Pure News

Water Reuse Program
Water Purification Demonstration Project

Water Purification | Demonstration Project

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Pure News: Issue 7

Welcome to Pure News, a newsletter to keep you informed about the latest happenings with the City of San Diego's Water Purification Demonstration Project.

San Diego Is Leading the Way

San Diego is paving the way for water purification not just locally, but also nationally and internationally. As water supplies shrink worldwide and with growing interest in sustainable water programs, water purification is gaining momentum as a potential solution to depleted water resources. There are great examples of full-scale water purification facilities operating successfully, such as Singapore's NEWater and Orange County's Groundwater Replenishment System. For cities and water agencies around the world, however, San Diego's Water Purification Demonstration Project exemplifies a key step in the development of a full-scale water purification project.

Orange County's water purification facility

Visitors from all over the world have come to San Diego to learn more about the Demonstration Project , which includes the installation and operation of a one-million-gallon-a-day Advanced Water Purification (AWP) Facility, a study of the San Vicente Reservoir, a pipeline alignment assessment and an extensive public outreach and education program. Since opening in June 2011, the AWP Facility has welcomed guests from nearly 20 countries, including Mexico, Australia, Vietnam, Spain, India, China, the United Kingdom, Iraq, Brazil and Ukraine. There are also many American visitors, including guests from Arizona; Florida; Massachusetts; Texas; Utah; Washington, D.C. and cities throughout California. These guests come to get ideas on how to implement water purification in their own locales.

The project has also received industry awards recognizing its achievements. The WateReuse Association, an international group of organizations and individuals working together to improve and increase local water supplies, honored the Demonstration Project with the 2012 WateReuse Small Project of the Year Award. The award provides industry recognition for successful small (less than five-million-gallons-a-day capacity) projects that have made significant contributions to advancing water reuse. Last year, the WateReuse Association recognized the Demonstration Project's outreach program as the 2011 WateReuse Public Education Program of the Year.

While it is important to have national and international recognition, the purpose of this project is to determine whether water purification is a feasible option for expanding San Diego's local water resources. The public outreach program's goal is to provide information about the project to as many San Diegans as possible. The outreach team will continue to encourage residents to learn about the project through presentations and facility tours throughout 2013. Request a presentation by emailing PureWaterSD@sandiego.gov or by calling 619-533-6638. Sign up for a tour online at www.purewatersd.org/tours.shtml.

San Vicente Reservoir Limnology Study:
An overview of the study and what it has shown

If the Demonstration Project advances to a full-scale project, purified water would be added to the untreated or "raw" water that is already stored in the San Vicente Reservoir. Part of the research conducted during the Demonstration Project was a limnology study, or a scientific study of the biological and physical features of the reservoir. Primarily, the project team needed to gain a good understanding of what effect– if any – purified water would have on the other water in the reservoir.

Although water purification technology is widely recognized as capable of purifying recycled water into drinkable water, regulatory agencies require that purified water be retained in an "environmental buffer," such as a groundwater basin or a surface water reservoir, before it becomes part of the drinking water supply. Adding purified water to an environmental buffer provides a public health barrier: dilution with other water sources and retention time that allows for additional natural treatment.

San Vicente Reservoir would serve as an effective environmental buffer for a full-scale project in San Diego. The reservoir stores a large volume of water capable of providing adequate dilution and retention of the purified water and, most importantly, exhibits seasonal stratification (see Page 3). A three-dimensional hydrodynamic model of the reservoir was developed by experts from the firm Flow Science, and was reviewed and accepted by the Demonstration Project's Independent Advisory Panel (IAP).

San Vicente Reservoir has been studied many times in the past. In fact, tracer studies of the reservoir were conducted in the 1990s. A tracer study involves putting an element in the water at a specific point and tracing its path through the reservoir. This provides an understanding of how water mixes in the reservoir. These tracer studies provided good background for the current study, which involved running the three-dimensional hydrodynamic model 18 times. The project team - with input from the IAP and regulators - selected eight modeling scenarios that represent the full range of operational conditions the full-scale reservoir augmentation project could encounter. The key findings are:

- The addition of purified water to San Vicente Reservoir would not affect the natural hydrologic characteristics of the reservoir (the natural dilution and retention in the reservoir).
- Dilution and retention of purified water in San Vicente Reservoir would constitute a substantial environmental barrier, sufficient to meet regulatory requirements.
- For all anticipated reservoir operating scenarios and purified water entry locations, the reservoir would dilute the purified water by a factor of at least 200 to one at all times.
- The addition of purified water would not negatively affect any aspect of water quality in San Vicente Reservoir. Independent of the Demonstration Project, the San Vicente Dam has been raised to a height of 337 feet. The expanded reservoir will hold over 240,000 acre-feet of water (more than double its original 90,000 acre-feet), which will improve the overall water quality in the reservoir. The addition of purified water will have no effect on these improvements.

What is a three-dimensional hydrodynamic model?

"Hydrodynamics" is the movement of water. The three-dimensional hydrodynamic model of San Vicente Reservoir is a computer-based model that simulates and predicts the movement of water in all three directions within the reservoir: up and down, left to right, and fore and back. The model incorporates solar heating, wind speed and direction, water inflows and outflows, evaporation and rainfall, and air temperature. Equations in the model calculate heating and cooling, mixing, and dilution of the reservoir water.

BREAKING NEWS: The California Department of Public Health, a key regulator in this project, provided written approval of the City's proposed reservoir augmentation concept in September 2012, stating that the City's concept "will not compromise the quality of the water derived from San Vicente Reservoir."

What is reservoir stratification?

Reservoir stratification – the formation of layers of water within a reservoir – is a natural phenomenon that occurs in nearly all reservoirs in western North America, including San Vicente Reservoir. Consistent and predictable stratification has been observed over more than twenty years of monitoring at San Vicente Reservoir. During the period of stratification, which lasts for about eleven months each year, surface water is heated by the sun. Because this warm water is less dense than cooler water it "floats" in the top-most layer of the reservoir. The denser, cooler water remains in the lower layer of the reservoir. During stratification, any dissolved or suspended constituents in the surface water do not readily mix with the water and constituents in the deep water. In winter the surface water cools, causing water temperature in the reservoir to equalize so that the surface and deep water mix, or destratify. The fully destratified condition lasts for a few weeks to a month and typically occurs during January or February. The natural stratification and mixing of San Vicente Reservoir is an important phenomenon because it determines the extent and timing of dilution and retention provided by the reservoir.

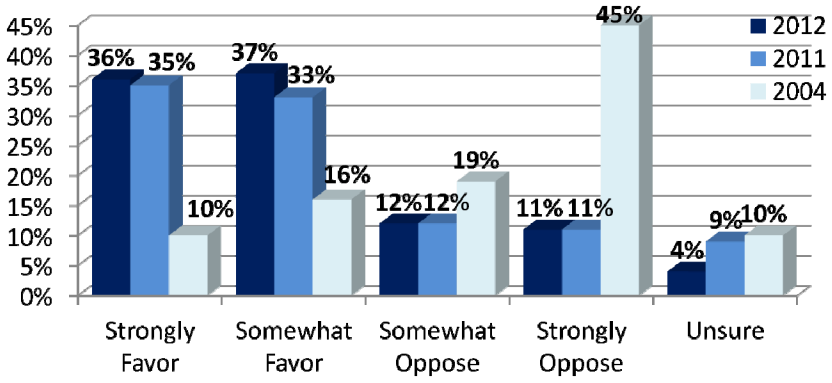
Understanding Local Water Attitudes

To get a better idea of public opinions regarding water issues throughout the county, the San Diego County Water Authority regularly conducts public opinion polls. For 2004, 2011, and 2012, the City of San Diego requested a sample of City residents be polled to ensure we have a good base knowledge about water attitudes in the City, including opinions regarding the use of water purification to create new water supplies.

The results from the latest research study are now available and show a steady increase in acceptance of water purification. Some of the questions and findings are below:

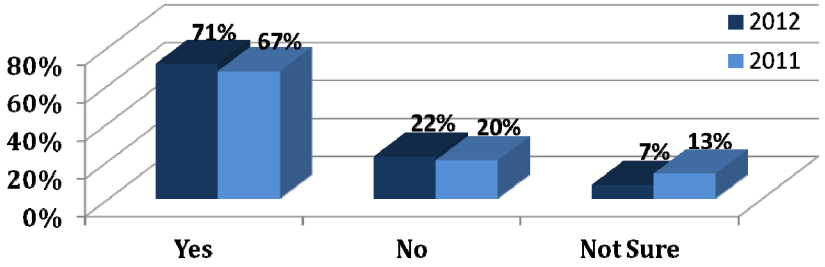
How would you feel about using advanced treated recycled water as an addition to the supply of drinking water?

- In 2004, only 26 percent favored using advanced treated recycled water (or purified water) to help diversify the City's water supply
- In 2012, favorability jumped to nearly three-fourths of City residents



Do you believe that it is possible to further treat recycled water currently used for irrigation to make the water pure and safe for drinking?

- The 2011 survey found 67 percent of the nearly 400 respondents felt that it is possible to further treat recycled water for drinking purposes
- A year later, 71 percent believe it is possible



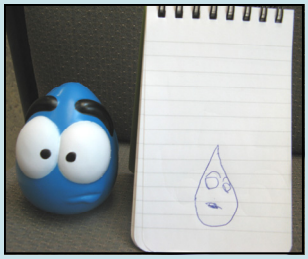
Despite these positive findings, many respondents were still unaware that San Diego is testing water purification locally. Additionally, the majority of respondents also did not know that Orange County's drinking water supply is supplemented with purified water produced using the same purification process being tested by the Demonstration Project. The Demonstration Project team continues to educate San Diegans about this test phase to increase local knowledge about water supply challenges and the science of water purification.

The entire public opinion poll findings can be found online at www.sandiego.gov/water/waterreuse/pdf/sdcwasurvey2012.pdf.

Year in Review: Building on the Momentum of 2012

This has been a productive and exciting year for the Demonstration Project. Our staff is grateful to the people of San Diego who helped spread the word about the project. We are proud to have spent almost every day in 2012 engaging curious and enthusiastic groups, decision makers and community members in the Water Purification Demonstration Project through tours, presentations, events and social media.

Since the tour program began in mid-2011, we have led over 225 AWP Facility tours for more than 3,000 participants. While we were honored to have visitors from as far away as Australia and Iraq tour the facility, some of our favorite guests have been children who asked thoughtful questions and got us to look at water purification in a whole new light. From drawings about the very curious "Wobbly the Waterdrop" to asking important questions about the water they are already drinking, educating young people is an important element of the project's outreach efforts. We have hosted 2nd graders who are just learning the terms associated with water purification, medical students who are interested in the technology, Girl Scout and Boy Scout troops, rotary clubs, senior groups and members of the military.



In addition to the tours, our speakers bureau has presented information about water purification to more than 120 groups and organizations in San Diego County. We have also participated in over 40 community events in each of San Diego's City Council Districts, as well as shared project updates and connected one-on-one with interested parties through active pages on Facebook and Twitter.

Decisions made about water supply sources today will determine how reliable San Diego's water supplies are in the future. Therefore, it is important to the Demonstration Project team that we share information with as many San Diego residents as possible about our future water needs and the role of this project.

Thanks again for making 2012 a great year for the Demonstration Project. We look forward to building on our momentum and continuing to share information about water purification at more events, presentations and tours in the coming months. Additionally, a final report wrapping up all of the project's findings is due out in 2013. Until then, we wish you and yours a happy holiday season. See you in 2013!

@PureWaterSD

Get the latest online

For our smartphone-savvy readers, use your barcode-scanning app of choice to scan the quick response (QR) barcodes to the left and right. You'll be an official Demonstration Project fan in no time!

Not receiving email updates from the Demonstration Project? Sign up at www.purewatersd.org or email purewatersd@sandiego.gov.

SanDiegoWPDP

To schedule a presentation for your organization, email purewatersd@sandiego.gov or call (619) 533-6638.

Visit www.purewatersd.org/tours.shtml to sign up for an AWP Facility tour.

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