



Testimony

***The Importance of Alternative Water Supplies in
The 21st Century***

Submitted to:

**Honorable Ken Calvert
Chairman
Subcommittee on Water & Power
Committee on Resources
U.S. House of Representatives**

Presented by:

**Mr. Richard Atwater
Chief Executive Officer
Inland Empire Utilities Agency
On behalf of the
WaterReuse Association**

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Introduction

Mr. Chairman and members of the Subcommittee, the WateReuse Association is pleased to have the opportunity to present this testimony on the importance and role of alternative water supplies – especially water reuse and desalination – in ensuring an adequate water supply for the nation in the 21st century. I am Richard Atwater, Chairman of the WateReuse Association's National Legislative Committee, and I am representing the Association today.

As a way of introduction, the WateReuse Association (WateReuse) is a non-profit organization whose mission is to advance the beneficial and efficient use of water resources through education, sound science, and technology using reclamation, recycling, reuse, and desalination for the benefit of our members, the public, and the environment. Across the United States and the world, communities are facing water supply challenges due to increasing demand, drought, and dependence on a single source of supply. WateReuse addresses these challenges by working with local agencies to implement water reuse and desalination projects that resolve water resource issues and create value for communities. The vision of WateReuse is to be the leading voice for reclamation, recycling, reuse, and desalination in the development and utilization of new sources of high quality water.

I am also Chief Executive Officer of Inland Empire Utilities Agency (IEUA), located in Chino, California, where through conservation and reuse we have reduced our potable water demand by 20% using innovative technologies to reuse our water supplies through desalting and recycling. IEUA is a municipal water district that distributes imported water from the Metropolitan Water District of Southern California and provides municipal/industrial wastewater collection and treatment services to more than 700,000 people within a 242 square mile area in the western portion of San Bernardino County.

The IEUA service area population is expected to double during the next 20 years. About 7000 new homes each year are built in the IEUA service area. To plan for future growth, we have developed an integrated water resources plan that will develop 75,000 acre-feet of new recycled water, desalination of over 50,000 acre-feet of brackish groundwater supplies, and conjunctive use storage with the Metropolitan Water District of 150,000 acre-feet in the Chino groundwater basin. This will be the primary new supplies to meet the rapidly growing needs of the Inland Empire region of southern California. Inland Empire is not depending on new imported supplies from the Colorado River or northern California through the CALFED Bay-Delta Program to meet our future water supply needs.

On behalf of the Association's Board of Directors, I want to commend you, Mr. Chairman, for convening this hearing. The hearing is especially timely, given the increasing number of challenges facing local agencies in their continuing quest to ensure adequate water supplies in the future. I understand that you would like our thoughts on H.R. 3834, the Desalination Energy Assistance Act of 2004. WateReuse is pleased to provide its views. We would also like to expand beyond H.R. 3834 and recommend ways to enhance the bill's ability to address the nation's future water supply needs. Clearly if the U.S. is to address its future water supply needs in an effective manner, we must enact legislation that takes a comprehensive approach.

The WateReuse Association and its Current Legislative Agenda

The Association assists its members in implementing projects that solve water supply challenges for local communities by:

- **Sponsoring research** that advances the science of water reuse and desalination and supports the Association's commitment to providing high-quality water, protecting public health, and improving the environment;
- **Reaching out to members**, the public, and local leaders and officials with information that communicates the value and benefits of water reuse and desalination; and
- **Encouraging more Federal and State support** for water reuse and desalination, including funding for scientific research and implementation of local projects.

The Association's membership is growing rapidly as more communities around the nation recognize the need to reuse water and develop alternative supplies. WateReuse now has more than 300 members nationwide, including more than 140 local water and wastewater agencies. One of the reasons the Association has been effective is due to its diverse membership, which, in addition to local agencies, includes state and Federal government agencies, consultants, equipment suppliers, and researchers.

WateReuse's current legislative agenda at the national level consists of three issues:

- Advocating the establishment of a government-wide task force in the Council on Environmental Quality (CEQ) to conduct an inventory of water reuse activities in Federal agencies and identify opportunities for increased collaboration and coordination of reuse and desalination related programs;

- Continuing to obtain Federal support for the growing, increasingly robust and productive research program of the WaterReuse Foundation and obtaining increased Federal funding to assist local water reuse projects needing financial assistance; and
- Advocating a strong Federal role in including reuse, desalination, and alternative water supplies in the solution of the nation's water needs.

The Association has developed a successful cost-shared research program with the U.S. Bureau of Reclamation (USBR) and other research organizations through its WaterReuse Foundation. We are especially grateful for your leadership and support of this priority over the past several years. The Foundation is engaged in conducting "leading edge" applied research on important and timely issues, including: 1) evaluating methods for managing salinity, including the disposal of concentrates from membrane treatment systems; 2) working cooperatively with USBR, Sandia Laboratories, the AWWA Research Foundation, and other organizations to implement the *Desalination and Water Purification Roadmap* developed in 2003 by Sandia and USBR; 3) evaluating ways to advance public acceptance of indirect potable reuse; 4) understanding the occurrence and fate of emerging contaminants, such as endocrine disrupting compounds, in conventional and advanced water recycling systems; and 5) gaining a better understanding of water quality changes that might occur in aquifer storage and recovery (ASR).

Although much research has already been conducted regarding the safety of water reuse, new contaminants and concerns emerge as analytical capabilities advance. Often a "pollutant de jour" is discovered in water or wastewater before the science explaining its significance is completed. Thus, our research efforts related to water reuse must keep up with the latest science so that we can continue to demonstrate to the public that reclaimed water is chemically and microbiologically safe – and the only way to accomplish that worthwhile goal is through research. I have attached a listing of the research projects currently being sponsored by the Foundation for the Subcommittee's review and use (see Appendix A). These projects represent research that is jointly sponsored by those organizations that must deliver the new water supplies that reuse and desalination promise.

On the issue of Federal funding for local water reuse projects, the Association has a long-standing and productive working relationship with the USBR and its Title XVI program. The Title XVI program has benefited many communities in the West by providing grant funds that made these projects more affordable. The Federal cost share – although a relatively small portion of the overall project cost – often makes the

difference in determining whether a project qualifies for financing. We strongly support the continuation of Title XVI funding. Unfortunately, communities in the East do not qualify for Title XVI funds. Hence, WaterReuse also supports the establishment of a national competitive grants program that would provide Federal grant funding for which communities in all 50 states would be eligible. As the Subcommittee considers H.R. 3834 we believe that strong consideration be given to establishing such a policy option. Such a policy commitment would mean that the nation would have in place the means to respond to the demands placed on current limited potable supplies and would address municipal, industrial and commercial demands as well as natural resources needs.

For the past two years, the Association has advocated the establishment of a task force within the Council on Environmental Quality for the purpose of conducting an inventory of water reuse programs in the Federal government. One key result of this inventory would be to identify opportunities for: a) Federal agencies to work together on water reuse and desalination; and b) increasing water reuse and desalination within the Federal government. We see this as an exercise in good government, which could produce substantial benefits at little cost.

Water Scarcity is a National Issue

A growing body of evidence suggests that the nation will experience a water crisis by the year 2025. Some of the reasons are as follows:

- Populations are growing rapidly in states all around the Sunbelt;
- There are no available sources of new water supplies in many geographic areas;
- While supplies are relatively static, demand is steadily increasing;
- Drought events, such as the current one in the West that is estimated to be the worst on record for the past 500 years, is debilitating and eliminating available sources; and
- Loss of potable water supplies due to manmade and natural contamination.

A U.S. Census Bureau projection predicts that the U.S. population will double by 2100 using moderate fertility, immigration and longevity assumptions. The same projections quadruple using aggressive assumptions. State estimates support these projections. California's population is growing at a rate of 700,000 per year, which means that the state's population will reach 50 million by 2020. Florida's population will increase from 14.2 million to 20 million by 2020. The population of Texas is increasing by 3000 people per day and is expected to increase from its current level of 20 million to approximately 37.5 million by 2020.

Long-term water projections in states such as Texas show that demand will exceed supply by the year 2020. Major rivers in the West such as the Colorado and Rio Grande have allocations today that greatly exceed supply. The only dependable, controllable, and reliable supplies of water in several fast growing cities such as Phoenix, Tucson, and El Paso are recycled water or desalination of brackish ground waters. Las Vegas, Phoenix, Tucson, and Southern California depend heavily on water imported from the Colorado River to satisfy growing demands; these fast growing areas are exploring various options, including water reuse and desalination, to keep up with demand. These hard facts suggest, as many knowledgeable observers routinely predict, that the U.S. will be facing a population-based water crisis, perhaps as early as 2020.

The importance of conservation and use of alternative sources to address future water needs is a national issue. Even in water-rich Florida, where the state receives an average of 44-54 inches of rainfall per year, water managers are heavily engaged in developing “non-traditional” or “alternative water supplies” such as water reuse and desalination. In fact, Florida leads the nation in water reuse with 584 mgd. They are also operating the nation’s largest desalination facility for drinking water in Tampa Bay, developed using a novel financing approach.

Because water scarcity is an issue that is national in scope and because the nation will most likely be facing a water crisis in a 2020-2025 time frame, it is important that the Federal government adopt a leadership role in the development and management of future water supplies.

The focus of my remarks today will be on alternative water supplies and their growing importance as essential tools that every water utility manager should have at their disposal as we endeavor to find ways to ensure adequate future supplies. All readily available sources of water are already being accessed and utilized. Future supplies will come from “alternative water supplies” such as water reuse and desalination. Cost-effective storage solutions such as aquifer storage and recovery (ASR) must be developed. ASR is beginning to be used in California and is rapidly expanding in Florida as a way of storing excess water in wet seasons for later use during dry periods. This innovative storage technique is actually the cornerstone of the restoration of the Everglades. A total of 330 ASR wells will be installed in south Florida as a means of storing excess wet weather flows for withdrawal and use during dry periods. Finally, we must all become increasingly engaged in water use efficiency (or water conservation). Many municipalities, including IEUA, Pinellas County (FL), El Paso, and others have extensive public education programs to educate and inform the public about the value and necessity of water conservation and reuse. A number of

municipalities are using less total water today than they were 10 to 20 years ago in spite of growth.

Alternative Water Supplies and Their Importance

Historically local water agencies could augment available water supplies by drilling a new well field, increasing withdrawals from nearby rivers, or purchasing water from a wholesale agency. Those options are becoming increasingly unavailable. Local water agencies – even in the water-rich East – must consider alternatives such as water reuse, desalination, and inter-basin transfer to meet the demands of growth.

One statement heard often these days in meetings of water professionals is that water reuse and desalination are “two essential tools in the demand management toolkit of the water utility manager of the 21st century.” The two are not competing alternatives, but are complementary and necessary elements in a long-term water supply plan.

Water reuse and desalination actually have much in common. Both involve taking an impaired source of water and utilizing advanced water treatment technologies to remove the impurities. The technology of choice for developing water reuse for high water quality applications and desalination is often the same, namely membranes. When using reverse osmosis membrane technology to remove solids and other impurities, both water reuse and desalination confront a similar set of challenges: 1) reducing the concentrations of total dissolved solids, organic chemicals, and inorganic chemicals to extremely low levels; 2) accomplishing this task as inexpensively as other competing alternatives; and 3) disposing of the brine concentrate generated during the removal process.

Water Reuse

The practice of reclaiming and reusing water in the U.S. is a large and growing industry. An estimated 2.6 billion gallons per day (bgd) is reused daily in the U.S. This is but a small fraction (7.45%) of the total volume of wastewater generated – 34.9 billion gallons per day – according to EPA’s 2000 Clean Water Needs Survey. Hence, the future potential for reclaiming treated wastewater is enormous.

There is a long history of water reuse throughout the country, encompassing a wide variety of applications including landscape and agricultural irrigation, industrial processing, power plant cooling, and groundwater replenishment. There are numerous examples of water reuse success stories, dating from the 1950s. Some of the best known facilities and programs are described in a new publication recently developed by

the Association entitled *Innovative Applications in Water Reuse: Ten Case Studies*. We have attached a copy of this publication as part of our testimony.

Water reuse represents a viable, long-term solution to the challenges presented by growing municipal, industrial, and agricultural demands for water. Reclaimed water has numerous benefits, including the following:

- a sustainable alternative supply of water;
- can use less energy than importing water;
- provides local control;
- avoids construction impacts of new supply development; and
- reduces the quantity of treated wastewater discharged to sensitive or impaired surface waters.

Desalination

Desalination, like water reuse, has enormous potential. Desalination is one method of reusing water by removing salts (or salinity) to meet purification standards for the intended use. On a global basis, the practice of desalination is growing rapidly. According to the International Desalination Association (IDA), there are 15,000 desalting units globally with installed capacity of six billion gallons per day (bgd). Twenty-five percent of this capacity has been added in the past two years. IDA projects that an additional three billion gallons per day capacity will be added in the next two years.

In early 2003, Sandia Laboratories and the U.S. Bureau of Reclamation, carrying out a directive from the Congress, completed a report entitled *Desalination and Water Purification Technology Roadmap*. The *Technology Roadmap* identifies areas of research necessary to develop cost-effective technological “tools” that can be used to help solve the nation’s water supply challenges. According to the *Technology Roadmap*, “the Achilles Heel” of...desalination technologies...is cost – they are currently expensive to purchase and operate.” Costs have limited the application of desalination to regions that a) have no choice but to employ them and b) can afford them.

The new Tampa Bay desalination facility, with a capacity of 25 mgd, is the nation’s largest facility for drinking water and is an excellent example of the potential for desalination. The Metropolitan Water District of Southern California also has plans for a new desalination facility. The Marina Coast Water District in northern California also has a desalination plant. Others are being planned in both southern and northern California and in Texas.

According to the *Technology Roadmap*, “by 2020, desalination and water purification technologies will contribute significantly to ensuring a safe, sustainable, affordable, and adequate water supply for the United States.” For this to happen, however, a substantial research investment will be needed to find a way to reduce the capital and operating costs. Although desalination has several advantages (not the least of which is a stable, unlimited supply in coastal regions), it will always have two huge technical challenges: 1) removal of as much as 35,000 milligrams per liter (i.e., 3.5% by volume) of salt and other impurities; and 2) disposal of the brine concentrate that is a by-product of the treatment process. The WaterReuse Foundation, working in conjunction with the U.S. Bureau of Reclamation and other research foundations through the Joint Water Reuse & Desalination Task Force (JWR&DTF), is heavily engaged in conducting research on innovative, cost-effective methods of concentrate disposal.

Aquifer Storage and Recovery (ASR)

Many water purveyors in Florida, Texas, California, Arizona, and several other states have turned to aquifer storage and recovery (ASR) as an alternative water supply source. The most prevalent practice is to use ASR as a means of storing treated drinking water. In recent years, however, increasing attention has focused on the potential for storage of reclaimed water, which is often the most reliable source of “new” water available.

In ASR, either treated or reclaimed water is injected into an aquifer storage zone, which is typically several hundred feet in depth. Water typically is injected during wet weather periods or when excess water is available and then is withdrawn for use during dry weather periods. ASR thus allows a balancing of supply and demand to minimize the impacts of seasonal weather patterns. ASR is a viable and proven water resource management tool. ASR can be used to accomplish the following objectives:

- seasonal and long-term water storage;
- emergency water storage;
- help maintain minimum flows and levels;
- help control salt water intrusion;
- aquifer recharge and conveyance; and
- help to reduce costs of water management and facilities expansion.

The long-term vision for ASR is that aquifers will be used for the storage of drinking water, reclaimed water, stormwater and groundwater to meet a wide variety of seasonal, long-term water banking, emergency and other water management needs.¹

¹Pyne, David G., *Fundamentals of Reclaimed Water ASR*, FWEA/FDEP Reuse

Florida leads the nation in ASR with more than 40 operational sites and more than 30 new systems under development. Arizona has five ASR wellfields for reclaimed water storage. California has at least nine operational ASR wells for drinking water storage and another 15 under development. As noted earlier, approximately 330 ASR wells are planned as part of the overall design for restoration of the Everglades.

H.R. 3834 and the Importance of a Comprehensive Approach to the Nation's Water Supply Needs

The WateReuse Association believes that H.R. 3834 is worthy of consideration. The bill has served to stimulate debate on the future course of how to address construction of alternative water supply projects. The approach envisioned under H.R. 3834 is innovative as it only promises to provide a Federal subsidy for facilities that are operational. Clearly this is one financing tool that may prove useful in the future.

WateReuse's concerns rest with the old cliché, "the devil is in the details." As H.R. 3834 is currently drafted, if a community were to construct and operate a desalination facility, it would have to factor into the rate structure assumptions that it may not receive Federal operating subsidies in the future. This may make the project impractical. Second, we are concerned that the emphasis on providing "after the fact" subsidies could create obstacles to communities that are unable to develop the necessary resources to develop a facility without up-front assistance. I am reminded that WateReuse testified before this subcommittee two years ago where it was pointed out by a capital financing expert that with a small Federal contribution, local communities can secure the public's approval to bond projects. At that same hearing a finance official testified that any Federal support can reduce capital costs because of the federal priority for the project. Clearly, if Congress is going to develop new tools to support project construction in needy as well as financially capable communities, it should provide a broad array of financing tools and allow communities to choose the appropriate mix of financing instruments.

If the nation is to develop new financing approaches for desalination facilities, it would be appropriate to make available the full panoply of such instruments. This could include grants, low interest loans, and increase the availability of such proven financing tools as private activity bonds that can attract private sector resources, thereby reducing demands on the Federal treasury.

Seminar, January 19, 2001.

As Congress reviews options to finance alternative water supply systems, the most important point that WateReuse want to make is that the ability to design financing packages that addresses the unique needs of each community -- be they rural, urban, suburban, or economically disadvantaged -- should be uppermost in importance. We look forward to providing additional recommendations to the Subcommittee as legislation is considered.

Last, the Association believes that any legislative approach that the Subcommittee decides to pursue should also emphasize research, technology demonstration and commercialization. I will discuss this further in my testimony, but we note that in addition to H.R. 3834, the Subcommittee also has pending before it H.R. 4835. The latter bill, if enacted, would address many of the research priorities that WateReuse believes can accelerate the development of alternative water supply projects and meet the challenges of providing reliable and secure water supplies for municipal, industrial, agricultural and natural resource needs.

The Federal Role in Water Reuse and Desalination

In the opinion of our Association, the Federal government should provide a leadership role in promoting water reclamation and reuse, desalination, ASR, and water use efficiency. If the appropriate Federal role is identified now and appropriate actions are taken, our nation will be well positioned to meet the water challenges of the future.

There are numerous ways in which the leadership role of the Federal government could manifest itself. Federal subsidies for local water reuse projects and targeted investment through demonstration grants could be used to promote reuse practices. The Federal government could promote increased use of recycled water at Federal facilities (e.g., military bases and new GSA buildings); these could be examples of good stewards of water efficiency and water reuse.

We also believe it is critically important for the Federal government to provide adequate funding for research. If this country is to have the wherewithal to provide cost-effective water supply facilities, we must be able to reduce the costs of production and to increase greater public acceptance and reliance on alternative water supplies.

One of the many issues faced by water researchers is to understand the meaning and potential health and ecological impacts of thousands of organic compounds that have been identified at trace levels in wastewater and other alternative supplies. The challenge is that analytical methods, which allow identification of emerging chemical contaminants for both drinking water and wastewater, are ahead of the science that allows us to understand what these emerging contaminants mean in

terms of protection of public health and the environment, and ultimately what treatment technologies are needed to ensure safe and appropriate alternative supply development. The same challenge is true for microbial contaminants. This is not only a water reuse challenge, but also one that also applies to every municipality whose source of water supply is a major river or whose groundwater is impacted by impaired water sources. Only through conducting substantial research can local, state, and Federal governments provide proper assurance to the public that both drinking water and reclaimed water are safe.

We believe the first appropriate action for the Federal government would be to establish a multi-agency task force to conduct a government-wide study on reuse issues. Headed by the Council on Environmental Quality (CEQ), this task force would assemble an inventory of Federal agency efforts in the areas of water reuse and recycling, desalination, and water use efficiency. Federal agencies covered would include, but would not be limited to, the Department of Interior's Bureau of Reclamation, the Department of Defense, Department of Energy, Environmental Protection Agency, Department of Agriculture, and the Tennessee Valley Authority.

The Federal task force would produce a report for the President and Congress. In addition to the inventory of current programs, the report would identify opportunities for improving and promoting water use efficiency. The net result of this overall effort would be to increase the visibility and importance of the issue of water reuse and water use efficiency to the nation's future well being.

WaterReuse is also strongly supportive of additional Federal funding for water reuse and desalination projects. Although the President's budget typically includes less than \$20 million for USBR's Title XVI program, we have consistently encouraged the Congress to support this worthwhile program with an appropriate level of funding (i.e., \$30-50 million).

Finally, WaterReuse would like to express its support for the Tularosa Basin National Desalination Research Facility in Alamogordo. This facility will focus on research and development of technologies addressing the technical, economic, and environmental issues associated with the treatment and utilization of inland brackish groundwater. The research, development, and demonstration program envisioned for Tularosa will advance the science of both water reuse and desalination.

Recommendations

In summary, we believe that alternative water supplies will be a critical component of the nation's water supply in the 21st century. To ensure that this important resource is fully utilized and that appropriate actions are taken now in order to avoid a future water crisis, the Federal government needs to play a leadership role. Some of the specific actions that should be taken by the Subcommittee include the following:

- Support the formation of a multi-agency taskforce in CEQ to inventory water reuse programs within the Federal establishment and identify opportunities for enhanced water reuse and water use efficiency;
- Support additional research, technology demonstrations and technology transfer of desalination and water reuse that is essential to developing answers to questions on environmental pollutants of concerns, gaining public acceptance. and reducing the costs of production;
- Direct the U.S. Bureau of Reclamation to continue to include water reuse as part of its "core mission;" support increased funding for the Title XVI program;
- Support the enactment of legislation that would establish a competitive grants program for which local water agencies in all 50 states would be eligible that would provide funding for much needed water reuse and desalination projects. The Subcommittee should advocate an authorization of \$100 million/year for water reuse projects and \$100 million for desalination over at least a five year period.
- Increase Federal "venture capital" (i.e., seed capital assistance through innovative financing tools and targeted grants (e.g., Title XVI) to assist communities in developing innovative reuse and desalination projects.

Conclusion

Once again, the WaterReuse Association wants to thank you, Mr. Chairman, for convening this hearing. We would be pleased to work with you in addressing critical issues related to water reuse, desalination, water use efficiency and salinity management. We are strongly supportive of the Subcommittee's efforts to ensure adequate and safe supplies of water in the future for the entire country.