3/20/07 BdWrshp Item 8
Water Recycling
Deadline: 3/27/07 5 pm

WATEREUSE ASSOCIATION

CALIFORNIA SECTION

March 27, 2007

Via Electronic Mail & U.S. Mail

Tam M. Doduc, Chair, and Members
State Water Resources Control Board
1001 I Street, 24th Floor
P.O. Box 100
Sacramento, CA 95812-0100

Attention: Song Her, Clerk to the Board commentletters@waterboards.ca.gov

RE: **Development of a Statewide Policy For Water Recycling**

Dear Chair Doduc and Members of the Board:

The California Section of the WateReuse Association appreciates the opportunity to provide these comments, which supplement our testimony at the March 20, 2007 workshop on the development of a statewide policy for water recycling ("Water Recycling Policy" or "Policy"). The California Section of the WateReuse Association is a non-profit organization with a mission to promote responsible stewardship of California's water resources by maximizing the safe, practical, and beneficial use of recycled water and by supporting the efforts of the national WateReuse Association.

Recycled water is a critical component of California's water supply future and a vital resource for the State's economy. In 2003, California's Recycled Water Task Force clearly identified regulatory inconsistency and overly burdensome requirements as barriers to increased water recycling in the State. Inconsistency and overly burdensome requirements place recycling at an artificial and unfair disadvantage compared to other, typically less energy efficient water sources. We believe it is time for a statewide policy that reduces needless delay and obstacles in the permitting of water recycling projects.

This letter provides an overview of several key issues relevant to development of the statewide Water Recycling Policy, and in particular, attempts to respond to questions raised by members of the State Water Resources Control Board "(State Water Board") at the March 20,

2007 workshop. The attachment provides our more detailed comments on the issues and directly responds to the questions raised in the public notice.

Best Practicable Treatment or Control

We recommend that "best practicable treatment or control" ("BPTC") be defined in the Water Recycling Policy as the use of economically feasible treatment and control technologies that most effectively prevent the introduction of pollutants into waste streams or that provide the most amount of pollutant removal from them. Economically feasible should be interpreted from a general perspective, not from a particular applicant's perspective. That is, the relevant perspective should focus on what is feasible for the majority of facilities in the applicant's industry. This is consistent with the meaning of BPTC as discussed in State Water Board Orders. BPTC for particular types of recycling projects is discussed further below.

Permitting Irrigation Projects

One of the themes that emerged from the State Water Board workshop was the concept of a tiered approach to establishing requirements in permits based upon the type of proposed recycled water use. Too often, the permitting of recycled water irrigation projects is a process fraught with excessive delay and overly stringent requirements. As a result, recycling projects to benefit the people and environment of this State and help achieve water supply goals adopted by the Legislature fail to become a reality. WateReuse believes that a statewide water recycling policy is necessary to facilitate greater use of recycled water for irrigation while adequately and appropriately managing public health and anti-degradation concerns.

With regard to public health concerns, the Policy should instruct the regional water quality control boards ("Regional Water Boards") to defer to the Title 22 criteria promulgated by the Department of Health Services ("DHS"). The Legislature delegated the task of establishing standards for recycled water to protect public health to DHS. (Wat. Code, § 13520.) Title 22 specifies the treatment levels necessary for various categories of use, including irrigation of parks, residential landscaping, playgrounds, golf courses, medians, etc.

As for application of the anti-degradation policy, the analysis is fairly straightforward, given that only *de minimis* amounts of recycled water, let alone constituents, reach aquifers as a result of irrigation at agronomic rates. Customer quality requirements will serve to ensure that constituents such as salts do not exceed reasonable levels. The Policy should specify that irrigation with recycled water that replaces potable water is presumed to be to the maximum benefit to the people of the State. BPTC for irrigation projects is defined in Title 22, and varies by the type of reuse. The Title 22 requirements for nonpotable projects should be considered

BPTC for purposes of the Policy. No additional regulation of irrigation projects is generally necessary; salts and nutrients should be managed on a watershed basis.

In those rare cases where groundwater is of sufficiently high quality that salt levels in recycled water may implicate anti-degradation concerns, we recommend that the project proponent prepare a mass balance analysis that shows the impact of the project on groundwater. If the mass balance shows that groundwater beneficial uses will not be adversely affected, the project should go forward.

Another issue of concern for permitting recycled water irrigation projects is the issue of minor amounts of runoff that may occur even where the irrigation system is designed and managed to ensure that recycled water applied remains on the irrigated areas to avoid public health and nuisance problems. As recognized by California's Recycled Water Task Force, incidental runoff or overspray of minor amounts of irrigated water at the edges of irrigated areas is difficult to prevent. As more fully described in the attachment, WateReuse recommends that the Water Recycling Policy specify that the minor amounts of runoff that occur as part of normal irrigation practices and may reach surface waters should be permitted under municipal separate storm sewer system permits.

Permitting Groundwater Recharge Projects

As in the irrigation context, the Water Recycling Policy should defer to DHS with regard to the protection of public health and groundwater recharge projects. Title 22 requires that the recycled water used for groundwater recharge must be of sufficient quality to protect public health and specifies that DHS will make recommendations on projects on a case-by-case basis. The Policy should require Regional Water Boards to base permit limits for groundwater recharge projects and the associated monitoring and reporting programs on recommendations provided by DHS. This would be in lieu of relying on the process set forth under the existing "Memorandum of Understanding between DHS and the State Water Board on the Use of Reclaimed Water."

The Policy also should define BPTC for groundwater recharge projects. As with irrigation, treatment technologies vary by the type of recharge project. For those projects that use injection wells, BPTC generally is treatment by reverse osmosis, disinfection, and the implementation of source controls. For those projects that use spreading basins, BPTC generally is oxidation, filtration, and disinfection and the implementation of source controls. DHS is currently developing recharge regulations to specifically define these requirements.

One issue raised by State Water Board Members and staff at the March 20, 2007 Workshop involved uncertainty. Specifically, the question was whether project sponsors should be required to provide financial assurance mechanisms to address contamination of groundwater

where water quality objectives change in the future and a recharge project results in exceedance of the new objectives. While this is an important issue, we do not believe that it needs to be addressed in the Water Recycling Policy. First, this issue is not limited to recycled water; this is an unknown for various activities and discharges that could impact drinking water beneficial uses. Second, for groundwater recharge projects, conditions established by the DHS and included in permits by Regional Water Boards have provisions not for financial mechanisms, but plans approved by DHS to provide an alternative source of water or to treat an affected well if the recharge has caused the well to violate drinking water standards, or if the well has been degraded by the recharge so it is not safe, or if the well does not meet the setback/retention time requirements established by DHS. This approach is adequate to address this question and therefore, does not need to be separately addressed in the Water Recycling Policy.

Toxics & Chemicals of Emerging Concern

The question of what should be done to protect the public from toxic constituents and chemicals of emerging concern ("COCs"), in the absence of approved drinking water standards, is not unique to recycling. This is an issue for drinking water in general because these chemicals have been detected in source waters globally. As analytical methods continually provide lower detection limits, which enable the detection of ultra-low levels of contaminants in trace amounts (e.g., nanograms per liter or less), more and more compounds will be found. However, the ability simply to detect a compound does not necessarily or automatically translate to health concerns.

DHS is fully aware of this issue and is addressing it in the development of groundwater recharge regulations and establishing conditions for recharge projects by using a multiple barrier approach. This approach consists of source control and industrial pretreatment, recycled water treatment for control of unregulated chemicals, blending provisions, provisions for minimum retention time of the recycled water underground, extensive monitoring, and the requirement to develop a plan for providing drinking water if a well cannot be used to serve water for drinking purposes, as discussed above. For groundwater recharge projects, DHS holds a public hearing and issues findings and conditions that address COCs and that are included in permits issued by the Regional Water Boards. Thus, there are procedures and provisions already in place to deal with the toxics issue in the absence of specific regulations and this issue should not be addressed in the Water Recycling Policy.

Relevance of the Clean Water Act

We were surprised by the references made by some commenters to concerns that the contemplated Policy might somehow conflict with the federal Clean Water Act. These comments were puzzling, given that recycled water projects are not *discharges* to surface waters but rather a *use* of water. We do not dispute that discharges of treated wastewater to surface streams will continue to be regulated under the National Pollutant Discharge Elimination System permit program. The Policy we advocate, and that we believe the State Water Board intends, will derive from the Board's authority to regulate waters of the State, including groundwater, and to issue permits for reclamation projects pursuant to the Water Code. With the exception of incidental runoff of recycled water from golf course ponds, which is discussed in the attachment to this letter, we do not believe Clean Water Act concerns are implicated in any way by the proposed Water Recycling Policy.

Thank you for your time and consideration of our comments. We look forward to working with you, your staff, and other interested parties to develop an effective and sensible statewide recycling policy. If you have any questions, please contact WateReuse's Regulatory Advocate, Roberta Larson at (916) 446-7979.

Sincerely,

Bill Jacoby

Bill Jacoby
President

BJ/jp

CALIFORNIA SECTION, WATEREUSE ASSOCIATION COMMENTS REGARDING DEVELOPMENT OF A STATEWIDE WATER RECYCLING POLICY

I. POLICY ISSUE

A. The State Water Resources Control Board Should Develop A Water Recycling Policy.

The concept of a policy to further water reuse has had a long "gestation period," and the time to develop the Water Recycling Policy (or "Policy") is now. The California Legislature adopted statewide goals for recycled water supply: 700,000 acre-feet by the year 2000 and 1,000,000 acre-feet by 2010. When recycled water provided only about 300,000 acre-feet of the State's water supply, the WateReuse Association and State Water Resources Control Board ("State Water Board") partnered to advance water recycling in the State. The 1994 Statement of Support for Water Reclamation memorializes this partnership and provides:

> Specifically, the agencies will work to overcome and reduce institutional and regulatory disincentives and funding constraints and to promote public acceptance of water reclamation. The agencies will cooperate to develop specific policies and resource commitments that will enable the State of California to meet the Legislature's water reclamation goals and help satisfy the State's overall water needs.

The passage of AB 331 in 2001 further advanced the partnership. AB 331 established California's Recycled Water Task Force to "identify and report to the Legislature on opportunities for increasing the use of recycled water ... and identify constraints and impediments including the level of State financial assistance."

In 2003, recycled water provided approximately 525,000 acre-feet of water supply – less than the Legislature's stated goal. In the same year, the Recycled Water Task Force issued a report that included two recommendations that should be considered in an updated and clarified State Water Recycling Policy. Because the recycled water supply fails to meet the Legislature's goals, it is necessary and urgent to implement these recommendations, which are:

- Recommendation 4.2: The State should investigate within the current legal framework alternative approaches to achieve consistent, less burdensome regulatory mechanisms affecting incidental runoff of recycled water from user sites; and

- Recommendation 4.3: The State should create uniform interpretation of State standards in State and local regulatory programs, taking steps to oversee uniformity within the State Water Board and the Regional Water Quality Control Boards ("Regional Water Boards").

Since 2004, WateReuse has worked with the State Water Board, Regional Water Boards, recycled water producers and suppliers, and nongovernmental organizations to develop guidance related to permitting recycled water projects in accordance with State Water Board Resolution 68-16. (See The State Water Board's draft Guidance for Implementing State Statutes, Regulations and Policies for Recycled Water Projects, November 2005 ("Draft Recycling Guidance").) While we recognize that this guidance has not been finalized, the document reflects some of the best thinking on these issues. We recommend that the State Water Board incorporate much of the content of the Draft Recycling Guidance in the Water Recycling Policy.

The State Water Board does have an existing policy on water recycling—Resolution 77-1. A revised Policy is needed to provide clarity to permit writers, remove impediments to water recycling projects, and expand the State's water supply. WateReuse encourages the State Water Board to build on Resolution 77-1 and adopt the following findings of fact in the updated Policy:

- The Governor of California made water recycling an important element of California's water supply policy;

- The State Legislature adopted a statewide goal for water recycling to provide 700,000 acre-feet per year by the year 2000, and this goal has not been met;

- The State Legislature adopted a statewide goal for water recycling to provide 1,000,000 acre-feet per year by the year 2010, and this will require a near doubling of the amount of water that currently is recycled;

- California's extensive experience with water recycling provides reliable assurances that the potential public health risks are minimal:

- The United States Congress established pollution prevention as a national objective in the Pollution Prevention Act of 1990 and the United States Environmental Protection Agency's definition of pollution prevention, pursuant to the Act, includes increased efficiency in the use of water; and

- Recycled water projects are local in nature, which minimizes the need for pumping imported water, thereby reducing greenhouse gas emissions that contribute to climate change.

II. IRRIGATION PROJECTS AND SALTS

A. The State Water Board Should Adopt A Holistic Approach To Protect Groundwater Basins In The State From The Accumulation Of Salt, Including Nitrate.

The State Water Board does not need to devise a complex regulatory scheme for irrigation projects. Minor and incidental groundwater recharge from irrigation projects

designed to apply water at agronomic rates will not significantly contribute to the accumulation of any constituent in groundwater. Groundwater protection is a regional issue best pursued with all regional stakeholders. Water recycling projects can reduce demand on groundwater basins and assist in better management by providing an alternative source of supply. Any individual water project undertaken to augment the State's water supply should not bear a disproportionate cost or responsibility for regional protection.

The Legislature provided clear guidance and mechanisms for groundwater protection. For example, Water Code section 10750 authorizes the development of local groundwater management plans. Water Code section 10780 established the Groundwater Quality Monitoring Task Force. Water Code section 13240 requires the Regional Water Boards to prepare water quality control plans.

The best way the State can protect groundwater basins is to provide adequate resources and technical leadership for basin planning and support local groundwater management activities. This should consider all basin activities and not focus just on recycled water irrigation projects unless it is clearly demonstrated that a single recycled water irrigation project will not have a significant water supply benefit and will present a unique threat to the established beneficial uses of the groundwater basin.

An example of a successful planning effort is the well-developed salt and nutrient basin-wide management plan for the Santa Ana Region. Key stakeholders participated in the plan's development, and the effort helped to promote local reuse and protect surface water and groundwater. The project was not trivial and required significant resources and time. In addition, it is critical that the new Water Recycling Policy not impinge on watershed-based management plans that effectively address salt and nitrogen issues.

B. It Is Not Necessary To Limit The Concentrate Of Salt In Recycled Water To Protect Groundwater Basins From Salt Accumulation.

Groundwater recharge from recycled water irrigation projects is, at most, incidental. Typically, the amount of salt in recycled water correlates directly to the salt in the potable water supply, which also is used for irrigation. The State Water Board's Draft Recycling Guidance provides a well-documented process to evaluate potential impacts on groundwater. The State Water Board should incorporate the approaches presented in this draft guidance into the Water Recycling Policy as follows:

- If recycled water meets the water quality objectives for the underlying groundwater basin, there should be no additional limitations or regulations applied;

- If recycled water does not meet the water quality objectives, then mass balance calculations should be conducted; and

- If assimilative capacity exists, it should be allocated to recycled water projects because of the significant water supply benefits that are provided by recycled water. These benefits can reduce competing demands on the groundwater basin.

- If assimilative capacity does not exist, permitting requirements can still be established that allow a recycling project to proceed.

C. The State Water Board Should Not Require Recycled Water Users To Prepare Nutrient Management Plans.

The Water Recycling Policy should not require recycled water users to prepare nutrient management plans. Rather, such plans should be prepared on a watershed basis and involve all stakeholders. As previously discussed, a regulatory action that allocates disproportionate costs and burdens to a single project that augments water supply is inappropriate. The Santa Ana Region engaged in a watershed-wide, stakeholder-supported effort to update salt and nitrate management plans. This effort was effective because all stakeholders were involved and the process was consensus-based.

In addition, the Water Recycling Policy should acknowledge that irrigation management helps mitigate any potential impacts from salts.

D. Groundwater Monitoring Should Not Be Required For Recycled Water Irrigation Projects.

Groundwater monitoring is unwarranted for landscape irrigation projects, which are designed to minimize incidental percolation and runoff.[1] Requiring groundwater monitoring, particularly if it involves construction of new monitoring wells, will render many potential and existing projects uneconomical and disproportionately impact smaller communities with more limited budgets and resources. Irrigation projects are typically the simplest type of recycled water use and must remain so to meet State water recycling goals.

The mass balance approach described in the Draft Recycling Guidance document is sufficient to protect beneficial uses of groundwater without overly burdening irrigation projects. The approach is not complex, as the data tend to be readily available and include a large margin of safety. Attached as appendices to these comments are examples of salt balances that demonstrate the viability and straightforward nature of the mass balance approach. However, in some cases, especially where recycled water quality exceeds the water quality objective and there is no assimilative capacity, limited or focused groundwater monitoring may be necessary. These decisions should be made at the regional level.

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[1] With regard to groundwater monitoring, the Water Recycling Policy should distinguish between landscape irrigation projects and large regional agricultural irrigation projects. As discussed herein, groundwater monitoring is not necessary for the former. However, for some large agricultural projects, combinations of crop management and groundwater monitoring may be warranted to ensure protection of groundwater. Specific monitoring requirements should be developed based on site-specific conditions.

III. GROUNDWATER RECHARGE REUSE PROJECTS

A. The State Water Board Has Already Determined The Requirements To Be Placed On Groundwater Injection Projects To Address Toxic Constituents.

Last year, the State Water Board issued a precedential Order for the Alamitos Barrier indirect potable reuse project. (Order No. 2006-0001.) The Order concluded that "[b]ased on the policies favoring reclamation and reuse of water, it was inappropriate for the Los Angeles Regional Water Board to include DHS' [Department of Health Services] notification levels as effluent limitations in the water reclamation and waste discharge requirements for the Alamitos Barrier Recycled Water Project." (Order No. 2006-0001 at p. 7, emphasis added.) The Order also included important findings applicable to both injection and surface-spreading projects:

- Effluent limitations can be based on criteria that have not been adopted as water quality standards so long as appropriate findings are made;

- Notification levels are likely to change over time; such a "moving target" poses practical problems if used as an effluent limitation;

- Regional Water Boards should follow DHS' recommendations on the appropriate use of notification levels; DHS has not recommended the use of notification levels for limitations in permits issued for indirect potable reuse projects; and

- Injected water is subject to extensive treatment, blended with imported water, and must meet all drinking water requirements prior to being pumped up and served to customers.

(Order No. 2006-0001 at pp. 4-7.)

Consistent with the Alamitos Barrier Order, the Water Recycling Policy should more precisely define the roles of the Regional Water Boards and DHS as related to the establishment of permit limits and monitoring programs for indirect potable reuse projects that serve to protect the public against toxic constituents. The Policy should require Regional Water Boards to base permit limits for groundwater recharge projects and their monitoring and reporting programs on recommendations provided by DHS rather than relying on "consultations" as allowed under the existing "Memorandum of Understanding between DHS and the State Water Board on the Use of Reclaimed Water." This would ensure the direct inclusion of appropriate health-based limits and monitoring requirements in permits.

Consistent with DHS positions, the Water Recycling Policy should clarify this issue by:

- Defining a "no-significant threat" threshold for potable reuse projects that can be established above the *de minimis* or negligible risk of 10^{-6} up to 10^{-4} to be consistent with drinking water programs and legislative intent; and

- Addressing appropriate points of compliance for potable reuse projects that authorize the application of attenuation, dilution, and mixing where appropriate.

IV. IMPOUNDMENTS

A. "Standard" Requirements Are Not Appropriate For Recycled Water Impoundments.

WateReuse does not believe that "standard" requirements are appropriate for recycled water impoundments. We recommend that the Water Recycling Policy:

- Clarify that when recycled water stored in an impoundment meets groundwater quality objectives, no additional regulation is necessary;

- Clarify that it is appropriate to allocate existing assimilative capacity to recycled water projects, including impoundments;

- Clarify that when local soil conditions (e.g., tight clays) provide a barrier between the stored recycled water and groundwater, no additional regulation is necessary; and

V. ANTI-DEGRADATION POLICY

A. The State Water Board Should Not Modify Resolution 68-16, The "Anti-Degradation Policy."

It is not necessary to modify the State Anti-Degradation Policy, as it has broad applicability to various activities throughout the State and has been functioning well for nearly forty years. Rather, the best approach to encourage water recycling and address associated issues is to provide definitions of key concepts contained in Resolution 68-16 as they apply to water recycling projects in the Water Recycling Policy.

B. The Water Recycling Policy Should Define "Maximum Benefit To The People Of The State" And What Constitutes "Best Practical Treatment or Control" For Water Recycling Projects.

The Water Recycling Policy should define "maximum benefit" and "best practicable treatment or control" in the context of different recycling applications (irrigation, indirect recharge, injection, etc.) There currently is no clear understanding as to how regulators and project sponsors should define and apply these concepts to interpret the State Anti-

Degradation Policy for recycling projects. Further, the Water Recycling Policy should address the allocation of assimilative capacity for recycling projects.

1. Maximum Benefit

Recycled water is a critical element of the State's water resources program, and thus this overriding principle must be factored into the definition of "maximum benefit." The Water Recycling Policy should specify that when evaluating the maximum benefit to the people of the State, the benefit should be compared to the alternative of not approving the recycled water project. For example, if a water recycling project is not approved, the alternative may be to discharge treated water into the ocean, which would make it necessary to deplete fresh water supply for irrigation.

In addition, there would be a monetary cost for the use of fresh water in lieu of recycled water. There also would be an environmental cost to develop the fresh water supply, such as construction of storage facilities or increasing diversions of fresh water supplies from the Sacramento/San Joaquin Delta and other surface waters where beneficial uses are impaired because of diversion-related reduced flows. Another environmental cost relates to the use of energy where the fresh water must be transported a long distance to the end user while the recycled water is locally available. Indeed, water recycling is the most energy efficient water supply in Southern California. Pumping water from the Delta through the State Water Project ("SWP") is six times more energy intensive than recycling (3000 kwhr/AF SWP vs. 500 kwhr/AF recycling projects). In many cases, the additional water supply provided by a water recycling project will outweigh any degradation in the groundwater supply. This would not be the case, of course, if the impact on groundwater would be so significant as to impair beneficial uses.

2. Best Practicable Treatment or Control

The State Water Board should define "best practicable treatment or control" or "BPTC" as "the use of economically feasible treatment and control technologies that most effectively prevent the introduction of pollutants into waste streams or that provide the most amount of pollutant removal from them." The State and Regional Water Boards should interpret "economically feasible" from a general perspective, not from a particular applicant's perspective. That is, the relevant perspective should focus on what is feasible for the majority of facilities in the applicant's industry. This is consistent with the meaning of BPTC as discussed in State Water Board Orders, such as WQ 81-5, 82-5, and 90-6.

Irrigation projects: BPTC for irrigation projects is defined in Title 22, and varies by the type of reuse. The Title 22 requirements for nonpotable projects should be considered BPTC for purposes of the Policy.

Groundwater recharge projects: For groundwater recharge projects that use injection wells, BPTC generally is treatment by reverse osmosis and the implementation of source controls. For those projects that use spreading basins,

BPTC generally is oxidation, filtration, and disinfection and the implementation of source controls.

Because of overly conservative interpretations of the State Anti-Degradation Policy, there is a real possibility that some Regional Water Boards may define BPTC for potable and non-potable recycling projects as the application of end-of-pipe advanced treatment using membranes (i.e., microfiltration/reverse osmosis). This should not occur because it is not required in all applications to meet the requirements imposed by DHS and there are potentially significant environmental impacts associated with this technology. Such environmental impacts include, but are not necessarily limited to:

- Increased energy usage compared with normal wastewater treatment plant operations;

- Brine disposal, since approximately fifteen percent (15%) of the quantity of wastewater treated using advanced treatment becomes brine, which presents significant disposal issues and costs;

- Increased generation of hazardous waste depending on the brine disposal alternative selected; and

- Air emissions associated with energy usage to operate advanced treatment facilities or trucks that transport brine.

3. Assimilative Capacity

The Water Recycling Policy should direct the Regional Water Boards to give priority to the allocation of assimilative capacity to recycling projects to encourage and promote their implementation. Assimilative capacity is the amount of a contaminant that can be discharged to a specific water body without exceeding water quality standards or criteria. In the groundwater context, this would be the difference between the background concentration of a contaminant and a water quality objective.

When assessing permit limits for a recycling project, the Regional Water Board may consider the available assimilative capacity of the groundwater basin. However, pursuant to Water Code section 13263(b), the Regional Water Board is not obligated to authorize the utilization of the assimilative capacity of the groundwater. When a Regional Water Board denies the use of assimilative capacity, the result can be overly stringent permit requirements that impact control measures needed for project approval. Accordingly, the approach can discourage implementation of recycled water projects or result in situations where such projects are not allowed to proceed. The State Water Board can alleviate this problem by giving priority to the allocation of assimilative capacity to recycling projects in the Water Recycling Policy.

VI. AGENCY COORDINATION

A. The State Water Board Has Already Appropriately Decided To Defer To Regulations Of The Department Of Health Services On Issues That Pertain To Groundwater Recharge Reuse Projects.

In the Alamitos Barrier decision (State Water Board Order No. 2006-0001), the State Water Board decided to defer to DHS regulations on issues that pertain to groundwater recharge reuse projects. The State Water Board concluded, consistent with statute, that DHS is the appropriate authority for requirements associated with the protection of public health. (Order No. 2006-0001; see Wat. Code, § 13521.)

The Regional Water Boards should not "second-guess" DHS with regard to establishing limitations or monitoring requirements for human-health related constituents. The Water Recycling Policy should direct the Regional Water Boards to defer to DHS on requirements for human-health based criteria.

VII. AQUIFER STORAGE AND RECOVERY PROJECTS

A. Aquifer Storage And Recovery Projects Present Different Challenges And Therefore Should Be Addressed Separately From Recycled Water.

It is true that the use of potable or raw water for aquifer storage and recovery projects ("ASR projects") and the use of recycled water for groundwater recharge projects may present similar issues. However, the differences are significant enough that the Water Recycling Policy should not cover ASR projects. For example, water quality differs between raw water that received no treatment, treated potable water that generally is filtered and disinfected, and recycled water that is treated with microfiltration, reverse osmosis, and disinfection. Further, ASR projects implicate a different regulatory structure and approach as well as numerous additional stakeholders, some of which are not involved in water recycling.

If the State Water Board decides to provide guidance on ASR project regulation, it should do so in a separate policy. In 2003, the Recycled Water Task Force identified the critical components of a Water Recycling Policy, and the Policy has been discussed and under development since 2004. Including ASR projects in the Water Recycling Policy may unnecessarily increase its complexity by introducing concerns unrelated to recycled water quality and thus further delaying the Policy's development. Delay is unacceptable given the documented need to bring additional recycled water to the State's supply portfolio.

VIII. INCIDENTAL RUNOFF OF RECYCLED WATER

A. The Water Recycling Policy Should Address The Reasonable Regulation Of Incidental Runoff Of Recycled Water.

Although the State Water Board did not specifically solicit comment on the issue, WateReuse believes it is critical that any updated Water Recycling Policy address reasonable regulation of incidental runoff of recycled water. Minor amounts of irrigation water, such as overspray or runoff associated with normal sprinkler use, do not present a water quality threat, and over regulation of these unavoidable occurrences is unacceptable. At section 4.2 of their 2003 report, the Recycled Water Task Force explained:

> 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 [Regional Water Boards], 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 [Regional Water Boards] strictly enforce the runoff prohibitions, resulting in the need for expensive design provisions or preventing the feasibility of using recycled water.

To address this, WateReuse recommends that the Policy specify that incidental amounts of recycled water runoff from urban irrigation projects be considered "irrigation water," and that as such, incidental runoff is an illicit non-stormwater discharge that is not a significant contributor of pollutants to a municipal separate storm sewer system, and therefore covered by the municipal separate storm sewer system ("MS4") permit.

Recycled water stored in golf course ponds presents a slightly greater challenge, given that the volumes of water that can be released from the ponds is greater than that associated with irrigation. To address golf course ponds, WateReuse recommends that the Water Recycling Policy incorporate aspects of the February 24, 2004 memorandum from Celeste Cantú, Executive Director of the State Water Board, to the Regional Water Board Executive Officers regarding Incidental Runoff of Recycled Water. Specifically, the Water Recycling Policy should provide two options in the context of golf courses:

(1) Allow recycled water ponds to be designed not to spill during wet months; or

(2) Allow recycled water ponds to be drained and refilled with potable water or flushed with potable water prior to the onset of the wet season. If this operational strategy is implemented, the de minimis

amounts of recycled water that may be included in any overflows that occur during storm events should also be considered illicit non-stormwater discharges of irrigation water under the MS4 permit.

Appendix A

Example of a Salt Balance for an Irrigated Field

To estimate the concentration of salts in the percolate from an irrigated field, a water balance and a salt balance may be prepared. For this example water balance, the inputs to the water balance are the applied irrigation water and precipitation. The outputs are evapotranspiration, runoff, moisture in grass clippings, and percolation. The amount of percolation to groundwater, therefore, is the applied irrigation water plus precipitation minus evapotranspiration, runoff, and moisture in grass clippings. These amounts were estimated primarily by using local meteorological data.

For the salt balance, the inputs are salts in irrigation water, salts in precipitation, and salts in fertilizers applied to the field. The outputs are salts in runoff, salts in grass clippings removed from the field, salts lost through denitrification, and salts in the percolate. The amount of salt in the percolate, therefore, is the salt in irrigation water, plus the salt in the fertilizers minus the salts in runoff, salts in grass clippings, and salts lost through denitrification.

Once the water and salt balances were completed, the concentration of salt in the percolate was calculated. It is the mass of salt in the percolate divided by its volume. The following table shows the example salt balance.

Water Balance (100 Acre Irrigation site)								
Input	**Feet**	**MG/yr**		**Output**	**Feet**	**MG/yr**		**Mg/yr**
Rain	1.50	48.9		Evapotranspiration	4.00	130.3		
Recycled Water	4.00	130.3		Runoff (20% of rain)		9.8		
				Clippings		0.3		
Total	5.50	179.2				140.4	Percolation (Water)	**38.8**

Salt Balance (100 acre irrigation site)								
Inputs	**mg/l**	**lbs/yr**		**Losses**	**mg/l**	**lbs/yr**		**lbs/yr**
Rain	5	2,038.06		Denitrification		7,000.0		
Recycled Water	650	706,527.17		Clippings		24,000.0		
Fertilizer		24,000.00		Runoff	200	12,676.8		
Total		732,565.23				43,676.8	Percola-tion (Salt)	**688,889**

For this example, the percolate concentration is:
688,889 lbs/(38.8 million gallons * 8.34 lbs/gallon) =2128 mg/l

The concentration of dissolved solid in the recycled water was 650 mg/l.

Appendix B

Examples of Basin-wide Mass Balance Analyses for Irrigation Projects

In the example shown in Table 1, the flow-weighted average inflow total dissolved solids (TDS) concentration is 588 mg/L with and without the project, because the recycled water project supplies only 500 acre-feet per year out of a total inflow of 120,000 acre-feet per year (AFY).

Table 1
Hydrologic and Salt Inflow Summary for the Chino Basin North
Without and With Recycled Water
Year 2001

Inflow Component	With No Recycled Water Recharge				With Recycled Water Recharge			
		TDS				TDS		
	Volume (afy)	Conc. (mg/L)	Mass (tons)	% of Inflow	Volume (afy)	Conc. (mg/L)	Mass (tons)	% of Inflow
Deep Percolation of Precipitation	57,421	100	7,812	8%	57,421	100	7,812	8%
Deep Percolation of Applied Water from Dairies and Agriculture	6,763	3,546	32,630	34%	6,763	3,546	32,630	34%
Deep Percolation of Applied Water from All Other Sources	27,245	1,264	46,839	49%	27,245	1,264	46,839	49%
Santa Ana River Stormflow Recharge	5,600	100	762	1%	5,600	100	762	1%
Imported Water Replenishment	6,500	290	2,565	3%	6,500	290	2,565	3%
Recycled Water Replenishment	0	487	0	0%	500	487	331	0%
Subsurface Inflow	16,410	240	5,358	5%	16,410	240	5,358	6%
Subtotal	119,939	588	95,966	100%	120,439	588	96,297	

Note: afy = acre-feet per year
Reference: Excerpt from table in letter dated April 19, 2002 from Chino Basin Watermaster to Executive Officer, Santa Ana Regional Water Quality Control Board

In the Table 1 example, it was assumed that, over the long-term, water inflow to the basin will generally match water outflow. Over a period of decades or longer, if water inflow does not generally match outflow, either overdraft or overfilling will occur. Neither overdraft nor overfilling is sustainable on a long-term basis. In any particular year, water inflow may exceed outflow, but over the long term, they will generally balance. For basins or sub-areas where inflow generally equals outflow, the primary value that needs to be determined and used in the salt impact evaluation is the average flow-weighted inflow concentration. If the average flow-weighted inflow concentration is less than the water quality objective, this provides evidence that the basin or sub-area will comply with the water quality objective.

If groundwater flows out of the basin or sub-area to downstream areas, the analysis should demonstrate that outflow to downstream areas will not negatively impact beneficial uses or cause exceedances of water quality objectives in downstream areas.

This approach does not account for the TDS of water produced or pumped from a groundwater basin that may be used within the basin. In some cases, an evaluation will need to account for recirculation of salt within a basin.

Depending upon local conditions, alternative approaches may be used to assess potential salt impacts. The approach presented in Table 1 is not the only acceptable approach. For example, an alternative approach is to calculate the flow-weighted average concentration based on available information regarding inflows to a basin. Table 2 shows an example of an approach used to evaluate recycled water use in the San Fernando Basin (SFB).

The purpose of the SFB analysis was to assess the effects of replacing 10,000 AFY of imported water used for irrigation with 10,000 AFY of recycled water. The SFB is an adjudicated basin operated so that, over time, the water recharging the basin balances the water leaving the basin. In addition, recirculation of water in the basin in minimal. For the SFB, the amount of water estimated to reach groundwater from delivered imported water sources, water spread in spreading grounds, and rainfalls are reported on a regular basis.

Under average management of the SFB, 300,000 AFY of imported water is delivered to the SFB for all uses including inside uses (industrial, commercial, and domestic) and outside uses (public, commercial, and residential irrigation). Of this water, approximately 63,000 AFY recharges groundwater after being used primarily for irrigation. For the with recycled water analysis, the recharge by imported water was reduced to 53,000 AFY, and the difference was replaced with 10,000 AFY of recycled water.

The imported water delivered to the San Fernando Valley (referred to as "delivered return water") is a blend of water from the Los Angeles Aqueduct and the Metropolitan Water District (MWD). For this analysis, a typical blend of 50% LA Aqueduct water and 50% MWD water was assumed. Data for chloride and TDS concentrations in water imported from October 1, 1990 through September 30, 2002 was reviewed. The average chloride concentration for water purchased from MWD was 68.7 mg/l. For water from the Los Angeles Aqueduct, the average chloride concentration was 26.5 mg/l. For TDS, the average concentrations were 341.4 mg/l for MWD water and 195.5 mg/l for Los Angeles Aqueduct water. A blend of 50 percent MWD and 50 percent Los Angeles Aqueduct water results in an average imported water chloride concentration of 48 mg/l and an average TDS concentration of 268 mg/l.

Table 2
San Fernando Basin Salt Loading Calculation

SALT LOADING CALCULATION UNDER Current Conditions

Sources of recharge	Quantity (annual average) AFY	Concentration			Recharge concentration contribution	
		Chloride mg/L	TDS mg/L		Chloride mg/L	TDS mg/L
Recycled Water	0	190	605		0.00	0.00
Return Water, LA and Burbank (residential use, golf course irrigation, etc.)	63,000	48	268		28.66	160.04
Spreading Grounds	26,000	6.2	150		1.53	36.97
Rainfall on Valley Floor	12,500	6.2	150		0.73	17.77
Hill and Mountains	4,000	9.8	269		0.37	10.20
Total Recharge	**105,500**				**31**	**225**

Salt Loading Calculation with 10,000 AFY Recycled Water

Sources of recharge	Quantity (annual average) AFY	Concentration			Recharge Concentration Contribution	
		Chloride mg/l	TDS mg/l		Chloride mg/l	TDS mg/l
Recycled Water	10,000	190	605		18.01	57.35
Return Water, LA and Burbank (residential use, golf course irrigation, etc.)	53,000	48	268		24.11	134.64
Spreading Grounds	26,000	6.2	150		1.53	36.97
Rainfall on Valley Floor	12,500	6.2	150		0.73	17.77
Hill and Mountains	4,000	9.8	269		0.37	10.20
Total Recharge	**105,500**				**45**	**257**

The SFB salt loading calculations show that, under average conditions, the concentration of chloride in the total recharge is 31 mg/l, and for TDS it is 225 mg/l. When 10,000 AFY of imported water is replaced with 10,000 AFY of recycled water, the average concentration of chloride in the total recharge increases to 45 mg/l, and the average concentration of TDS increases to 257 mg/l. These calculations show that, over a long term, recycled water use will not cause chloride and TDS concentrations in the SFB to exceed basin plan objectives.

Because of limited available data, the calculations do not consider some factors that may affect the concentrations of chloride and TDS in the total recharge. Factors that could increase the concentrations in both analyses include the effects of evapotranspiration and the use of fertilizers. Factors that could decrease the concentrations in both analyses include the limited recharge and percolation of salt to groundwater because of clay, which underlies areas of the basin, and the accumulation of salt in soil, which prevents it from reaching the groundwater.