd was reclaimed for wastewater for nonpotable reuse in the San Diego service area and it was decided to put the remaining 20 mgd in one of the city's drinking water reservoirs. It is my opinion that discharge of appropriately treated wastewaters to sea is a lesser health risk than obliging people to drink the wastewaters.
- The nonpotable reclamation in San Diego was a good start but it could have been extended; with a few exceptions, only the lowest cost nonpotable uses, landscape irrigation, were introduced. Toilet flushing, air conditioning, environmental enhancement, construction, industrial use etc. might have been evaluated.
- The most important reason is that "…modifications to water rights regulations should be thoroughly evaluated." as recommended in the 1987 report. Water rights in California are inherited from policies established generations ago when water for irrigation was essential to populate the region. The crop produced is valued at less than the value of the water consumed. It is time that urban needs are met and, at last, consideration was being given to transferring water from the Imperial Valley to the Metropolitan Water Board for use in San Diego. It is absurd on the face of it to use water for irrigation while people are

obliged to drink wastewater. And, of course, reclaimed water is entirely suitable for irrigation. While this transfer of water has not been approved, it is likely to be adopted in the near future.)The "farmers" pay less than $15 an acre-foot for the water and San Diego is prepared to pay over $200 an acre-foot.

Blaming the failure of repurification (incidentally, a word invented for the purpose) to be accepted entirely to a slogan is to magnify the failure of the very heavy investment in public relations. The academic literature thirty years ago and ever since has shown that the public has always been fully accepting of nonpotable reuse, considering it a positive conservation practice, but very reluctant to accept the purposeful introduction of reclaimed wastewater into their drinking water supply.

San Gabriel Valley Groundwater Recharge Project

The description of this project in the White Paper is glib, ascribing the rejection as being attributed to "… a local brewery, owned by a major tobacco company, (which) then moved to block the project on the grounds of public health concerns." In this instance, the quality of the water that would be drawn from the recharged aquifer would have been much poorer than the water being recharged from the Whittier Narrows project because the recharge area was to be at the foothills of the of the San Gabriel Mountains where the soil is made up of gravel which has a much lower capacity for removing contaminants than is the case at the lower reaches of the river where the soils are much tighter. The reclaimed water would be similar to the reclaimed water at Whittier Narrows, secondary treatment followed by filtration and disinfection.

The only process for removing trace contaminants would be passage through the very porous soil, which would be minimal. No studies were done to assess the capacity of the soil for SOC removals. The well water in the proposed recharge area is currently of very high quality and it clearly would be contaminated following spreading of reclaimed wastewater over the recharge area. The water utilities and the brewery that would have drawn water from the aquifer would have been obliged to accept a poor quality of water or add additional treatment. Investigations revealed that the reclaimed water from the LA County reclamation plant harbored microbial contamination. The project was abandoned after the case was taken to the courts. There was mention of a smaller "demonstration" project below the brewery, but the demonstration would have obliged the customers of the water utilities to drink that water. In any event, the project was abandoned.

The objections to the project was that it was not necessary, and that it posed a significantly increased public health risk. "Toilet to Tap" had little role in its demise.

City of Los Angeles Department of Water and Power's East Valley Water Reclamation Plant.

The Tillman Reclamation Plant is a fine facility, originally intended for nonpotable reuse. For p[otable reuse, it suffers from the same problem as the San Gabriel project. The reclaimed water to be recharged would have been conventional tertiary effluent without any engineered process to remove trace organics. Such contaminants may be reduced in concentration in passing through the soil, but if a contaminant was to accumulate in the soil, in time it might be leached out and there would be then no process to remove the trace contaminants. Orange County's Water Factory 21 had advanced treatment, including processes for removing SOCs, before recharging the aquifers.

Had this LA project provided for an engineered process, such as RO membranes, for removing the trace organics, it would have been much more acceptable.. With RO membranes, for example, the unit can be continuously monitored and rejected if anything goes amiss. Discharged directly to the aquifer from the reclamation plant without provision for SOC removal would pose a serious health risk if the water is to be used for drinking.

General Comments.

Chapter 1: Page 6, line 13, Economics

The first sentence is interesting and indicates that the public favors nonpotable reuse with or without "Toilet to Tap." The next few sentences are gratuitous statements that intend to show that nonpotable reuse has serious problems,

especially related to costs. Such statements are not made about potable reuse. The statement that some 200 nonpotable systems are in operation in California must mean that these communities found that costs were not a serious handicap. Many statements may be made about the costs of potable reuse; the treatment needs to be far more intensive for construction, operation, monitoring, and analytical costs, which are very heavy for trace organic contaminants and for viruses, cryptosporidium, and other parasites. The other difference is that urban wastewaters have many contaminants that are yet unknown and using such a source poses risks that are not present in nonpotable reuse projects. Of course, nonpotable reuse requires an investment in preventing cross-connections and some monitoring, but nothing like that required for potable reuse. Another major cost for potable reuse projects is the preliminary research to determine the necessary treatment. This is not required for nonpotable reuse. Finally, nonpotable reuse requires little investment in "public relations" which was a major expenditure in San Diego.

Page 10, lines 12-37, Conclusion

The first paragraph duplicates the second paragraph of Chapter 1 in recognizing that the public accepts nonpotable reuse. There is no doubt that the public needs to be enlightened about its water supply but is there any evidence that more knowledge has resulted or will result in greater acceptance of potable reuse. It may well be that the growing concern about the newly emerging contaminants, which has received considerable attention in the public as well as the scientific press, has troubled the public about their water supplies and led to an increase in the sale of bottled water and home treatment units. The State Assembly public hearing in San Diego on December 8, 1997 may have been the first heavily attended event where both the proponents and opponents of the repurification project were heard. Members of the audience were allowed one-minute comments and they were overwhelmingly opposed to the project. Representatives of the tourism industry were particularly concerned.

Chapter 4, Page 26, lines 12-18, Policy and Politics

I thoroughly agree that the lack of clarity in dealing with potable and nonpotable water reuse is confusing and often intentionally misleading. I have long advocated having every mention of reuse be preceded by "potable" or "nonpotable," unless the context is clear such as in Chapter 5, which is devoted to potable reuse, or when it clearly applies to both,

Inasmuch as the fact is that there is far more investment in nonpotable reuse than potable reuse, why is there not a chapter on nonpotable reuse? The White Paper is clearly devoted to the promotion of potable reuse.

Chapter 6, Page 30, Par. #8

This is a good statement.

Conclusion

A document published by so important a body and impacting on so important subject as wastewater reclamation and reuse for both potable and nonpotable reuse should be even handed and supported by professional and scientific testimony from the literature. The few references in the document are from very partisan authors, one the PR organization involved in "selling" the San Diego potable reuse project.

References

Environmental Health Perspectives, 2001: National Institutes of Health, Bethesda, Vol. 109, No. 7, pp 675-80, July

National Research Council, 1999: *Setting Priorities for Drinking Water Contaminants,* National Academy Press, Washington, DC, 113 pp.

State of California, 1987: Report of the Scientific Advisory Panel on Groundwater Recharge with Reclaimed Water, Sacramento, November, 29 pp.

EAST BAY
MUNICIPAL UTILITY DISTRICT

January 8, 2003

Richard Katz
Chair, 2002 Recycled Water Task Force
c/o Fawzi Karajeh
Office of Water Use Efficiency
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Dear Mr. Katz:

On behalf of the East Bay Municipal Utility District Board of Directors, I am writing to you and the members of the 2002 Recycled Water Task Force to urge that, as you consider the white papers submitted by the Task Force's workgroups and begin to formulate the Task Force's report of recommendations to the Legislature, you consider whether there is a need for mandated dual plumbing in all new construction in California, including residential. A great deal of expertise was convened under the Task Force auspices and it may be useful to consider this matter as one of the many options to maximizing the safe use of recycled water.

There are a number of existing water recycling policy provisions in the California Constitution and the California Water Code that identify appropriate uses for recycled water. Assembly Bill 331, which created the 2002 Recycled Water Task Force, added to the California Water Code in Section 1, 13578 (b)(3) the following language related to the Task Force's range of possible recommendations to the Legislature:

> "Changes in state statutes or the current regulatory framework of state and local rules, regulations, ordinances, and permits appropriate to increase the use of recycled water for commercial laundries and toilet and urinal flushing in structures *including, but not limited to,* those identified in subdivision (c) of Section 13553…" (Emphasis added)

The "*including, but not limited to*" language could be interpreted to include dual plumbing in all new construction, including residential structures.

Thank you for your consideration. We look forward to the Task Force's report and providing whatever assistance might be useful and appropriate.

Sincerely,

Katy Foulkes

Katy Foulkes, President
Board of Directors

Mr. Richard Katz
FYI. Thanks.
1/10/03

KF:LS:akg

375 ELEVENTH STREET . OAKLAND . CA 94607-4240 . (510) 287-0404

City of Carlsbad
Public Works-Maintenance & Operations

Stated in the Task Force meeting 1/10/03

January 9, 2003

Richard Katz, Chair
2002 Recycled Water Task Force
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Dear Mr. Katz:

I have reviewed the 2002 Recycled Water Task Force Summary of Recommendations dated January 8, 2002. I appreciate the work the Task Force has accomplished, but have some strong concerns about several of the proposed recommendations.

The City of Carlsbad has been a strong supporter of the use of recycled water. We have had a mandatory ordinance that requires designated users to utilize recycled water since 1992. Our use sites include 3 schools, a senior assisted living center, tourist attractions such as Legoland and the Flower Fields, and 24-hour facilities such as the Four Seasons Hotel and La Costa Resort. Recycled water is used to irrigate common areas for many of our homeowner associations.

A number of the Plumbing Code/Cross Connection Control and Regulations and Permitting recommendations, if implemented, would be a serious impediment to the City of Carlsbad's recycled water program. Currently, we conduct an annual inspection of all recycled water use sites. A cross connection control shutdown test is conducted at each use site served with both potable and recycled water at least once every four years. Our use site monitoring program ensures that each site is checked at least once per week to make sure recycled water is being used in accordance with our rules and regulations. These activities are integral to the success of our program and contribute to the excellent working partnership we enjoy with both the end site users and our regulatory agencies.

Based on over 10 years of recycled water experience, the Plumbing Code/Cross Connection Control recommendation that "DHS guidance should be prepared that would clarify the requirement for testing in Title 22, Section 60316(a) and stress that alternatives to a pressure test are sufficient in many cases" would not adequately protect our public water supply. The best way to determine if there is a cross connection between the recycled water and potable water systems is to conduct a shutdown test involving a pressure test of both systems. The recommendation to conduct an annual visual inspection, which would involve fully exposing the recycled water piping from the meter to the last area of potential use is unfeasible for obvious reasons.

5950 El Camino Real • Carlsbad, CA 92008-8893 • (760) 438-2722 • FAX (760) 431-1601

My next comment concerns the recommendation that "DHS should amend Title 22, Article 5 to incorporate inspection and testing requirements...included as Appendix C in the Plumbing Code/Cross Connection Control White Paper." Again, it has been our experience that the best way to verify there are no cross connection tests is to conduct a shutdown test involving a pressure test of both systems. In order to have a level of confidence in the test results, it is necessary that the shutdown test be performed by a certified Cross Connection Control Specialist with experience in the field of recycled water.

I concur that the "concept of statewide uniformity" is a worthwhile endeavor that we should strive to attain. To protect the health and safety of the public, uniform recycled water standards that require periodic shutdown tests, annual inspections and frequent use site monitoring would be strongly supported by the City of Carlsbad.

I support the Plumbing Code/Cross Connection Control recommendation that a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water. The proposed study would include the likelihood of a cross-connection in various use situations. It is obvious that a cross-connection is most likely to occur when recycled water is used for irrigation and potable water is available nearby, especially on retrofit sites where white PVC pipe is used for both systems.

The 2002 Recycled Water Task Force has reached good recommendations concerning public information, education and outreach. As a suggestion, we have learned that educating the end users is critical to the safe use of recycled water.

In closing, the City of Carlsbad is dedicated to protecting the potable water supply for all those who enjoy our City and would seriously oppose any legislation that would lessen our ability to protect the public water supply. Should you have any questions, please feel free to call me at (760) 438-2722.

Sincerely,

Kurt B. Musser, Public Works Manager
Utility Operations

AMERICA FIRST

REVOLTING GRANDMA'S

Mary Quartiano, Spokesperson
Muriel Watson, Political Adviser

E PLURIBUS UNUM

January 10, 2003

Rich Mills
Office of Water Use Efficency
Department of Water Resources
901 P Street, Third Floor
Sacramento, CA 95814

Subject: Task Force Draft White Paper of November 17, 2002.
(Revolting Grandma's Preliminary Remarks)

Dear Mr Mills:

Most of the time the paper uses the term "recycling" or "recycled water" without any distinction between potable and nonpotable reuse and comments are intended to apply to both. In some instances this is OK, such as the fact that both potable and nonpotable reuse replace water resources and help meet the demand for urban water supplies. But almost all other statements about reclamation are very different and it is essential to introduce the adjective, potable or non-potable, that applies.....

An example is on line 7 on page 6: "Public health issues should continue to be the top concern in dealing with recycled water." It is the top concern with potable reuse but not with nonpotable reuse. Comments of this type are found throughout the White Paper Draft.

We will submit further comments shortly.

In our opinion, it seems that southern California has a **water management** problem, which in part, is the causation of southern California's so-called **water shortage**. For example:

San Diego's proposed treatment of reclaimed sewer water did not explore nonpotable reuse adequately. Potable water is wastefully used for irrigation in southern California.....

When the Imperial Irrigation District contract is fully honored, management of our resources would be more forthright.....

Instead of using water from the Imperial Irrigation District to replenish the Salton Sea, Why not use nonpotable recycled water from San Diego?

4080 Hancock Street, Suite 4311 * San Diego, CA 92110-6203 * Tel/Fax: (619) 226-6536
The Very Independent Revolting Grandma's

Rich Mills
Revolting Grandma's
01-10-03

By the way, our research leads us to believe that the proposed treatment of reclaimed sewer water in the San Gabriel Valley and in the LA East Valley projects have no engineered process for removing trace chemical contaminants from the reclaimed waters.

Respectfully submitted.

Sincerely,

Muriel Watson
(619) 479-1125

Mary Quartiano
(619) 226-6536

CC: Dick Murphy, Mayor of San Diego
Members of the San Diego City Council

Submitted by Denise St. Laurent by e-mail, 01/16/03.

Problems, promises of recycled water

By David Schubert
Schubert is a professor at the Salk Institute for Biological Studies. The Recycled Water Task Force Web site is www.owue.water.ca.gov/recycle/taskforce/ taskforce.cfm.

January 16, 2003

Recycled water is that which is collected from the sewage system, processed through filtration and sedimentation, heavily chlorinated, and then released for public use. Recycled water has its uses in our society, but it is also a potential health hazard and should be recognized as such.

While more effort should be put into educating the public about its dangers and its proper use, many of the organizations and companies that promote and use recycled water appear to be unwilling to do so. For public safety and to promote the acceptance of this commodity in our society, the California 2002 Recycled Water Task Force, an advisory board to the Legislature that will determine the future use of recycled water in our state, should be encouraged to require the state to maintain high levels of regulatory control over its use and distribution.

An alternative regulatory approach favored by some with financial interests is for more lax requirements for safety testing and distribution, in effect blurring the distinction between recycled and potable water. The existing regulations regarding irrigation and particularly overhead sprinkling used for turf irrigation should be enforced, and testing for illegal connections between recycled and potable water piping continued.

If the enforcement of the rules for the proper use of this water is not done effectively, there are likely to be long-term health consequences in areas where recycled water is used. The effects of chronic recycled water exposure would most likely appear 10 to 20 years in the future in the form of cancer or some chronic toxicity syndrome.

Recycled water is designed for irrigation, commercial uses such as air conditioning and, in some cases, toilet flushing. It should not be used in areas where children play on the ground, where it could be accidentally drunk, and never should be sprayed under conditions where it can be inhaled as a mist.

Most of the public health concern has been making the water free of live bacteria and viruses, which can cause serious diseases. While chlorination usually does this effectively, the standards for microbial contamination in California are not as high as in other states and countries, and live viruses and Giardia have been found in recycled water.

Sewage from modern neighborhoods and farms, heavily industrialized areas and places where there are biotechnology companies, scientific research facilities or hospitals contains hundreds of chemicals that cannot be monitored by existing technologies and that can pass through the limited purification steps. While there are some regulations about pouring larger quantities of known toxins or radioactivity down the drain, it is impossible to keep it all out, and my guess is that many individuals simply ignore the rules since the proper disposal of these compounds is very expensive.

In addition to the waste products generated by biotechnology and medicine, humans and farm animals also release chemicals in their urine, including antibiotics and hormones found in birth control pills. These will clearly be in the recycled water and are even being found in some of our drinking water.

Finally, the heavy chlorination step used in the preparation of recycled water also produces families of chemicals that are known carcinogens. Therefore it is not a good idea to be exposed to recycled water, even on the skin and certainly not by drinking or inhalation.

The people who regulate recycled water are aware of most of these problems and have formulated reasonable rules for its use and distribution. However, in my limited experience, these rules are frequently not obeyed and the public is unnecessarily exposed.
The rules associated with the permission to buy and use recycled water clearly state that the water is to be used only for overhead irrigation (sprinkling) between the hours of 10 p.m. and 6 a.m. unless a person is standing by to warn the public to keep away. However, these rules often are not followed (any infractions should be reported to the county Department of Environmental Health). For example, the driving range at Torrey Pines public golf course frequently sprays recycled water during the noon hour, and it is carried by westerly winds over the adjacent sidewalk, exposing walkers and joggers to both mist and spray.

The same lack of consideration for the public can be found at the rental properties along North Torrey Pines Road and at UCSD. A walk or drive around these areas during most days will confirm these statements.

The final problem, which has the most serious consequences, is the potential for accidentally connecting the recycled water to the drinking water supply, or to places like swimming pools. There have been several reported instances of this happening locally, and probably others have gone undetected. Indeed, I have seen distribution boxes with question marks on them, hardly a reassuring sight.

In situations where recycled water is used for neighborhood landscape watering, it has been reported that connections were accidentally made between recycled water lines and the in-house potable water supply by homeowners and landscape workers. To minimize this potentially dangerous possibility, the currently required regular testing procedure for monitoring improper connections by periodically shutting down both the recycled and the potable water supplies must be continued.

With a better informed public and more rigorous compliance with improved safeguards, we should all be able to live more comfortably and safely with recycled water.

February 26th, 2003
12:30-1:50 Panel on Processes for Community Involvement
Public Comments Presented by the Safe Water Coalition:
Christina Lai, Co-Founder
Safewater94065@yahoo.com
http://geocities.com/safewater94065/aboutus/aboutus.htm

Why Recycled Water Mandates Failed in Redwood City?

Overview

Treated wastewater (Recycled Water) has been on the drawing board in Redwood City for some time and consequently, the neighborhood of Redwood Shores was chosen as a pilot due to its proximity to SBSA's treatment plant. As many of you know, a pilot project was initiated in the median strips. These controlled areas of landscaping were "tested" to see if the project was feasible and more importantly to continue with the state grant process. The pilot was the right step to gain community acceptance but it did not lead to involvement among the community. Instead, it was used as "proof" that recycled water was a success and safe in a controlled environment. As a result it was perceived as unsuccessful in the minds of residents because of the lack of upfront buy-in and input. Furthermore, community leaders were not proactively involved early in any of the Recycled Water project planning. An over usage of consultants as surrogates to the process, led to a misreading of public perception and resistance.

When the scare tactics of drought and Hetch Hetchy shortage failed, the city finally admitted to an affordable housing agenda. After much research, residents discovered a "hidden agenda" to support developers who were looking to add 2700 units of housing projects with a median price of $500K. Resident concluded that this was an issue of health and taxes versus profits and not one of affordable housing.

The net result was the city passing a 5-2 resolution to keep recycled water mandates off the table and the usage of treated wastewater would be optional for existing homes and homeowner associations. Without the subscriber base, the project is at risk from the state cuts and subscriber base requirements for bond funding. Concurrently, the community is still empowered to seek protection for its schools and parks.

If the city forces recycled water in our children's schoolyard, that means, the quality our family life will be different. Why would anyone allow their child to be exposed to recycled water in our schoolyards if we will not allow our children to be expose to recycled water in our own front yard? Most concerned moms have already agreed they will be adamant about this issue when the time comes.

Treat people with respect

So let me share with you some background. Nine months ago, myself and one other resident only were sitting at the first public information session. We were curious as to what all the fuss around recycled water was about. So we went and were treated to a discussion by the public works director of all the benefits regarding recycled water. We were told that there were no drawbacks. No risks. The state regulated everything and they followed or exceeded those standards.

I started asking questions regarding health and safety. Instead of clear-cut answers, I received "non-answers". The other guy in the room asked about cost, and they said it would be a $40M project. We asked about taxes, they said no increases if made mandatory. We asked for choice and got a laugh. Adding insult to injury, I was told that it'd be made mandatory anyways and that my neighbors and I would have no choice. We were furious! We had not heard the other side of the issue.

Lesson learned: One person can make a difference, especially someone like me who is inquisitive and believes in her cause. Take the time to engage and address concerns of all people. Do not

February 26th, 2003
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"gloss over" the issues. If you treat people with respect, you won't alienate them. You won't enrage them but engage them. You seem genuine. Involve community leaders early in the process. Involvement includes input in decisions and decision-making. Don't go against the wishes of the community.

Inconsistencies, credibility, and the truth.
So from that point on, the city began it's PR campaign thinking all was fine except 2 loonies out there. However, as time went on we were faced with many inconsistencies in messages over the course of the effort. Here are some examples:

1.The city sells recycled water to pilot customers at a discount and tells us it will be cheaper. They tell all our property managers as well.
Then months later we hear that recycled water should cost the same as "fresh" water.

2. The city tells us that rates won't go up. No taxes.
Then the city tells you that our residential water rates will go up by 8% every year for 5 years to pay for the recycled water project that we don't even want safe or unsafe. We also will float a bond that is also a "tax".

3. The city tells us that we need this for a drought like the one we had in the 80's. Nice scare tactic.
Then, we find out from the State that something like this doesn't happen for 50 to100 years

4. The city tells us that this project is not being done to appease developers.
Then, we find out the developers are willing to add $7M to the pot and that several projects of 1900 homes, and 500 homes are pending this outcome.

5. The city tells us that the project is needed because we are over our Hetch Hetchy allocation by 1000 acre-feet. Nice scare tactic. We agree and ask for conservation programs that will address this. Including Indoor usage rebates (e.g. low flow toilets) as well as irrigation conservation (e.g. weather based ET).
Yet, they provide no input and move forward with recycled water.

Lesson learned: Your credibility is the only thing you have to build trust. Be honest and upfront about your intentions. Residents aren't as dumb as they look =). People inherently mistrust government. We want to know the background and true intentions. Drought is a non-issue compared to health. Our grass can go brown so long the kids are safe. If the real reason is developer driven and we can conserve to meet our goals, let us decide. Involve us in those trade-off decisions.

Do not bias information
In September the city had decided to address the outrage in our community by holding a second public information forum. This was definitely a great idea in concept. By then, we had 700 petitions and the support of a good number of Home Owners Associations. Community leaders were outraged and momentum was building. Anxiety was reaching peak levels.

Instead of bringing a balanced panel, our public works director had scheduled a complete panel of pro-recycled water individuals covering landscaping, health, cost, and implementation. If we had not pushed hard with the help of our councilwoman, we would not have heard balanced testimony from

those who were aware of the risks. Furthermore, a majority of the panelists had financial incentives from such projects as consultants, experts, or potential contracts at stake.

Without our panelists there, we wouldn't have addressed the soil issues that afflict filled land communities of high salinity content, pharmaceutical waste issues, and related pending environmental lawsuits among many other health related topics. All we would have heard would have been the benefits. Allowing us to invite experts after the fact was a nice gesture but by not being upfront we were even more suspicious.

Lesson learned: Actively seek balanced input in information sessions. A very one-sided debate and discussion only adds to the criticism and suspicion of the public. Let's discuss the merits and not promote the cause. ***Seek suggested expert speakers from the community.*** Keep the ratio balanced. Choose a neutral moderator. Our was given a mission that was biased.

Conclusions and Suggestions

Be cognizant of a community's concerns. They are real whether it be public perception and the impact to property values, mistrust of government standards, health concerns, and/or despise for tax increases. Though we may not be "experts", we are interested in having an opportunity to choose our destiny. Do not misread this as a lack of support. It is just part of the healthy discourse that will lead to cleaner and safer environments and safe usages of recycled water through involvement.

In the spirit of such dialogue, we would like to make these additional community involvement principles for the public record based on our experiences:

1). **NO Mandates:** Recycled water should not be mandated or forced in any residential areas especially when the neighborhood was not developed with recycled water to begin with. There should be no such thing as "Mandatory Ordinance" to existing homes. Residents should have choice in their communities as they make informed decisions. Residents who choose recycled water should also be able to change their minds as additional information is gathered.

2). **Involve Early:** Projects should involve community leader input and feedbacks in the early stages of any developed recycled water project. This way issues are aired out early and an action plan to resolve these issues are public and timely. Input should not be paid "lip-service". They should address issues in a meaningful and constructive way.

3). **Conduct adequate and on-going research:** In November, Metropolitan Water Board member, Bill Robinson asked the Task Force to form a panel of scientists to investigate and research "emerging contaminates". Bill Robinson has also asked for a "screening panel" for estrogen on endocrine disruptors. We understand that Federal has this screening panel, and we would like your support the Ca. state to form one as well to parallel with the Federal.

4) **Support Sustainable Growth Policies:** Communities should proactively avoid water shortages through indoor conservation and irrigation conservation. Thus, for new developments, all developers should state clearly in writing in early stage as where they are going to get their source of water to build their project, and if there are any concerns from the existing residential communities. Recycled water should be used as a last resort, not a means to expand dependence on pure water supplies or impact residential areas for the sake of profits over health.

In all honesty, cities or regional bodies who take into consideration these lessons learned will find the process less contentious and more rewarding. A side benefit is the ability to address community issues as we look towards a way to address our water supply issues. Together we can meet the needs for our commercial and industrial users and satisfy residential user concerns.

We have reached that point with Redwood City and now are working in a more cooperative and involved process. Without a City Council that was sensitive enough to address these issues and take the leadership to give residents a choice on recycled water, we would not be here today. We hope to continue in this spirit of cooperation and community involvement.

February 26th, 2003
10:10-11:50 Panel on Water Recycling with Public Dialogue
Public Comments Presented by the Safe Water Coalition:
R "Ray" Wang, Co-Founder
Safewater94065@yahoo.com
http://geocities.com/safewater94065/aboutus/aboutus.htm

Like many of you today, I come here looking for solutions to our water shortage. We need long-term sustainable solutions in addition to conservation. That's why we strongly believe that the intent of recycled water is noble. The objectives are admirable. That's the genesis of this gathering and why so many hours and dollars are spent touting the benefits. Yet, we only hear about the benefits and we rarely hear or delve deeply into the potential risks. As far as we are told, they are minimal, negligible.

To be clear, I have and always will be a supporter of issues and policies that promote sustainable environments, smart growth, and environmental protections that provide us with a better place for our future generations. Prior to the city of Redwood City forcing a mandate on its citizens, I believed in the concept of recycled water as conceptualized for irrigation. Throughout the entire information campaign effort, we were told there would be no downside (i.e. no risks, no tax increases, no long-term damage.) But, we hardly doubted that there would be no risks, short or long term so we sought second opinions from experts and they told us otherwise. More importantly, the experts we sought had nothing to gain financially from a cost benefit analysis. They were not developers, they were not consultants, and they did not have "hidden" agendas or belonged to related advocacy groups.

We took the extra effort because when it comes to your children, your loved ones, your property values, it's too much of a "forced" risk. Consequently, the reality of having treated wastewater forced onto our residential areas (front lawns, common areas, parks, school yards) was too troubling for not only myself but also our community of 5000 residents and ultimately the 77,000 residents of Redwood City. This is why 9 months ago we formed the Safewater Coalition.

By promoting recycled water projects at this juncture, proponents do so without acknowledging the lack of strong government oversight, lack of assumption of long-term liabilities by promoters, inadequate commitment to health research, and approval of the re-introduction of known and unknown contaminants into our environment. In effect, proponents are asking our fellow citizens to take undue involuntary risks, albeit calculated. I know this is not their intent, yet let me show you why this unfortunately is the reality.

For example, we often hear that there are "stringent" regulations in place like Title 22. Yet, Title 22 has not been continuously updated to be current. The history of similar "stringent" regulations and government oversight like this have shown that it is very possible to have debacles like Asbestos, Lead, DDT, Love Canal, MTBE, and most recently TCE and perchlorate , just to name a few. We ask you to call for tougher and updated regulations on usage. or support related legislation. But to do so, you need adequate scientific research.

Consequently, we frequently hear that all these communities use treated wastewater and it's safe. Great most are in industrial or commercial usage. No worries. You're protected. But in our case, we were going to go straight to the residential areas. Fine, then shouldn't promoters shoulder the burden of proof to prove safety beyond a reasonable doubt? Let's agree that a certain level of due diligence must be performed. It's only our health and safety. So, to put this in perspective, you can't help but wonder how much money is going into long-term health and safety research? What is that percentage for this research versus the amount spent promoting these projects? What prospective epidemiological studies have been put into place? Bottom line: Why aren't we building these studies into our "grand experiments"? Don't you want to know? Shouldn't a group like yours take a stand on

this and make a recommendation to increase research funding and require this as a component in all projects?

Regarding assumption of liability, will any of the proponents here assume liability for long-term impact regarding health and environment? Proponents all claim it's safety and that it's used in X number of communities with no problems. I challenge them to assume the risk. They ask us to do so with our health and environment. We ask them to back it up by assuming financial liability or contributing to a long-term liability fund to be used for our protection.

Finally, as a society, we produce tens of thousands of new chemical compounds a year. We are lucky to even test 10%, maybe 5%, ok really 1% of these. Granted some of these are micro contaminants and/or at a low "dosage", but there are those in the EPA and other scientific communities (e.g. pharmacology) that would agree that you can't rule out the additive effects of unknown combinations on our environment. Those additive effects quickly take them back into the concentration ranges of significance. With so many new pharmaceuticals, personal care products, hormones, estrogens, and industrial chemicals known to cause risks in our treated wastewater, what agencies are monitoring these substances? As you know what is regulated today may not cover for years what is produced tomorrow?

Like I said earlier, we are not against recycled water. We're just not convinced we've done our homework or proven to our fellow Americans that adequate due diligence was conducted. All we see are the people who financially benefit lobbying for recycled water without having the safeguards of appropriate and stringent standards, the adequate continuing research funding, and the specter of liability upon those entities that mandate usage. The sheer lack of checks and balances disproportionately tilt the equilibrium towards proponents. Without such safeguards, we are providing inadequate and inconclusive information that only takes away from the spirit and intent of recycling. We may be doing ourselves a long-term disservice in this noble effort. As a task force, act and move forward to recommend more due diligence before these projects end up in more residential areas and usages, especially drinking and irrigation usages. Most importantly, we need to allow local communities to have the choice as opposed to being forced into mandates out of convenience.

Testimony of Ellen Stern Harris
Executive Director of The Fund of the Environment

Submitted for the 2/26/03 Public Workshop of the DWR / SWRCB / DHS 2002 Recycled Water Task Force and The Environmental Justice Coalition for Water

Mr. Chairman and Members of the Committee:

The Fund for the Environment fully endorses the appropriate reuse of water extracted from sewage, properly treated, and continuously monitored.

As part of this process, fail-safe systems must be required, including back-up generators and sufficient storage capacity to deal with electrical outages and protracted storm conditions.

We support this form of recycled water use and its transport, in separate piping, as has been done for decades at Irvine Ranch and elsewhere. This is properly utilized in industrial cooling applications, on freeway landscapes, golf courses and for certain crops.

However, we specifically and strongly oppose tertiary treated water, from sewage, being inserted into our potable water supplies.

Our existing, available, groundwater is not just threatened, it is increasingly polluted. A quarter of the wells in the San Gabriel Valley are contaminated by industrial solvents. Santa Monica has had to close many of its wells, due to the infiltration of MBTE.

The State has ordered Chevron to truck in water to Cambria to compensate for its MTBE pollution of that community's water. There will be further disclosures of this type, as plumes of such toxins move toward and into other wells. And Orange County has closed down wells contaminated by a by-product of chlorine: NDMA.

In water, quality definitely matters. I speak from experience.

I have served on the Los Angeles Regional Water Quality Control Board and on the board of directors of the Metropolitan Water District of Southern California. The Fund for the Environment's Science and Medical advisor, Dr. Harvey S. Frey, M.D., Ph.D., and I have also met with the top lab people at L.A. County Sanitation Districts' pioneer water reclamation plant, at Whittier Narrows.

This was when a facility to insert reclaimed sewage effluent into an aquifer was being proposed by the Upper San Gabriel Municipal Water District.

Dr. Frey, a Cal Tech grad, came away from this meeting and said that the lab's techniques and methodologies were then 30 years behind the times. I so testified in court, when Miller Brewery sued to stop the USGMWD's plans.

Miller ended up settling its suit. It will continue to be extracting its water from a source which will not include any of the treated effluent. I hope that Anheuser-Busch will similarly consider the possible adverse effects of this kind of water on its product, if the East Valley facility of LADWP is ever approved for that area.

The USGMWD also agreed to scale down its plans to a demonstration project. But this demonstration project is still not on line, so we have not had the benefit of lessons it might provide.

The testing protocols must be made far more stringent than at present. It is the CA. Dept. of Health Services and the L.A. Regional Water Quality Control Board which are responsible for setting such inadequate standards and requiring inadequate monitoring and inadequate back-up provisions.

I believe that we can also expect inadequate enforcement. When the alarm rings, we wonder whether anyone will be anywhere nearby to respond timely and effectively.

I knew Don Tillman, before the East Valley LADWP facility bearing his name was built. I supported its being built. But, that was with the clear understanding that its output was not to be co-mingled with potable supplies. I believe that what is now proposed for the E. Valley is a betrayal of the public trust, and of Don Tillman's intent.

What is driving this seemingly well intentioned, if misguided push for ever-more water extraction from sewage? I believe it is, in part, to meet the recent requirement of a 20-year supply of water having to be secured before large developments may be given a construction permit.

And it is undoubtedly being pushed to help save the Delta in Northern California, from which we in Southern California import so much of our water. It may also be to help save Mono Lake, a laudable goal. And it is undoubtedly to help comply with California's obligation to reduce our take from the Colorado River.

However, with more and more treatment-resistant bacteria and viruses, our society's health considerations should be paramount. The very young and the aged and others need our protection. That's because their undeveloped or impaired immune systems may not be able to fend off water-borne disease from questionable supplies.

There are far better places to get the drinking water we need than from sewage: Consider please, that as much as 85% of California's water is used by agriculture. Only about 5% of the State's water is used domestically. And yet, residential consumers are required to do 100% of the conserving.

It's time that corporate agriculture assumed its share of responsibility. We might even get the legislature to offer them low-cost loans for improved irrigation systems. We should also get Congress and our Legislature to make our drinking water standards far more stringent than at present.

Jeopardizing our citizens' health and our aquifers with an inferior quality of water is not the way to go. Insisting on inserting such an inappropriate product into our potable water supplies will mean that only the well-to-do will feel any sense of safety, when drinking or bathing with this reclaimed effluent. It is they who will install reverse osmosis systems in their homes and rely upon bottled water for drinking and cooking.

This administration's claim that it is concerned with environmental justice rings hollow if you, as a task force, proceed to recommend adoption of recycled effluent being added to our aquifers. Your ignoring the precautionary principle is done at our peril and yours.

Involuntary exposure to such degraded supplies, whether for drinking or absorption through bathing, will evidence further discrimination against the working poor and even lower middle-income families.

We urge you to reconsider this rush to what appears to be a very regrettable course of action.

Respectfully submitted,

Ellen Stern Harris

The San Diego Union-Tribune

Recycled water essential to San Diego's future

By Harold Bailey
Bailey is director of operations and water quality for the Padre Dam Municipal Water District.

March 8, 2003

When you turn on your faucet at home, the water comes out. Clean, safe, reliable water - the essential ingredient for the exceptional quality of life we enjoy in San Diego County.

However, 90 percent of our water supply in San Diego County is imported from Northern California and the Colorado River. It is a finite supply, subject to drought and political conditions, inadequate for the projected population growth of California, Arizona and Nevada.

San Diego has four options to manage our demand for imported water: water recycling, desalination, ground water resource development and conservation. In fact, a combined approach utilizing all four options is the most effective strategy to sustain our San Diego lifestyle.

The San Diego region currently uses 6.19 billion gallons of recycled water annually. The state of California hopes statewide production will reach 1 million acre feet annually, enough water to offset the demands of 2 million families, by 2010.

Recycled water is not intended for drinking or cooking. The political catchphrase, "Toilet to tap," suggesting that yesterday's waste water becomes today's drinking water, is misleading. Recycled water is used indirectly, either to replace drinking water for outdoor irrigation and industrial uses, or for the replenishment of underground aquifers, reservoirs or lakes.

In both uses, recycled water is highly treated. In the latter use, the blend of natural and treated recycled water is treated a second time before being distributed as drinking water for the community.

The safety of recycled water for landscape irrigation, ornamental lakes and water sports is well established. Hundreds of recycling systems serve thousands of customers in water short areas. Examples include Santee Lakes, Santa Rosa, Monterey, Orange County, Phoenix, El Paso and many projects in Florida.

The technology is well understood, and plants and systems operate reliably. Stringent regulation, and the continual advancement of the technology, assures recycled water's safety.

While drinking water is regulated under the federal Safe Drinking Water Act, the production and use of recycled water is governed under Title 22 of the California Health Code, and regulated by the Regional Water Quality Control Board, the State Department of Health Services and the county Department of Environmental Health Services. California's standards for recycled water are the bench marks in the United States and worldwide.

It may surprise many readers to learn that California's standards allow for full-body contact with recycled water, such as might occur while swimming or water-skiing, where accidental ingestion is assumed to occur. That is because before recycled water is used for outdoor purposes, it undergoes secondary treatment, followed by filtration and high-level disinfection. Water recycling processes and distribution systems are continuously monitored, inspected and tested.

Critics point to the presence of parasites in recycled water. However, independent studies have shown that the parasites are incapable of causing disease.

The risk we face in San Diego County is not from the use of recycled water. We face a much larger risk - an inadequate water supply to support our quality of life. Water recycling, desalination and conservation are all essential to San Diego County's future.

We must inform the public and elected officials about the science and safety of recycled water use, and not allow misconception to undermine support for this vital resource.

Submitted by e-mail, 03/28/03

April 8th, 2003

Public Comments Presented by Maureen K. Smith
Horticultural Consultant
Redwood City Resident

Redwood City Ca 94065

I would like to add a public comment on the February 4, 2003 Draft White Paper on Public Education, and Outreach Workgroup on Better Public Involvement in the Recycled Water Decision Process.

Near the bottom of page 24 of the Draft White Paper mentioned above, the Task Force states, "If a community has parks and golf courses, recycled water help the vegetation to remain green during water shortages. That is a real benefit to the community." This statement is generally true only when referring to turf in established landscapes.

At the August 26, 2002, Redwood City Council Meeting Nelda Matheny, president of HortScience, Inc. of Pleasanton, described the negative effects the components of recycled water can have on landscape plants and soils as necrosis, leaf-tip burn, leaf chlorosis, soil impermeability, and insolubility. To determine the ability of an existing landscape to accommodate recycled water, the salt-sensitivity of plants, soil texture, soil drainage, irrigation method and frequency of irrigation must be considered. Although there are lists of plants with varying degrees of salt tolerances she warns that the effects of salts on plants and soil are cumulative and over the long run this information may change, further limiting the palette of plant material.

On September 16, 2002, the landscape experts Dr. Ali Harivandi, authority on turf, soil and water, Barrie Coate, consulting arborist and national authority on plant and tree problems, and Chris Willig, consultant in irrigation with Environmental Water Management, were questioned regarding plant damage, mitigation of the same, cumulative damage, soil quality and recycled water, and desirable irrigation practices. Barrie Coate acknowledged that recycled water can kill many established landscape plants as is happening with some redwoods in the East Bay but that drip irrigation can reduce the ill effects on established trees if foliage is not affected. Dr. Harivandi confirmed that turf is not adversely affected by recycled water. The mineral salts residue in soil and on turf resulting from the use of recycled water is not obvious because those salts accumulate in the tips of the blades that are removed with mowing. He also mentioned that some nutrients in recycled water when discharged into an aquatic environment lead to undesirable aquatic growth in ponds, fountains and waterfalls.

Mr. Willig acknowledged that separating new recycled water irrigation from existing potable water already piped into houses could possibly expensive. When it was pointed out to him that replacing plants damaged by recycled water with trees and shrubs of equal size to those they are replacing would also be expensive he agreed it was something to consider. He also acknowledged that the city must work hand in hand with the homeowners to combine the use of recycled water with conservation – both are important and that cities must be more proactive in educating and assisting homeowners to conserve.

Unfortunately at neither presentation was there time to discuss the problems of installing drip irrigation in already established landscapes. Drip irrigation is not appropriate for all plant material or for all soil types. There is an increased maintenance cost due to clogging of tubing and emitters by mineral salts.

In early December the California Exotic Pest Plant Council released Pest Plant Lists. Many of plants considered salt tolerant are considered invasive in some areas and are included in these lists, further limiting the selection of plants appropriate for use with recycled water.

Page 27 of the aforementioned Draft White Paper begins, "Continual dissemination of accurate and complete information on water issues to the public is essential……."
In the interests of accurate and complete information I ask that these comments be documented for the public record of April 8th Recycled Water Task Force meeting.

Thank you for your consideration.

Submitted by Dick Carlson by e-mail, 04/01/03

RECYCLING & REUSE
Commentary: Toilet to tap
Long Beach Press Telegram - 3/30/03
By Ralph E. Shaffer and R. William Robinson

Back in the 1930s and '40s, a grade school joke up in Lynwood was "Flush the toilet. Long Beach needs more water!' Half a century earlier one Southern Californian seriously suggested that the Los Angeles River be converted into an open sewer, carrying the stuff down to the beach. Well, Long Beach, it may still happen.

Under relentless pressure from sanitation districts and the waste water reuse industry, a state task force is about to offer a final report that will contribute to the dumping of an even greater amount of potentially hazardous contaminants into the drinking water of all Californians.

Caught between the state's rapidly growing population and a diminishing source of potable water, the report of the Recycled Water Task Force led by former legislator Richard Katz is about to become a cheerleader for the "toilet to tap' movement led by both public and private water reuse advocates, with support from a wide array of business interests that stand to benefit from this action.

Created by the Legislature in 2001 to maximize use of recycled water, the task force undertook an aggressive review of existing state and local obstacles that stand in the way of their goal. Their emphasis is on quantity, rather than the quality, of water available for use within the state.

February's task force meeting in San Francisco was held in conjunction with the first annual meeting of the California section of the Water Reuse Association, a reclaimed water promotion group composed primarily of engineering firms, water consultants and water agencies. The coziness of the state task force with a private organization whose sole purpose is to increase the amount of water available for distribution raises serious questions about the state's commitment to protecting the health of millions of Californians.

A significant portion of the Water Reuse meetings was devoted to what was called, in the utility industry's exploitation of electricity deregulation, "gaming the system.' The state's residents are protected by the California Toxics Rule and its State Implementation Policy, which outline toxic standards for waters of the state. Under the guise of policy reform, panelists suggested ways to alter existing standards to promote recycling. That's where the danger lies.

Worldwide the No. 1 topic of environmental research is focused upon a barrage of chemicals that did not exist decades ago but are now in the bodies of most Californians, waiting to be excreted into the state's waste water. In addition, our throwaway economy has provided us with an array of synthetic chemicals dishwasher compounds, laundry detergents, and cosmetics which also end up as waste flowing into the state's sewer system.

Although the Katz group would roll back current regulations, a growing number of scientific studies have challenged existing water quality standards as not strict enough. They raise questions about contaminants that act on wildlife and on humans as hormone blockers or mimic and interfere with natural physiology. The effect may be devastating on embryos, pregnant women and young children. Yet the old rules allow the dumping of a large number of unregulated compounds residue of household drugs, personal health care items and a variety of synthetic chemicals for which adequate testing has not yet been done.

While the state task force has not yet published its final report, nor has it released any of the periodic "white papers' that it once promised the public, a set of 13 "top recommendations' is out, none of which emphasizes protecting the public from health problems that might result from introducing toxics into the state's drinking water. Instead, the recommendations read like a waste water lobbyist's wish list. [http://www.owue.water.ca.gov/recycle/docs/ OverviewFeb26_Karejeh.pdf]

When the Katz report's findings are finally made public, promoting a radical change in the way the state protects its drinking water from pollution by recycled sewage, Californians may well find that it is too late to stop this waste water juggernaut. And "Long Beach water' may be more than a grade school joke.

Ralph E. Shaffer is a professor emeritus at Cal Poly Pomona, and R. William "Bill' Robinson is an elected director, Division 4, Upper San Gabriel Valley Municipal Water District. #

From: Ellen Stern Harris
Sent: Wednesday, April 02, 2003 6:39 PM
To: Task Force member list
Cc: Interested Parties list
Subject: Re: Recycled Water Task Rescheduled April 8 meeting to April 29 (10:00 to 3:30)

2002 Recycle Water Task Force

Chairman Richard Katz ~~

With this latest change of meeting dates, it seems that no consideration has been given to those of us who have now twice made and twice cancelled our reservations to get to Sacramento.

We have also twice wasted our valuable time getting through to the post office to have our mail held. And, to the newspapers to have our deliveries held, as well as calling others with whom we had plans, which had to be re-scheduled.

We are truly amazed at this seeming chaos in your alleged "planning." It casts further doubt on the validity of your mission and on your abilities to perform in the public interest. This seems as if it is a deliberate plan to discourage meaningful public participation.

Why don't you return to the Legislature and ask for an extension to do your job properly? And while you are asking for this, why not also ask to include in your considerations, viable options to pushing recycled sewage effluent into our potable supplies?

Take a poll. You'll see just how oppossed the citizens of California are to what you are trying to force them to swallow.

None of this rescheduling may be a problem, for those of you who have wives, secretaries and and others to assist you. But what you are doing, shows an unconcionable disregard for those who are not on government, developers' or consultants' payrolls.

Please take your responsibilities far more seriously and start showing genuine consideration for the public you should be serving. Thank you.

Very sincerely,

Ellen Stern Harris

At 4/2/03, Karajeh, Fawzi wrote:
>Members of the Recycled Water Task Force and interested parties,
>
>This message is to inform you that the April 8 Recycled Water Task Force
>meeting is being rescheduled to April 29. This is to allow Staff
>sufficient time to edit the draft report and then to allow Task Force
>member and the public sufficient time to review the draft report before
>April the 29th meeting.
>
>We appreciate your patients with rescheduling however; the chair believes
>that it is important there will be a quality draft and sufficient time for
>review.
>
>Revised meeting Scheduled
>April 29, 2003 (Tuesday 10:00-3:30): The Seventh 2002 Recycled Water Task
>Force to be held at the CAL/EPA Building 1001 I Street Sacramento, California.

>
>Please mark your calendars for the above date.
>
>For information about Your Task Force and its different workgroups, please
>visit our homepage at
><http://www.owue.water.ca.gov/recycle/taskforce/taskforce.cfm>
>
>Our apology for an inconvenience that this change may cause.
>
>Fawzi Karajeh
>Executive Officer, Recycled Water Task Force and
>Chief of Water Recycling and Desalination Branch
>Office of Water Use Efficiency
>California Department of Water Resources
>(916) 651-9669

Ellen Stern Harris
Executive Director, Fund for the Environment
Editor of <http://www.BeverlyHillsCitizen.org>

P.O.Box 228 / Beverly Hills, CA 90213

From: Harold Welborn
Sent: Thursday, April 03, 2003 10:06 AM
To: Earle Hartling; 'Ellen Stern Harris'; Task Force member list
Cc: Interested Parties list
Subject: RE: Recycled Water Task Rescheduled April 8 meeting to April 29 (10:00 to 3:30)

Dear Mr. Hartling

Thank you for taking the time to address the totally inappropriate comments from Ms. Harris. Such uninformed personal soap box speeches cannot be left lying around in peoples email folders without a counter by a representative of the vast majority.

Again, Thanks.

Harold Welborn, PE
ECO:LOGIC Engineering
Rocklin California

-----Original Message-----
From: Earle Hartling
Sent: Thursday, April 03, 2003 9:18 AM
To: 'Ellen Stern Harris'; Task Force member list
Cc: Interested Parties list
Subject: RE: Recycled Water Task Rescheduled April 8 meeting to April 29
(10:00 to 3:30)

Dear Ms. Stern Harris,

I'm sorry to hear that you've been inconvenienced by the rescheduling of the Task Force meeting date. As someone who has been involved with the Task Force for a whole year, I can attest to the fact that circumstances arise that cause scheduling changes. Since this is to be the last official meeting of the Task Force in which the final report to the Legislature will be presented, it is my opinion that having the best and most complete document ready for the Task Force members to review is the primary goal, not the convenience of the attendees.

The comments you made in your widely-broadcast email were uncalled for, as they were rude, insulting and unprofessional. Such personal attacks are unproductive, divisive and have no place in civil discourse. I hope when the final report is issued to the Task Force for review, your comments will be more thoughtful and constructive.

As for the change in meeting dates, don't think for a minute that this doesn't impact all of us on the Task Force who have to rework our schedules, since the vast majority of members still have jobs that have to be done, above and beyond what the Task Force requires of us. And for the record, neither my wife nor my secretary makes my travel plans nor schedules my day-to-day activities, I've got to sweat those details out myself. My work at the Sanitation Districts will still be waiting for me after I take a day out of my workweek to attend the Task Force meetings, and I'll have to fit that into the time I have left. This is a very import job we've all been charged with, and if your plans with other people happen to be of a "social" nature, then you'll get no sympathy from me or anyone else.

And I'll leave you with a couple of time-saving tips: This is only a half-day meeting, there's no reason to have your mail held at the Post Office or to have your newspaper stopped!

Earle C. Hartling
Water Recycling Coordinator
Sanitation Districts of Los Angeles County
1955 Workman Mill Road
PO Box 4998
Whittier, CA 90607-4998

-----Original Message-----
From: Ellen Stern Harris
Sent: Wednesday, April 02, 2003 6:39 PM
To: Task Force member list
Cc: Interested Parties list
Subject: Re: Recycled Water Task Rescheduled April 8 meeting to April 29 (10:00 to 3:30)

Note: Text of this message is included in the previous comment.

Letter to the Editor
Sacramento Bee - 4/21/03

By Richard Katz, chairman, 2002 Recycled Water Task Force

The "Toilet to tap" article inaccurately characterized the role of the 2002 Recycled Water Task Force. With California's need to supply water for 17 million additional people by 2030, we need to conserve and find creative new re-uses for water.

Each year, we use 500,000 acre-feet of recycled water for landscape and agricultural irrigation, groundwater recharge and industrial uses, an amount equivalent to an annual freshwater supply for 2 million people.

We are not "dumping contaminants" into our water supply, as the article suggested. The highly regulated treatment of recycled water far exceeds that of wastewater discharged to the water bodies upstream of a community's drinking water intake.

The Task Force recognizes that public health protection is the first goal; water conservation and re-use must be secondary.

We encourage public participation in this deliberative process. To learn more about the Task Force, see the Department of Water Resources Web site at www.water.ca.gov.

Water is a precious resource that we all need. It is up to all of us -- not just the Task Force -- to help shape public policies to protect the public health and expand our precious, but limited water supply.

Sacramento Bee Letters to the Editor 4/21/03

Water recycling

When I read the article on " 'Toilet to tap': Let's not get hasty," April 7, I found it remarkable that a retired professor and an elected director of a water district wrote it. I found it amazing that they would "skew" the facts to paint a picture that would imply that the task force is trying to implement measures that would use recycling water as a substitute for "drinking water." Thus the "toilet to tap" label.

Water recycling is mainly being promoted to replace industrial, agricultural and landscape irrigation where potable water or "raw" water is being used. The task force does not intend to introduce the recycled water directly into our potable water supply (used for human consumption).

Currently "raw" water is taken directly out of the California Aqueduct to irrigate farmland. In case the authors are not aware, this "raw" water is of lower quality than tertiary treated recycled water.

Vinoo Jain, P.E., Sacramento

The authors of this article capitalized on the 'yuck' factor of the concept of recycling water. I especially liked the phrases "there are ominous signs" and "the recommendations read like a waste water lobbyist's wish list." If either of the authors have any scientific insight, they failed to project it in this article.

With changing climatic conditions and California's need for more water, I feel a bit better about saving water by recycling than I do about sitting home and hoping that it rains. Rain, by the way, is just a simple recycling process (you still get toilet water).

The authors might consider a rain-dance to make this whole issue a moot point.

R. Brent Dudley, Citrus Heights

From: Ellen Stern Harris
Sent: Saturday, April 26, 2003 10:12 AM
To: Task Force Member list
Cc: Interested Parties list
Subject: Re: toll-free teleconference number for April 29th meeting

>To: Richard Katz, Chairman & Members of the 2002 Recycled Water Task Force,

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Amended testimony of Fund for the Environment's
Executive Director, Ellen Stern Harris

We have previously submitted our testimony for the Task Force's (TF) two cancelled meetings of March 31 and April 7. Please amend the following to those submissions, for the record of the TF's April 29, 2003 public hearing.
Thank you.

I greatly appreciate your having distributed my April 2, 2003 Los Angeles Times op-ed piece entitled, "'Smart" Farming Could Avert Urban Need for Reclaimed Water." However, I regret that you did not forward to the TF, the NY Times article about SARS, in which possible sources of transmission mentioned included sewage and sputum.

On April 24, the L.A.Times also published an important piece by the Nobel prize-winning microbiologist and former Rockefeller University president, Dr. Joshua Lederberg.

"An Inner Peace: In battling disease, we have to settle for a truce with the microbes inside us," was the title. Dr. Lederberg earlier served on a State of California panel studying wastewater reuse.

He cautioned then, and continues to caution now, against adding this inadequately treated, inadequately monitored product to our drinking water supplies. I do hope that you will soon forward this important piece to your members.

The Whittier Daily News article of April 21 is also instructive, and well worth your distributing to the TF: "Wells Near River to Close: Water agencies told to spend $33 million to move pumps," is the headline. "Officials from the Calif. Dept. of Health Services say the 23 wells in question are downstream from water-recycling plants in the Whittier Narrows."

You have solicited comments on the TF's Draft Report. The following are some of the thoughts that come to mind:

The composition of the TF itself, makes its findings highly questionable.
Where much of the proposed recycled wastewater is intended to be used is in the Los Angeles Area. And yet, most of the TF meetings have taken place in Northern California.

Also, there are no representatives on the TF who were among those protesting the two L.A.County "Toilet-to-Tap (T2T)," facilities, neither of which are yet on-line. This, despite $55 million having been spent on LADWP's East Valley facility.

It appears that the objectives of this report are to push through increased development of T2T to satisfy housing developers and those engineering and constructing the wastewater recycling plants.

The process by which this task force has operated makes a mockery of independent inquiry. The assumptions were designed to arrive at a foregone conclusion, despite the many warnings of credible scientists.

Your report urges full-speed ahead, in developing additional recycled wastewater, despite the lack of fail-safe systems and the risk to public health. Scientific research may be done after-the-fact, if at all.

Instead, propaganda is to be produced by the state under the guise of "education," better known as disinformation. The skull and crossbones symbol is to be banished, despite the sorry record of cross-connection errors and their grievious consequences.

Most disturbing of all, is the TF's failure to even consider recommending that the agricultural users of water be required to conserve, in the public interest.

Right now, the ag sector is using as much as 85% of the state's water. If this sector was to be given low-cost loans for water-conserving technology, there would be no justification for even considering recycled effluent for insertion into our precious drinking water supplies.

It is unconscionable to be bringing California's drinking water quality and reliability standards down to those of a third world country. I urge you to reconsider your now entirely inappropriate recommendations.

Instead, please vow to serve the higher purpose of protecting public health. That can only be done with the best and safest drinking water available. And it defintely won't come from recycled sewage effluent.

April 29th I have also been invited to testify in Los Angeles on developing a National Agenda on the Environment and the Aging. With the impaired immune systems of the elderly, my focus will be on the importance of assuring a reliable, top quality of drinking water. Otherwise, I would have planned to deliver the remarks above, in person.

Very sincerely,

Ellen Stern Harris
Fund for the Environment

>This is a follow-up message to my previous e-mail on April 17 regarding
>the Seventh Recycled Water Task Force meeting to be held on April 29th
>(10:00-3:30) in CAL/EPA Building, Sacramento.
>
>The Recycled Water Task Force Chair, Mr. Richard Katz, highly encourages
>you to attend in person this last working meeting. However, to
>accommodate those members of the Task Force and others who might not be
>able to come, a toll-free teleconference number has been assigned for the
>meeting. The number is 1-877-952-5973 >> Passcode: 195308
>
>Look forward to seeing you on Tuesday.
>
>
>Fawzi Karajeh
>Executive Officer, Recycled Water Task Force and
>Chief of Water Recycling and Desalination Branch

>Office of Water Use Efficiency
>California Department of Water Resources
>
>http://www.owue.water.ca.gov/recycle/

Ellen Stern Harris
Executive Director, Fund for the Environment
Editor of <http://www.BeverlyHillsCitizen.org>

P.O.Box 228 / Beverly Hills, CA 90213

From: Denise St. Laurent
Sent: Sunday, April 27, 2003 9:06 PM
To: Karajeh, Fawzi
Cc: Richard Katz
Subject: Comments on Task Force draft final report

Dear Fawzi,

The Safe Water Reuse comments on the Task Force draft final report are attached.

Best regards,

Denise

Safe Water Reuse

P.O. Box 19097, San Diego, CA 92159-0097

http://www.safewaterreuse.org

Comments on the 2002 Recycled Water Task Force Draft Final Report

As stated in the Final Report, the 2002 Recycled Water Task Force was created by AB331. Not mentioned in the final report is that AB 331 was sponsored by WateReuse, the lobbying arm for those with a financial interest in producing and selling recycled water. The Task Force membership was heavily populated by WateReuse recommendations – 2/3 of the members according to the WateReuse web site at http://www.watereuse.org.

The overall tenor of the final report reflects the industry-dominated composition of the Task Force. Public health considerations are subordinated to the requirements of the recycled water industry. The convergence of the needs of developers for ever increasing supplies of water with the attempt by the Task Force to minimize the public health regulations related to the uses of recycled water is very obvious in this report.

Recently, the Chromate Toxicity Committee report was thrown out by the California legislature because of undue industry influence. The parallels between the Chromate Toxicity Committee and the 2002 Recycled Water Task Force are, unfortunately, extremely apparent in this final report.

Safe Water Reuse is very concerned about the recommendations in Section 3.2 DHS Guidance on Cross Connection Control.

Whenever recycled water is used for irrigation, it is all too easy for landscapers or homeowners to inadvertently connect the recycled water and potable water systems, which is a cross-connection. Whereas recycled water has many beneficial uses, drinking recycled water is not one of them and that is the result of a cross-connection.

There have been 20 recycled water cross-connections that were both discovered and reported to State Health in California. These were reported at schools, parks, golf courses, businesses and private homes where recycled water is used for irrigation. This does not reflect all of the cross connections that have occurred, as many cross connections are not reported because they are difficult to detect and, when found are usually corrected without being reported. The majority of these reported cross connections were at use sites not considered to be "dual-plumbed.", a Title 22 interpretation limiting "dual plumbed" use sites to only where recycled water is used inside buildings and at residential sites. The majority of recycled water use sites such as those mentioned in the following paragraph are ignored in regulations.

One of the "impediments" the Task Force is looking to do away with is periodic cross connection testing to make sure the recycled water and potable water systems are not cross-connected. Our State Health Department Office of Drinking Water has apparently taken the position that these tests are no longer needed at our schools, hospitals, medical facilities, parks, etc., where recycled water is used for irrigation.

In Florida, a similar position was taken in the early 1990s. In 2000, the Florida Department of Environmental Protection started to require the reporting of cross-connections between recycled and potable water systems. In 2001, the first reportable year of the new requirements, 44 cross connections were reported.

The following statement from Section 3.2 has little basis in reality and the potential health and safety effects must be carefully considered.

Most of the requirements in Title 22, Article 5 (see Appendix D) apply only to dual-plumbed systems – plumbing outlets within buildings and landscape irrigation at individual residences. The requirement of greatest concern is for a test every four years to show that a cross-connection does not exist. A pressure test (alternating shutdown of the potable and recycled water systems) has been the accepted test. The cost and service disruption associated with the test is an impediment to dual-plumbed recycled water systems.

The Task Force composition, while heavily dominated by industry, included no representatives from recycled water customers. To determine if the pressure test was considered an "impediment" by those using recycled water, Safe Water Reuse sent a survey by mail to 36 recycled water customers and landscape companies in San Diego County. Thirteen completed surveys were returned by mail or fax, a 36% rate of return.

The results reflect both the positives and negatives viewed by customers actually using recycled water. Four of the thirteen results were from facilities operating 24 hours/7 days per week. Recycled water uses by our respondents included landscape irrigation, concrete mixing, field crops, golf course, toilet/urinal flushing and dust control.

Respondents ranked the primary benefits of using recycled water from 1 (Not Important) to 5 (Very Important) in the following order:

1. A beneficial use of recycled water.
2. Uninterrupted supply of water during drought.
3. Using recycled water frees potable water for other uses.
4. Reduced rates for water.
5. Reduced need for fertilizer.

One reply indicated that "I pay more!" for recycled water; and another reply stated "Doesn't apply - Not reduced" to the "Reduced rates for water statement".

Respondents ranked the negative aspects of using recycled water from 1 (Not Important) to 5 (Very Important) in the following order:

1. Water quality (salt, chlorine, etc. limiting selection of planting material).
2. Increased maintenance costs due to more frequent system repair (valves, sprinklers, etc).
3. Potential health effects.
4. Cost of regulatory oversight by County of San Diego Department of Environmental Health staff.
5. Inconvenience of cross connection (shutdown) tests.
6. Site Supervisor training requirements (County Water Authority class)
7. Inconvenience of inspections/oversight by Water Purveyor staff.
8. Restricted hours for usage.
9. Initial connection fees charged for meters.

One of the results included was "Cost of potable vs. recycled" 5+. The same respondent indicated 5+ for both Increased Maintenance Costs and Water Quality; however the results were tabulated using 5.

An opportunity to forward comments to the 2002 Recycled Water Task Force was provided and the comments are as follows:

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I am working with other large users in our area on problems associated with:

a) Debris in the system
b) High chlorine content
c) Deterioration of equipment (premature)
d) Effect of salts on the condition of all plant material

Four Seasons Resort Aviara. Recycled water used for landscape irrigation (24-hour facility)

~~~~~~

Low cost of water and consistency or quality are absolute musts for our operation. Currently water quality is highly variable and has too many contaminants for our usage. Chlorine and other salts are creating problems for us.

Recycled water is used to irrigate annual field crops – cut flowers and bulbs. Site information not provided.

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Most individuals would use reclaimed water:

a) *If cost significantly cheaper*
b) *If there is a potential to mix both fresh and recycled before use*
c) *General public were to know it is not drinkable but very safe. There is a stigma that it is raw sewage.*

Recycled water used for golf course irrigation. Site information not provided.

~~~~~~

Media and County health have very poor job handling information regarding benefits of recycled water. The two together have created hysteria over so called "potential" health effects. Recycled water has been used for many years/decades in other parts of the country without any documented cases of health issues. We should be pumping this water back into our reservoirs and reprocessing it to decrease our dependence on Colorado River which is dirtier than anything coming out of the recycle plant.

BD Biosciences Pharmingen. Recycled water is used for landscape irrigation, cooling tower, toilet and urinal flushing.

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More than adequate supplies and are currently looking for additional consumption at our location. Dust control is a better application of recycled water than using drinking water supplies.

Sycamore Landfill. Recycled water used for dust control.

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Water quality affects plant material and irrigation components in an abnormally short amount of time. Also it concerns my health.

Tierra Verde Resources. Recycled water used for landscape irrigation.

~~~~~~

My only concern is how the water is purified for use in concrete batches. I believe there is a lot of salt used in the process which could damage concrete over time. I am told that the reclaimed water is within certain guidelines and hope this to be true as it is used in every batch of concrete we produce.

San Diego Precast. Recycled water used for concrete mixing.

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It is interesting to note that most of the comments received were related to water quality. This is an important issue that must be resolved if we are to increase the acceptance of recycled water for non-potable uses. This issue was not addressed by the Task Force, simply because the industry-dominated composition did not include any representatives from sites where recycled water is used.

There were no comments submitted, either positive or negative, concerning the undocumented assumption by the Task Force about the cost or inconvenience of cross connection (shutdown) testing.

Safe Water Reuse is concerned about the lack of public participation in this process.

The transmission letter to Thomas Hannigan, Director, DWR states that *"In addition to input from industry and government, these recommendations benefited tremendously from the input of the public. Their input helped inform the Task Force's thinking and the report as a whole".*

This statement should be stricken as there was very little opportunity for public involvement or input in this process. The three so-called "public" hearings were held at the May 8, 2002 Association of California Water Agencies Conference in Monterey; the October 10, 2002 California Water Policy Conference in Los Angeles; and the February 26th WateReuse Annual Conference in San Francisco. These cannot possibly be considered as venues encouraging the input of the public, and a review of the attendance lists from the Conferences confirms the lack of public participation.

A list of the issues that were created for the Task Force to address is attached, and provides further evidence of its industry domination (please see the list of WateReuse members referenced on the list).

In closing, Safe Water Reuse strongly believes that cross connection testing requirements for recycled water are NOT an impediment to the safe use of recycled water. Our position is that these requirements are critical for protecting our drinking water supply at all sites that use recycled water and potable water. We further believe that participation from the public is key to any decisions affecting their drinking water supplies.

Respectfully submitted,

Denise St. Laurent

Attachment

ISSUES PRESENTED FOR CONSIDERATION TO 2002 RECYCLED WATER TASK FORCE*

Category	Issue	References	WateReuse Member	Task Force Member
Public Perception/Education & Outreach	Determine current public perceptions and acceptance of water recycling	Norris Brandt	Yes	No
Public Perception/Education & Outreach	Provide a consistently high funding for public education programs	Minutes, 4/3/02 Meeting	NA	NA
Public Perception/Education & Outreach	Additional testing and certification to ensure the safe use of recycled water	Richard Prima	Yes	No
Public Perception/Education & Outreach	Update epidemiological studies and provide an overall current assessment of the science regarding public health and the use of recycled water	Norris Brandt	Yes	No
Public Perception/Education & Outreach	Address social equity in the distribution of recycled water	Minutes, 4/3/02 Meeting	NA	NA
Public Perception/Education & Outreach	Educate farmers and growers who are often reluctant to use recycled water as allowed in Title 22	Richard Prima/Martin Wilder/ Bob Whitley	Yes/Yes/Yes	No/No/Yes
Economic Feasibility/Grants & Loans	Provide grants for recycled water projects to make them competitive to other sources	Ann Farrell/Norris Brandt/Tim Anderson/Suja Lowenthal[1]	No/Yes/Yes/No[1]	No/No/No/No
Economic Feasibility/Grants & Loans	Provide grants for education of the public/farmers/food processors	NOT PROVIDED	NOT PROVIDED	NOT PROVIDED
Economic Feasibility/Grants & Loans	State subsidy program is lengthy and cumbersome	Norris Brandt	Yes	No
Economic Feasibility/Grants & Loans	Consider financial assistance for water recycling from CALFED and the State Water Project	Minutes	NA	NA
Economic Feasibility/Grants & Loans	Tax break for entities using recycled water	Suja Lowenthal[1]	No[1]	No
Economic Feasibility/Grants & Loans	Tax breaks and incentives for one entity may mean additional tax or financial burden for others	Minutes, 4/3/02 Meeting	NA	NA
Economic Feasibility/Grants & Loans	Provide mechanisms for financial support to research addressing emerging health concerns	Bob Whitley	Yes President	Yes
Economic Feasibility/Grants & Loans	Water credits to users of potable water who decide to convert to recycled water, therefore helping solve local water shortages	Bob Whitley	Yes President	Yes
Economic Feasibility/Grants & Loans	Outline costs and benefits of water recycling and provide rigorous analysis of the true costs and benefits.	Minutes, 4/3/02 Meeting	NA	NA
Economic Feasibility/Grants & Loans	Clarify the economic criteria for state funding of water recycling projects	Minutes, 4/3/02 Meeting	NA	NA
Economic Feasibility/Grants & Loans	Clarify and strengthen language in State Water Code that gives agencies more authority to impose penalties on entities that do not use recycled water	Suja Lowenthal[1]	No[1]	No

Economic Feasibility/Grants & Loans	The costs of recycling projects are often borne locally even though the benefits of water reuse often accrue statewide	Martin Zvirbulis	Yes	No
Economic Feasibility/Grants & Loans	Provide incentives for land developers to install water recycling systems	Minutes, 4/3/02 Meeting	NA	NA
Economic Feasibility/Grants & Loans	Costly repetitive Engineering reports needed for each site	Norris Brandt	Yes	No
Economic Feasibility/Grants & Loans	Costs related to dewatering and discharge. Must dewater to sewer, can't dewater to creeks	Norris Brandt	Yes	No
Economic Feasibility/Grants & Loans	Costs related to cross connection program	Norris Brandt	Yes	No
Economic Feasibility/Grants & Loans	Costs related to spill reporting	Norris Brandt	Yes	No
Economic Feasibility/Grants & Loans	Large storage facilities are expensive	Norris Brandt	Yes	No
Economic Feasibility/Grants & Loans	Greater support for surface storage and groundwater storage	Norris Brandt	Yes	No
Economic Feasibility/Grants & Loans	Seasonal storage facilities are needed near wastewater treatment plants to store recycled water when it is not needed	Norris Brandt/Minutes 4/3/02 Meeting	Yes/NA	No/NA
Laws and Regulations	State law regarding land use and permitting treats recycled water as wastewater facilities	Albert Hazbun	Yes	No
Laws and Regulations	Discharge of recycled water to a pond requires enough freeboard to account for a 100-year storm	Albert Hazbun, Bob Castle	Yes/Yes Legislative Co-Chair	No/Yes
Laws and Regulations	One molecule rule considers that any discharge of rainfall-induced stormwater or incidental runoff that could contain one molecule of recycled water is an illegal point discharge of wastewater that requires a point discharge NPDES permit	Bob Castle/Bob Whitley	Yes Legislative Co-Chair /Yes President	Yes/Yes
Laws and Regulations	Address the issues of laws governing duplication of service in dual distribution systems	Norris Brandt/Minutes 4/3/02 Meeting	Yes/NA	No/NA
Laws and Regulations	Consider neutral third party mediators to facilitate multiparty agreements between competing recycled water purveyors	Bob Whitley, Minutes 4/3/02 Meeting	Yes President/NA	Yes/NA
Laws and Regulations	Review of overlapping laws and regulations relevant to wholesaling and retailing of recycled water	NOT PROVIDED	NOT PROVIDED	NOT PROVIDED
Laws and Regulations	Recycled water spill is considered as sewage spill	Andy Sienkiewich/Bob Greaney/Norris Brandt/Minutes 4/3/02 Meeting	Yes/Yes/Yes/NA	No/No/No/NA
Laws and Regulations	Include in the Water Code a clear classification for types and appropriate uses for each	Norris Brandt	Yes	No

Laws and Regulations	Clean Water Act considers that wetlands (even man made ones) are waters of the state with very strict effluent limitations making it difficult to implement reuse projects for wetland restoration	Tim Anderson	Yes	No
Laws and Regulations	Non-uniformity of water recycling standards statewide	Norris Brandt	Yes	No
Laws and Regulations	Legislation should be enacted to forbid local agencies from restricting recycled water projects in any manner that goes beyond the requirements of state law and regulations	Bob Whitley/Minutes	Yes President/NA	Yes/NA
Laws and Regulations	Current water recycling criteria impose in addition to water quality certain treatment technologies and plant designs making it restrictive on use of innovative technologies	Bob Whitley	Yes President	Yes
Laws and Regulations	Clarify the definition of impairment contained in California law. Water Code Section 13540 requires DHS to determine that injection projects will not impair receiving aquifers used as drinking water supply	Bob Whitley	Yes President	Yes
Laws and Regulations	Recycled water producers may be liable for users violations	Norris Brandt	Yes	No
Laws and Regulations	Regulate water softeners locally to protect recycled water for reuse	Minutes 4/3/02 Meeting	NA	NA
Laws and Regulations	Costly repetitive Engineering reports needed for each site	Norris Brandt	Yes	No
Laws and Regulations	Use of recycled water for industry should be enforced	Minutes 4/3/02 Meeting	NA	NA
Laws and Regulations	Residential use of recycled water for landscaping	Andy Sienkiewich	Yes	No
Laws and Regulations	Investigate if the ability to charge for regulatory oversight and inspections provides a financial inducement to create regulations that have lost sight of reasonable balance between risk management and costs	Bob Whitley	Yes President	Yes
Laws and Regulations	Insufficient coordination among various recycled water regulators. Each regulatory body works independently from the others	Norris Brandt/Tim Anderson	Yes/Yes	No/No
Laws and Regulations	Centralize reviews and approvals in "one stop" approach	Norris Brandt	Yes	No
Laws and Regulations	Need for a statewide coordinated program	Norris Brandt/Tim Anderson	Yes/Yes	No/No
Environmental Issues Surrounding Use	Consider the positive environmental impacts of water recycling upstream since recycling alleviates the demand for fresh water from streams and lakes	Minutes 4/3/02 Meeting	NA	NA
Environmental Issues Surrounding Use	Consider the benefits of recycling in complying with water quality requirements for discharges into receiving waters	Ann Farrell[2]	No[2]	No
Environmental Issues Surrounding Use	Consider the negative impact of recycling on receiving waters due to reducing discharge for the purpose of reuse	Minutes 4/3/02 Meeting	NA	NA

Environmental Issues Surrounding Use	Incidental recharge of groundwater	NOT PROVIDED	NOT PROVIDED	NOT PROVIDED
Environmental Issues Surrounding Use	Incidental runoff occurring from using recycled water for beneficial use can be in violation of NPDES permits	Tim Anderson	Yes	No
Environmental Issues Surrounding Use	Address the potential of high nutrient-laden recycled water contaminating groundwater basins	Minutes 4/3/02 Meeting	NA	NA
Environmental Issues Surrounding Use	Conflicts with downstream water quality benefits in cases where discharge contributes to enhancing stream water quality such as salinity reduction	Tim Anderson	Yes	No
Environmental Issues Surrounding Use	Negative economic impact on parties who have legal right to water downstream	Daniel Gallagher	Yes	No
Environmental Issues Surrounding Use	Diversion of recycled water for reuse may have negative impact on riparian habitat downstream	Daniel Gallagher	Yes	No
Environmental Issues Surrounding Use	Anti-growth proponents may view recycled water as a supplemental source to fuel growth	Suja Lowenthal[1]	No[1]	No
Environmental Issues Surrounding Use	Large storage facilities are environmentally controversial	Tim Anderson	Yes	No
Environmental Issues Surrounding Use	Drought waiver for discharge limits (no dilution) so as not to undermine the drought-proof aspect of recycled water	Leighton Fong	Yes	No
Environmental Issues Surrounding Use	Regional brine lines for discharging highly concentrated brines	Leighton Fong	Yes	No
Pharmaceuticals, Hormones, Trace Elements, Persistent Organics	Cost effective means to remove trace elements	Tim Anderson	Yes	No
Pharmaceuticals, Hormones, Trace Elements, Persistent Organics	Does the problem of pharmaceuticals concern recycled water specifically or water sources in general, including potable water supplies	NOT PROVIDED	NOT PROVIDED	NOT PROVIDED
Pharmaceuticals, Hormones, Trace Elements, Persistent Organics	Use academic institutions for more basic and applied research on wastewater reuse	Minutes 4/3/02 Meeting	NA	NA
Pharmaceuticals, Hormones, Trace Elements, Persistent Organics	The use of Action Levels as compliance mechanisms. Even though Action Levels are health-based advisory levels issued by DHS for chemicals in drinking water that lack maximum contaminant levels, they have become de facto regulations and significant barrier	Bob Whitley	Yes President	Yes
Plumbing Code Issues	Impossible to retrofit existing buildings if backflow devices are to be installed in existing fire systems served by potable water	Bob Castle	Yes Legislative Committee Co-Chair	Yes
Plumbing Code Issues	Cross connection requirements	Bob Castle	Yes Legislative Committee Co-Chair	Yes
Plumbing Code Issues	Disruptive shutdowns for pressure testing should be eliminated if other on-site safeguard criteria are met	Bob Castle/Richard Harris/Bob Whitley	Yes Legis Comm/Yes Lobbyist/Yes	Yes/No/Yes

Plumbing Code Issues	Overly restrictive spacing requirements in commercial buildings	Richard Harris	Yes Lobbyist	No
Plumbing Code Issues	Plumbing Code conflicts with the latest definitions of tertiary recycled water in Title 22 of the Water Code	Bob Whitley	Yes President	Yes
Plumbing Code Issues	Appendix J conflicts with Section 13553 of the Water Code due to legislation AB 1522 that expanded the types of structures where recycled water may be used for flushing	Bob Whitley	Yes President	Yes
Plumbing Code Issues	IAPMO Appendix J was never adopted into the California Plumbing Code	Bob Whitley	Yes President	Yes
Plumbing Code Issues	Recommended improvement to the Plumbing Code will also require corresponding changes to Titles 17 and 22	Bob Whitley	Yes President	Yes
Plumbing Code Issues	Include professionals knowledgeable in the domain to assist in the development of regulations	Bob Whitley	Yes President	Yes
Promote On-Site Systems to Accomplish Reuse Efficiency	Coordinate with AB 885 on-site wastewater treatment	Mark Capron	Yes	No
Promote On-Site Systems to Accomplish Reuse Efficiency	Satellite wastewater treatment plants technology for intercepting part of wastewater and treat it upstream where recycling is most needed	Mark Capron/Andy Sienkiewich	Yes/Yes	No/No
Promote On-Site Systems to Accomplish Reuse Efficiency	Prohibition against on-site water recycling should be deleted	Bob Whitley	Yes President	Yes

*Sources: List of Issues for Consideration, provided to 2002 Recycled Water Task Force, May 24, 2002
List of WateReuse members, http://www.watereuse.org

[1] Suja Lowenthal, Central Basin Municipal Water District
[2]Ann Farrell, Central Costa County Sanitary District

From: Bill Laird
Sent: Monday, April 28, 2003 2:19 PM
To: Robert Katz; Minton, Jonas; Dave Spath; Karajeh, Fawzi
Subject: Comments on 2002 Recycled Water Task Force Final Report

Mr. Karajeh,

The recommendations from the Task Force force are a pathetic misrepresentation of what a potentially good program should be. Instead of making recommendations that would protect the health and safety of the end users and promote the safe beneficial use of recycled water, the Task Force is recommending that we lower the standards for the protection of health and safety.

Little or no thought was given to more research into the long term exposure of unknown chemical compounds in recycled water.

What little oversite that was required of the health department was specifically removed and the ability of the purveyor to protect the potable system was completely removed from the proposed regulations.

The definition of financially motivated governmental appointees most certainly can be applied to the Drinking Water Department. You have been entrusted with the safety of the drinking water supply and you gave that responsibility to those hoodlums at Watereuse. You of all people should have had been screaming and shouting about the lack of protection for the public water supply but that didn't happen. You turned your back on that sacrosanct responsibilaty and allowed yourselves to be manipulated and turned to the ultimate demise of the safety of our water supply.

Now the fight for safe drinking water will pass to those that ultimately shoulder the burden of your spineless direction on the Task Force. The landscape worker that has no answer for his wife and children as to why his hands are so chapped that they bleed at night; the golf course manager that has to go to his CEO and explain why he is spending thousands of dollars a month on repairs due to water quality issues; the mother of a child that has unexplained asthma attacks after playing in water on the playground at school. These are the people you were supposed to protect. Not some over priced consulting firm or engineering and disign team. Shame is a word that will be used in the future when your department is mentioned.

Bill Laird
Laird's B & B Maintenance
Escondido, CA 92033-1414

From: Denise St. Laurent
Sent: Monday, April 28, 2003 10:31 PM
To: Karajeh, Fawzi
Cc: Richard Katz
Subject: R. William Robinson's Comments on Final Draft

Dear Fawzi,
Bill Robinson, Elected Board Member, San Gabriel Valley MWD, Division 4, West Covina has asked me to forward his comments on the 2002 Recycled Water Task Force draft final report to you.
If you have any questions, his e-mail address is bill_robbie@yahoo.com.
Best regards,
Denise

From: Denise St. Laurent
Sent: Tuesday, April 29, 2003 9:17 PM
To: Karajeh, Fawzi
Cc: Richard Katz
Subject: Revision to R. William Robinson's comments

Dear Fawzi,

Bill Robinson has changed two words in his comments to the Task Force - see below:
in the 8th paragraph it would be better if:

The Task Force (TF) needs to revise their draft report (not adjust) to answer Professor Daniel Okun's....

I have made the changes and they are attached. Please excuse the correction, but there was not much time provided to review the final report.

I understand that the comments I worked so hard on were not included in Dick Carlson's package - and others? I, like you have spent thousands of hours on the Task Force.

My hours have been spent after work and on weekends.

I worked very hard to submit comments that would help the Task Force understand the need for cross connection control and the forgotten landscape personnel/use site personnel who work with recycled water every day.

They were very carefully written due to the extreme fondness of WateReuse/Task Force members to call our Mayor to complain. I won't mention names, as you can probably figure it out.

I hope this was merely an oversight in Dick's package, but am a little skeptical after having the Safe Water Reuse web site removed from the DWR links "for review" on January 8 after complaints by Bob Castle - *does he have an office at the Capitol???* - I can't help wondering.

Anyway, none of this is personal because I know you have been working very hard and have even forwarded some non-complimentary news items to the entire Task Force. You have always been very professional and kind, and the Task Force was lucky to have you involved.

Best regards,

Denise

"TOILET TO TAP" LOBBY IGNORES PUBLIC INTEREST: COMMENTS ON 2002 RECYCLED WATER TASK FORCE FINAL REPORT

To: Richard Katz, Chairman & Members of the 2002 Recycled Water Task Force

Submitted by R William Robinson, Elected Board Member, San Gabriel Valley Municipal Water District, Division 4, West Covina

California isn't blessed with unlimited groundwater resources. Now the standards that protect what potable groundwater the region has from the pollutants that concern many distinguished scientists are in danger of being lowered.

The task force needs to answer Prof. Daniel Okun's written criticism. He reviewed several of the 2002 Recycled Water Task Force White Papers and his critique was presented at the January 10, 2003 Task Force meeting, but it is unclear if these remarks were included in the record.

The task force recommends that the legislature should get Cal-Fed involved, along with the California Bay Delta science program, and that they should examine the issues for a report at a later time. That recommendation is a loser.

I incorporate by reference all the information contained in the Safe Water Reuse web site. See [www.safewaterreuse.org]. This site contains a verbatim transcription of Professor Okun's comments made to the Task Force.

The task force was an insiders operation. Hearings were held throughout the state, but at forums and locations generally inaccessible to the general public.

No notices were given in newspapers of general circulation. But with conference locations like the Disneyland Hotel with parking only available at high prices, notice would not have mattered.

Additionally, the composition of the task force, open to those with a specific ax to grind, renders all of the report findings suspect.

It appears the Task Force (TF) needs to revise their draft report to answer Professor Daniel Okun's written criticism to you. See Draft Final Version of Task Force Report, dated April 17, 2003. The draft report on pages 42 and 43. (there are only about 4 paragraphs on Science and Indirect Potable Re-Use). The draft report, then refers one to Recommendation 2.2.7 on pages 23 and 24 saying, TF recommends we should ask to Legislature to get Cal-Fed organization involved... the California Bay Delta Science program to examine the issues for a report during the Jan 1 2004 to July 1 2005 time frame. This recommendation is a failure because:

- The Cal Fed program is on life support under the Bush Administration and with the State Budget in a crisis this program may not even survive two more years until the next presidential election.
- The recommendation seems a strategy and alternative for doing nothing at all. How can such an important project necessary to protect the groundwater basins of the state and potentially the health of residents and wildlife in our rivers be shunted off to an organization in the twilight of its existence? Instead this research task needs to become the responsibility of one or more of the following state agencies: State Water Resources Control Board, Department of Health Services, or the Department of Water Resources.

In October, 2001, following a successful wastewater lobby campaign, the legislature created a state recycled water task force, led by former legislator Richard Katz. The panel is charged with eliminating obstacles or disincentives that hinder the maximum safe use of recycled water. While the task force pretends to be an evenhanded deliberative body, their function is to void the science issues and eliminate all political opposition with a public relations barrage.

Check the industry connections to the task force. WateReuse, a private organization representing sanitation districts, water agencies and a host of "consultants" to the water industry, is snuggled up with the task force, to the extent of hosting a major joint conference in San Francisco earlier this year.

Pressured by the wastewater lobby and engineering firms eager to acquire contracts for treating wastewater, the task force has spent the past year ignoring the important scientific questions in order to reach one amazing conclusion: "education" and "public relations" are the key needs of the future. More of the Katz panel's recommendations deal with how to manipulate the public's perception of wastewater than with the concerns of the scientific community.

The public is obliged to consume the quality of water the government chooses to serve. Unfortunately, the task force's aim in “streamlining" the regulations is weakening the California Toxics Rule and the state implementation plan. Their tentative final recommendations offer no consolation to a concerned public.

Dan Okun, Emeritus Professor of Environmental Engineering at the Univ. of North Carolina, has spent a lifetime in wastewater engineering, often in California. The former consultant for the Department of Health Services, in criticizing a White Paper drafted by the panel, argues that "The reports that emanated from past bodies were scientific in content and professional in nature. This White Paper is neither. It is devoid of science and exhibits an unprofessional bias that provides little basis for making judgments related to the reclamation of waste water for reuse for either potable or non-potable uses. It does not build on what has preceded in California before the formation of the Task Force."

Not only does the task force avoid these earlier efforts that became the basis of our current regulations, it ignores the newer, more significant science of "endocrine disrupter compounds," pollutants that interfere with natural human and wildlife physiology.

Federal EPA labs and worldwide environmental research currently focus on a barrage of chemicals, nonexistent decades ago, but now being excreted by humans as drugs and pharmaceuticals into wastewater. Also, dishwasher compounds, laundry detergents, drugs, cosmetics and other discards end up as sewer waste, creating a complicated environmental cocktail of synthetic chemicals, most of which are unregulated under current standards.

Undeniably, regional water boards statewide need to require better waste water monitoring for two reasons. It informs regulators on what recycled water should be used for (drinking or irrigation). And, additionally, what technologies we need to apply to improve the waste water treatment process. Now policy wise we are groping in the dark with no information about unregulated contaminants.

Rather than forcing its tentative recommendations through the legislature, the task force should urge creation of an independent panel of scientists, preferably chosen from the medical-public health sector, to examine evidence from recent studies and make recommendations to the Legislature regarding water reuse. Recommendations from a scientific panel, without appearance of a conflict of interest, will be reassuring and will make unnecessary the proposed efforts to manipulate public opinion.

Water recycling, as it is now done, has powerful political forces supporting it. Many environmental organizations strongly endorse responsible non-potable use of recycled water. But a more scientific and balanced approach is necessary. Without proper safeguards, the groundwater basins, wildlife and river watersheds of the state will be impacted by dumping inadequately treated wastewater into them, creating significant public health and environmental damage. Californians should be alert.

April 29th, 2003 State Recycled Water Task Force meeting
Public Comments Presented by the Safewater Coalition:
Ray Wang and Christina Lai, Co-Founders
Safewater94065@yahoo.com
http://geocities.com/safewater94065/aboutus/aboutus.htm

Members of the Task force stated that the February 26, 2003 Public Workshop of the DWR / SWRCB / DHS 2002 Recycled Water Task Force and the Environmental Justice Coalition for Water, was not an official meeting of the Task Force, please consider our submission for that occasion, to also be Safewater Coalition's submission for the Task Force's official public hearing of April 8, 2003.

In our testimony today, Safewater Coalition would like to add an additional public comment on the February 4, 2003 Draft White Paper on Public Info. Education, and Outreach Workgroup on Better Public Involvement in the Recycled Water Decision Process.

If you read Page 3 of this Draft White Paper, the Task Force stated, "In California, water and wastewater agencies have implemented recycled water projects with varying levels of success, depending on the type of project and other factors. Nonpotable reuse, where recycled water is primarily used for landscape irrigation of public areas-golf courses, parks, schools, et----, for agricultural irrigation, and for industrial processes, has been **generally accepted by local communities and elected officials."**

Safewater Coalition asks the Task Force to remove or modify the above statement, which is a misstatement of fact. We have no quarrels with the use of recycled water on non-residential areas such as golf courses, highways, cemeteries, and industrial areas. We do question the wisdom and safety of its use in schools, schoolyards and landscaping for residential parks and private homes. Our view has been presented to the City Council of Redwood City and the Council in its wisdom has passed a resolution restricting the use of recycled water for landscape use in established neighborhoods.

To summarize, landscape irrigation has NOT been accepted by Redwood City Elected Officials. Redwood Shores residents, a local community of 5000 homes, and more than 15,000 residents has vigorously opposed the use of recycled water on private lawns and areas where children play. The entire Redwood City has a population over 80,000 people. Evidence has been presented at the Feb. 26th Recycled Water Task Force meeting. Please document both our Feb. 26th and today's testimony for the public record of April 8th Recycled Water Task Force meeting.

Thank you for your time and understanding.

From: Ellen Stern Harris
Sent: Tuesday, April 29, 2003 7:18 AM
To: Task Force Members
Cc: Interested Parties
Subject: Re: Recycled Water Report/revised version for April 29th meeting discussion

To: Chairman Richard Katz & Members of the Task Force ~~

Thank you for sending me a last-minute revision of the
Recycled Water Task Force's 129-page
Draft Report which was received by e-mail today.
Understandably, our testimony was based on your previous
version, upon which the notice of your meeting for today was also based.

I believe that timely notice of a meeting, and the specific material to be
discussed
cannot be changed overnight, without being in violation of the Bagley-Keene
Act.
As you may know, this Act applies to State agencies, commissions, advisory
committees and task forces.

Sincerely,

Ellen Stern Harris
Fund for the Environment

At 4/28/03, Karajeh, Fawzi wrote:
>Members of the Recycled Water Task Force and Interested Parties,
>Please find attached the current revised version of the Draft Report of
>the Recycled Water Task Force which will be the discussed in tomorrow's
>(April 29th) meeting. Please note that the yellow shading denotes
>substantive changes from the last version we e-mailed to you, and all
>other changes are shown without shading. We will be providing you with a
>hard copy of this version tomorrow during the meeting.
>
>Fawzi Karajeh
>Executive Officer, Recycled Water Task Force and
>Chief of Water Recycling and Desalination Branch
>Office of Water Use Efficiency
>California Department of Water Resources
>
>http://www.owue.water.ca.gov/recycle/
> <<FinalReport Draft 042903 Master.doc>>

Ellen Stern Harris
Executive Director, Fund for the Environment
Editor of <http://www.BeverlyHillsCitizen.org>

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