California’s Task Force evaluation of issues confronting water reuse

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Abstract 
Water reclamation and reuse have been occurring in California for over a century. The state is arid and semi-arid in large regions and must rely on a variety of water supplies to meet its water demands. Reclaimed water is a potential source to meet a significant portion of new demands expected by 2030. However, there are issues of public health and water quality regulation, cost, public acceptance, institutional and other barriers that must be addressed. The California State Legislature adopted legislation in 2001 to convene the Recycled Water Task Force to advise the state on the opportunities for using reclaimed water in a broad spectrum of applications and in identifying impediments and constraints to increasing the use of reclaimed water. The processes for conducting the Task Force are described to illustrate the actions that were intended to increase the credibility of the Task Force. The recommendations of the Task Force are summarized.

Keywords 
Public participation; wastewater reclamation; water recycling; water resources management; water reuse

Introduction
The reuse of treated municipal wastewater has been practiced in the State of California, USA, for over a century. Current reclaimed water use amounts to about 560 million cubic meters annually, or about 10 percent of the municipal effluent generated in the state. The uses include agricultural and landscape irrigation, groundwater recharge, industrial cooling and processing, toilet flushing, and a variety of environmental enhancement and other uses. Existing water resources developments in the state are stressed to meet current demands and inadequate to meet future needs.

There is a great potential for increased use of reclaimed water. However, issues of public health and water quality regulation, cost, public acceptance, institutional and other barriers must be addressed. California has a strong regulatory framework to protect water quality of streams and aquifers and to protect public health. While this helps maintain high public confidence in the safety of using reclaimed water, there are concerns that the requirements imposed on water reclamation are too restrictive and hinder the full potential of water reuse. On the other hand, some segments of the public are skeptical that existing safeguards are adequate, especially in the use of reclaimed water for groundwater recharge for potable purposes. Several large water reclamation projects have been suspended or abandoned before construction or operation because of public opposition.

In 2001 the California State Legislature adopted Assembly Bill No. 331 (AB 331), mandating that the 2002 Recycled Water Task Force be convened to advise the Department of Water Resources on the opportunities for using reclaimed water in a broad spectrum of applications and in identifying impediments and constraints to increasing the use of reclaimed water.
Of equal importance to the recommendations of the Task Force is the perception of credibility of the Task Force in the eyes of the public, the agencies of government, and the scientific and engineering communities. For this reason this paper will describe the process of creating the 2002 Recycled Water Task Force and of conducting its business. In addition, the issues addressed and the recommendations reached will be summarized, and some of the issues will be highlighted to illustrate the difficulties in arriving at a consensus about how to resolve obstacles.

Reclaimed water, or “recycled water”, is defined in California law 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” (State of California, 2003c). The focus of this paper is reclaimed water derived from municipal wastewater.

**Task force formation and process**

As directed in AB 331, the Task Force was convened by the California Department of Water Resources (DWR). The legislation specified a membership of 25 representatives of state agencies, a university, local water supply and wastewater management agencies, environmental and consumer advocacy groups, land development and industry. A state and a local health official were also included. There was concern that the specified membership was weighted in favor of local agencies that tend to support water reuse and to be critical of excessive regulation. If the Task Force were to develop a set of recommendations that would have credibility to the general public and be readily accepted by agencies expected to implement the recommendations, it was essential to expand the membership to broaden the range of opinion. The membership was increased to 40. This allowed for inclusion of a larger number of experts in the field of water reclamation and reuse, two representatives of groups that had opposed water reuse, an additional public health official, the federal government and a broader spectrum of opinion amongst local agencies.

California government is required to incorporate considerations of environmental justice in its decisions. “Environmental justice” is defined as “the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies” (State of California, 2003a, 2003b). An African-American who had represented the African-American community in opposition to an indirect potable reuse project in San Diego agreed to join the Task Force as the environmental justice representative.

To instill a cooperative spirit in the function of the Task Force, the leadership and staff support were shared by the three state agencies having primary responsibilities for water reclamation and reuse. Their roles, including those related to water reuse, can be summarized as follows:

- **Department of Water Resources (DWR):** Statewide water supply planning; operation of one of the primary water supply projects in California, the State Water Project; coordination and promotion of water reclamation and reuse; integration of water reuse into water resources planning
- **State Water Resources Control Board (SWRCB):** Regulation of water quality and water reclamation facilities; funding of water quality projects, including water reclamation research and operational projects; allocation of water rights
- **Department of Health Services (DHS):** Regulation of public health; adoption of statewide public health standards for treatment and use of reclaimed water

Public trust in the outcome of the Task Force could only be achieved in a transparent process. All meetings were open to public participation. A Web site was created to provide a source of easily available information. In addition to the eight geographically distributed meetings of the Task Force, three public discussion sessions were held to provide additional opportunity for public input.
Six workgroups were created to address specific issue areas in depth and to develop draft recommendations for the Task Force. About 40 people, in addition to Task Force members, joined the workgroups to provide additional expertise and viewpoints. The 22 meetings of the workgroups were all open to the public.


**Issues addressed by task force**

AB 331 specified some specific areas for investigation but also left the agenda open for any topic, excluding water rights, under the general scope of impediments or constraints related to increasing the use of reclaimed water. Early in the deliberations of the Task Force over 85 specific 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 consideration. The workgroups provided an opportunity for focused discussions by interested Task Force members as well as other people with special interests and expertise. The issues were divided into six issue areas 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 reclamation
6. Science and health/indirect potable reuse

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. A single Task Force report was adopted that summarized the issues it chose to act upon and the recommendations to address those issues.

**Recommendations**

Within the six issue areas identified above, 26 issues were identified for analysis. A total of 55 recommendations were adopted by the Task Force. Fourteen key issues were highlighted for more immediate attention. The 26 issues and a summary of the recommendations are shown in Tables 1 and 2. The issues have been numbered as shown in parentheses to correspond to their numbers assigned in the Task Force report.

**Challenge of decision-making**

As might be expected from such a broad range of viewpoints participating in the Task Force deliberations, there were some issues of contention. The common method of group decision-making is to use majority rule voting. Implicit in this is the willingness of the minority to accept the decisions even while disagreeing with them. However, the role of the Task Force was to develop recommendations for actions that represented the opinions and judgments of the Task Force membership. The majority cannot impose opinions on a minority. The only way to responsibly represent contradicting opinions would be to include in the report the numerical votes on each recommendation or to include minority opinions. Either solution would weaken the authority of the Task Force and its ability to sway public opinion or create change in government or nongovernmental organizations.

Consensus decision-making involves a process of only taking group action that is consented to by all group members. This does not mean that everyone is in perfect agreement,
but that no individual disagrees sufficiently that the individual would want to block the group from taking a proposed action (Pines, 1981). Consensus allows individuals to be recognized by the group for their strongly held opinions. The group must work harder to accommodate disagreement that might undermine group action.

The Task Force leadership declared at the beginning that it was going to strive to achieve consensus to avoid minority reports. Because of the strongly held disagreements expressed in the Task Force, there was fear that a consensus process would lead to inaction on important issues. However, Task Force members listened carefully to all viewpoints and articulated their viewpoints in the most persuasive manner. Full endorsement of all recommendations of the Task Force was ultimately achieved. At times special meetings were held with particular contenders to clarify the disagreements and work on compromises. Two examples illustrate the process.

The tension centered around concerns about public health and water reuse, specifically dealing with potable reuse and cross-connection control. Many of the recommendations on regulatory issues were intended to discourage unnecessarily restrictive regulations. To prevent the perception that the Task Force was intending to promote water reuse at the expense of public health, the Task Force report stated, “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 Task Force was commissioned to address potable reuse. Direct potable reuse, where treated wastewater would be fed directly into potable water systems, is not permitted in California and is not proposed. However, indirect potable reuse through groundwater recharge has been occurring since 1962. An indirect potable reuse project was proposed in San Diego that would have involved surface storage rather than aquifer storage of reclaimed water. Based on three major reviews conducted at the state level in 1987 and 1996 and by the National Research Council in 1998, California’s official position has been that groundwater recharge or surface storage can be accomplished with appropriate safeguards. The concept of multiple engineered and natural treatment barriers is an important framework for California requirements and draft regulations (California Department of Health Services, 2003). Nevertheless, the San Diego proposal along with two new groundwater recharge projects have been unable to be implemented due to public opposition.

The Science and Health/Indirect Potable Reuse Workgroup reviewed the reports of the three previous panels and committees on potable reuse and concluded that their recommendations were still valid and that there was no new information that warranted a new comprehensive review by a scientific panel. However, the workgroup recognized that there was significant public concern and that a panel should be convened to review not only the scientific literature but also socioeconomic factors and the water resources context to provide a framework of communicating better to the public the safety and appropriate situations for implementing indirect potable reuse. The Task Force accepted these recommendations but skepticism remained within the Task Force whether indirect potable reuse is safe. To ease this concern, the Task Force declared, “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.” While this language was not the strong support for
indirect potable reuse sought by some members, it was a declaration that would not be subsequently repudiated later by a Task Force minority.

A similar tension existed between some local public health officials and advocates for water reuse, who contended that local imposition of measures to prevent cross-connection between potable and reclaimed water systems were excessive. Near the conclusion of the

<table>
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<tr>
<th>Table 1</th>
<th>Summary of key issues and recommendations of Recycled Water Task Force</th>
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<tr>
<td><strong>Funding for Water Recycling Projects (1.1)</strong></td>
<td>State funding for water reclamation and reuse facilities and infrastructure should be increased beyond current sources.</td>
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<td><strong>Community Value-based Decision-making Model for Project Planning (2.1)</strong></td>
<td>Local agencies should engage the public in an active dialogue and participation using a community value-based decision-making model in planning water reclamation projects.</td>
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<td><strong>Leadership Support for Water Reclamation (2.2)</strong></td>
<td>State government should take a leadership role in encouraging reclaimed water use and improve consistency of policy within branches of State government. Local agencies should create and enforce well-defined reclaimed water ordinances. The State should convene an independent statewide review panel on indirect potable reuse to ensure adequate health and safety assurance for California residents.</td>
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<tr>
<td><strong>Educational Curriculum (2.3)</strong></td>
<td>The State should develop comprehensive education curricula for public schools; and institutions of higher education should incorporate reclaimed water education into their curricula.</td>
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<td><strong>State-sponsored Media Campaign (2.4)</strong></td>
<td>The State should develop a water issues information program, including water reclamation, for radio, television, print, and other media.</td>
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<td><strong>Uniform Plumbing Code Appendix J (3.1)</strong></td>
<td>The State should revise Appendix J of the Uniform Plumbing Code, which addresses plumbing within buildings with both potable and reclaimed water systems, and adopt a version that will be enforceable in California.</td>
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<td><strong>DHS Guidance on Cross-connection Control (3.2)</strong></td>
<td>The DHS should prepare guidance that would clarify Title 22 regulations pertaining to dual plumbed systems and amend the regulations to be consistent with a California version of Appendix J.</td>
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<td><strong>Health and Safety Regulation (4.1)</strong></td>
<td>The DHS 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 reclaimed water.</td>
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<td><strong>Incidental Runoff (4.2)</strong></td>
<td>The State should investigate, within the current legal framework, alternative approaches to achieve more consistent and less burdensome regulatory mechanisms affecting incidental runoff of reclaimed water from use sites.</td>
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<td><strong>Uniform Interpretation of State Standards (4.3)</strong></td>
<td>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 SWRCB to oversee uniformity within the SWRCB and the Regional Water Quality Control Boards, which are under the jurisdiction of the SWRCB and enforce permits for water reclamation and reuse.</td>
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<tr>
<td><strong>Water Softeners (4.4)</strong></td>
<td>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.</td>
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<tr>
<td><strong>Uniform Analytical Method for Economic Analyses (5.1)</strong></td>
<td>A uniform and economically valid procedural framework should be developed to determine the economic benefits and costs of water reclamation 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 should be established for comparing incremental costs of developing reclaimed water with the cost of developing an equivalent amount through alternative measures. An advisory team should be created by the DWR, the SWRCB, and the DHS to assist these tasks.</td>
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<tr>
<td><strong>Research Funding (6.1)</strong></td>
<td>The State should expand funding sources to include sustainable State funding for research on reclaimed water issues.</td>
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<tr>
<td><strong>University Academic Program for Water Reclamation (6.2)</strong></td>
<td>The State should encourage an integrated academic program on one or more campuses for water reuse research and education, such as through State research funding.</td>
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</table>
Table 2 Summary of additional important issues and recommendations

**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.

**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.

**Project Performance Analysis (1.6)** – Resources should be provided to funding agencies to perform comprehensive analysis of the performance of existing reclaimed water projects in terms of costs and benefits and reclaimed water deliveries.

**Recycled Water Symbol Code Change (3.3)** – The Department of Housing and Community Development should submit a code change to remove the requirement to use the skull and crossbones symbol in connection with reclaimed water in sections of the California Plumbing Code.

**Stakeholder Review of Proposed Cross-connection Control Regulations (3.4)** – Stakeholders are encouraged to review DHS draft changes to State regulations pertaining to cross-connections between potable and nonpotable water systems.

**Cross-connection Risk Assessment (3.5)** – The DHS should support a thorough assessment of the risk associated with cross-connections between disinfected tertiary reclaimed 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 DHS 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 reclaimed water supply.

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

**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 Potable Reuse Committee (California Potable Reuse Committee, 1996) and other related advisory panel reports and concluded that reconvening this committee would not be worthwhile at this time.

Task Force, the consensus process had to be invoked by convening a meeting of advocates on the Task Force for each viewpoint. Considerable discussion took place to clarify the essential concerns of the health officials and negotiate a new recommendation that would address those concerns.

**Future potential reuse**

California has a population of 35 million. This is expected to increase 17 million to reach 52 million by 2030. The additional water needs to satisfy this population is estimated to be 2,200 million to 3,400 million cubic meters annually. Groundwater overdraft, an unsustainable practice, is meeting some of the current water demands and should be replaced with more reliable supplies. There are also additional needs for maintaining flows in rivers to sustain aquatic habitat. California will need to develop a variety of water sources or management techniques to meet these additional demands, including storage of surface and groundwater, seawater desalination, recovery of poor quality groundwater (e.g., brackish water desalination), water reclamation and reuse, and water conservation.

Because of limitations of water quality, technology, cost, and proximity of suitable uses for reclaimed water, it is not possible to utilize 100 percent of urban wastewater. Based on
several major regional planning studies for reuse in California, the Task Force estimated that the utilization could be increased from 10 percent to about 23 percent by 2030. The projected amount of reclaimed water that could be in use could range from 2,100 million to 2,500 million cubic meters annually, as much as 4.5 times the current reuse.

Because a portion of effluent currently discharged is indirectly reused through downstream diversions, not all new reuse will yield a net increase in the state’s water supply. By 2030 reuse could generate about 1,300 million cubic meters annually of net new water supply. This potential new water could free up enough fresh water to meet the household water demands of 30 to 50 percent of the projected 17 million additional Californians.

To achieve this potential, it will be necessary to address the many issues identified by the Task Force. Indirect potable reuse, primarily through groundwater recharge, is in the mix of potential uses of reclaimed water. Ensuring the safety and public confidence in this use will be a major task. Financing will be a major hurdle. A capital investment of between US$ 9,000 million and US$ 11,000 million will be required between now and 2030, averaging about US$ 400 million annually.

Conclusion
California’s Recycled Water Task Force addressed many important issues facing the implementation and regulation of reclaimed water use. Because the Task Force has no authority to carry out its recommendations, many state, federal, and local agencies and non-governmental organizations must take the action to fulfill the recommendations. The only authority of the Task Force was the stature of its membership and its representation of the spectrum of public and professional opinion regarding water reclamation and reuse. To achieve this authority, the Department of Water Resources and the Task Force leadership incorporated four themes: representative composition of the membership, interagency cooperation, transparency, and consensus decision-making.

The Task Force recommendations, if implemented, would significantly improve the way projects are planned, increase state and federal financial support for research and project construction, improve the regulatory framework, and ultimately, lead to implementation of a water resource that would significantly mitigate growing water demands. Unfortunately, California state government is experiencing its worst fiscal crisis in history and many local agencies are also hurting. This is not a climate to exert new initiatives as called for by the Task Force. Nevertheless, movement has begun to address the regulation of water softeners, plumbing in buildings, and runoff from sites using reclaimed water. The vigilance of constituencies outside of government or from different levels of government will be needed to maintain pressure to accomplish the Task Force recommendations.

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References


