Pure News

# Pure Water San Diego

May 2014

The City of San Diego • Public Utilities Department

## Pure News

Welcome to Pure News, a newsletter about Pure Water San Diego, the City of San Diego's program to address the need for a safe, secure and sustainable local water supply.

## Examining Additional Safety Barriers

Since June 2011, the City has operated a one-million-gallon-a-day Advanced Water Purification (AWP) Facility which relies on three "barriers" or treatment processes: microfiltration/ultrafiltration, reverse osmosis and advanced oxidation using ultraviolet light and hydrogen peroxide. This three-step water purification process was tested as part of the City's demonstration indirect potable reuse project. Now, through state grant funding made available by voter-approved Propositions 50 and 84, the City has partnered with the WateReuse Research Foundation to monitor, evaluate and demonstrate a test plan for direct potable reuse. The grant funding will allow the City to continue to operate the AWP Facility and investigate two additional treatment barriers: ozonation and biological activated carbon (BAC) filters. Pure Water San Diego deputy director Marsi Steirer was also appointed to lend her expertise to an Advisory Group for the development of direct potable reuse criteria. San Diego's input and the information gained through the testing of the new equipment will aid the California Department of Public Health in determining the feasibility of direct potable reuse projects.

**Redirecting Recycled Water**

*The recycled water produced at the North City Water Reclamation Plant will be directed to ozonation and BAC filters prior to the AWP Facility's 3-step water purification process. Additional piping was installed to direct the recycled water to the new equipment.*

*(Continued on page 3)*

## Did You Know?

*Potable* means drinkable. *Potable reuse* is the addition of purified water to raw or untreated water supplies.

*Indirect potable reuse (IPR)* utilizes an "environmental buffer," such as a groundwater basin or reservoir, as an additional safety measure. For IPR in San Diego, purified water would be sent to San Vicente Reservoir prior to regular drinking water treatment. This is known as reservoir augmentation.

*Direct potable reuse (DPR)* does not use an environmental barrier and would likely require additional engineered treatment barriers in lieu of a reservoir or groundwater basin. A likely DPR concept would convey purified water from the water purification facility directly to a drinking water treatment plant. Additional treatment (potentially ozonation and BAC filters) would be added to compensate for the lack of an environmental buffer. It is not currently known what barriers or treatment would be used for a full-scale project.

There are currently no regulations for IPR with reservoir augmentation or for DPR. Water Code Division 7, Chapter 7.3 directs the California Department of Public Health to do the following by December 31, 2016: 1.) Develop and adopt uniform criteria for regulations for IPR with reservoir augmentation, and 2.) Investigate and report on the feasibility of developing uniform criteria for DPR.

## What's New in...Youth Education

Water purification could eventually provide up to one third of San Diego's water supply, and the next generation of San Diegans will influence decisions about addressing future water needs. Because water purification could impact San Diego's water supply long term, Pure Water San Diego's education program has a renewed focus on youth engagement. Recent youth outreach includes tours, partnerships and events.

### Children's Tours

There are many science and technology terms associated with water purification, and it is important to put the information into a format that is understandable for even the youngest tour participants. The 1st to 6th grade version of the tour presentation and the water purification process video take the more advanced concepts and explain them in a relatable way for young students.

Recently, 2nd graders from Porter Elementary toured the Advanced Water Purification Facility. During the presentation, the students talked about all the ways they use and save water. Their teacher Ms. Castelo shared the students delight at being able to see and feel the membrane straws and reverse osmosis sheets and track how the "germs" get removed from the water drops at each step in the process. When they wrote about their experience back in their classroom, several students said that one of the things that stuck with them the most was learning the fact that we drink the same water the dinosaurs drank.

*Porter Elementary School 2nd graders visit the AWP Facility.*

### Project SWELL

Pure Water San Diego is partnering with Think Blue San Diego, San Diego Coastkeeper and San Diego Unified School District as part of Project SWELL, a school-based science curriculum that teaches children about the importance of the San Diego region's waterways. As part of the water lessons for 5th graders, a special lesson is devoted to understanding recycled water and the water purification process. The lesson plan includes a multimedia PowerPoint and it will be given to hundreds of teachers and schools around San Diego County to include as part of their science classes.

### San Diego Youth Commission

The high school and college-age students on the San Diego Youth Commission are responsible for identifying critical issues that affect youth in the City of San Diego. They provide advice and recommendations to the Mayor, City Council and other City officials on these issues. The Commission voted to make Pure Water San Diego one of the "issues" they would like to work on and support. Future activities will include presentations at their schools and partnerships with environmental and ecological clubs on campus. Commission members will also help guide outreach to high school and college-age students by polling their friends and classmates about the water issues most important to them and the best mediums for communicating those messages.

### Science EXPO Day

Pure Water San Diego hosted a booth at the San Diego Science and Engineering Festival EXPO Day at Petco Park. Hundreds of students visited the booth to take the "Water You Know?" water quiz challenge and to speak to project engineers about the water purification process and potential careers in the water industry.

*Science Expo Day at Petco Park*

### Ozone

Ozone is a gas produced by subjecting oxygen molecules to high electrical voltage. It destroys bacteria and microorganisms and breaks down organic substances. The City's ozone system (which looks like a shipping container from the outside) contains equipment that concentrates oxygen from the air then converts some of that oxygen to ozone gas. The ozone gas is then infused into the recycled water.

*The shipping crate seen above contains the entire ozone system.*

*An inside view of the ozone system.*

### Ozone Contactor

After going through ozonation, the water travels through a long series of pipes, called the ozone contactor. This ensures that the ozone has adequate time to react with and break down the contaminants in the water. The ozone is consumed and breaks down into oxygen prior to reaching the BAC.

*Because these pipes will be outside and exposed to the sun, a special paint is used to protect the pipes from the sun's ultraviolet rays.*

### BAC Filter

Following ozonation, the water goes through the BAC filters. The filters are filled with carbon granules covered in "aerobic" bacteria, which are bacteria that only live in the presence of oxygen. The ozonated recycled water enters the filters, and the bacteria on the granules consume 30 to 50 percent of the organic matter (anything that is living or was living at one time). The "helpful" bacteria, along with any other bacteria still in the water, are removed in the next treatment step: microfiltration or ultrafiltration.

*Each BAC filter weighs 17,000 pounds – heavier than an African elephant.*

Pure Water San Diego is evaluating these barriers for their effectiveness as additional treatment barriers for DPR. The improvement in water quality before the water enters the AWP Facility will also be examined. The findings will help determine whether ozone and BAC filters could be used in a DPR system.

## Welcoming Scouts

Thousands of people have visited the AWP Facility since it first opened for tours in June 2011, and local scout troops have been some of the most regular visitors. At least one troop tours nearly every month. Because of this great response, special events just for scouts are often held at the AWP Facility.

Boy Scouts have participated in tours of the North City Water Reclamation Plant and the Advanced Water Purification Facility in partial fulfillment of their Soil & Water Conservation and Public Health merit badges. The boys learn about the importance of having clean water and the processes involved in developing purified water.

More than 30 Brownie Girl Scouts from various troops participated in a Wonders of Water Journey event at the AWP Facility. The girls toured the facility, visited a water quality laboratory and participated in a rain barrel activity. The event focused on the importance of water and what can be done to ensure San Diego has water for years to come.

There will be more special events for scouts in the near future. To register your troop for an AWP Facility tour, please visit www.purewatersd.org/tours or email purewatersd@sandiego.gov.

@PureWaterSD

### Get the latest online

Use your barcode-scanning app of choice to scan the quick response (QR) barcodes to the left and right.

Not receiving email updates from Pure Water San Diego? Sign up at www.purewatersd.org or email purewatersd@sandiego.gov.

PureWaterSD

To schedule a presentation for your organization, visit www.purewatersd.org/presentations.

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

The City of San Diego

Pure Water SAN DIEGO

PureWaterSD.org

City of San Diego PUBLIC UTILITIES Water & Wastewater

City of San Diego Public Utilities Department • Pure Water San Diego Program
525 B Street, Suite 300, San Diego, CA 92101 • (619) 533-7572 • www.purewatersd.org