

Appendix H: Public Outreach and Education

Section 2: Education and Outreach Materials and Tools

Fact sheet.....	3
English.....	4
Spanish.....	6
Vietnamese.....	8
Quick facts document.....	10
Frequently Asked Questions (FAQ).....	12
English.....	13
Spanish.....	15
Vietnamese.....	17
Information (fact) card.....	19
Interest and information card	21
Website.....	23
Photographs	25
Community Events.....	26
AWP Facility Tours	27
eUpdate	28
November 2010.....	29
February 2011	30
May 2011.....	31
July 2011 (Urban Water Cycle Tour invitation).....	32
November 2011 (10 News Coverage).....	33
December 2011 (Social media).....	34
December 2011 (Holidays)	35
February 2012 (New York Times coverage).....	36
February 2012 (Stakeholder public involvement).....	37
March 2012 (American Assembly public involvement)	38
April 2012 (Earth Day)	39
August 2012 (CBS 8 Coverage)	40
December 2012 (Holidays)	41

Pure News	42
Winter 2010.....	43
Spring 2011.....	47
Summer 2011.....	51
Fall 2011.....	55
Winter 2012.....	59
Summer 2012.....	63
Fall 2012.....	67
Poster boards	71
Water process diagram.....	72
Downstream map.....	73
Water Reuse Around the World.....	74
U.S. Indirect Potable Reuse timeline.....	75
San Vicente Reservoir map.....	77
Bookmarks	78
White papers	85
Potable Reuse Projects In The United States.....	86
Water Purification Demonstration Project.....	92
Water bill insert	95
AWP Facility brochure	98
Display board	101
Children’s activity page	103
English.....	104
Spanish.....	107
Videos	111

Fact Sheet

Fact Sheet

Water Reuse Program

Water Purification Demonstration Project

The City of San Diego • Public Utilities Department

Water Purification | Demonstration Project



Recycled Water

The City of San Diego has limited local water sources and relies on importing approximately 85 to 90 percent of its water supply. In the past, importing water from the Colorado River and Northern California has been a low-cost, reliable option, but environmental stresses and court-ordered pumping restrictions have continued to reduce the amount of water that can be delivered to San Diego. These circumstances and the threat of further limitations on our water supplies have intensified the need for new sources of water. As part of the City's effort to provide a local and sustainable water supply, the Water Purification Demonstration Project is examining the use of water purification technology to provide safe and reliable water for San Diego's future.

The Demonstration Project is the second phase of a process evaluating ways for the City to increase its use of recycled water. The first phase was the City's 2005 Water Reuse Study that identified reservoir augmentation as the preferred option for developing recycled water sources. The Demonstration Project will determine if reservoir augmentation is a feasible option for San Diego.

Reservoir augmentation is a multi-step process that includes:

- Using water purification technology on recycled water
- Sending the purified water to a reservoir to blend with existing water supplies
- Treating the blended water again to be distributed as drinking water

The Demonstration Project is underway and will conclude in early 2013. During this time, the Advanced Water Purification Facility will operate for approximately one year and will produce 1 million gallons of purified water per day. A study of the San Vicente Reservoir is being conducted to test the key functions of reservoir augmentation and to determine the viability of a full-scale project. No purified water will be sent to the reservoir during the demonstration phase.

An independent advisory panel of experts is providing oversight on project research to determine (1) if the purification process satisfies all water quality, safety and regulatory requirements of the California Department of Public Health, and (2) the behavior of the reservoir and what will happen if the purified water is added. A summary report detailing the results of the Demonstration Project will be provided to the Mayor and City Council. If deemed technically feasible, and following Mayoral and City Council authorization, a full-scale reservoir augmentation project would be implemented.

Potential benefits of implementing Reservoir Augmentation in San Diego:

- Provide a local and sustainable supply of purified drinking water for San Diego
- Improve the quality of water in the San Vicente Reservoir
- Decrease dependence on imported water
- Increase utilization of recycled water
- Provide a supply of water that uses less energy than imported water
- Have a positive impact on the environment by producing less discharge into the ocean and working toward lower carbon emissions

In an effort to keep San Diego citizens informed about this important project, the public outreach program is offering free tours of the Advanced Water Purification Facility and project presentations will be made to groups upon request. For more information, please call (619)533-7572 or email purewatersd@sandiego.gov. To register for a tour please visit www.purewatersd.org.

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.



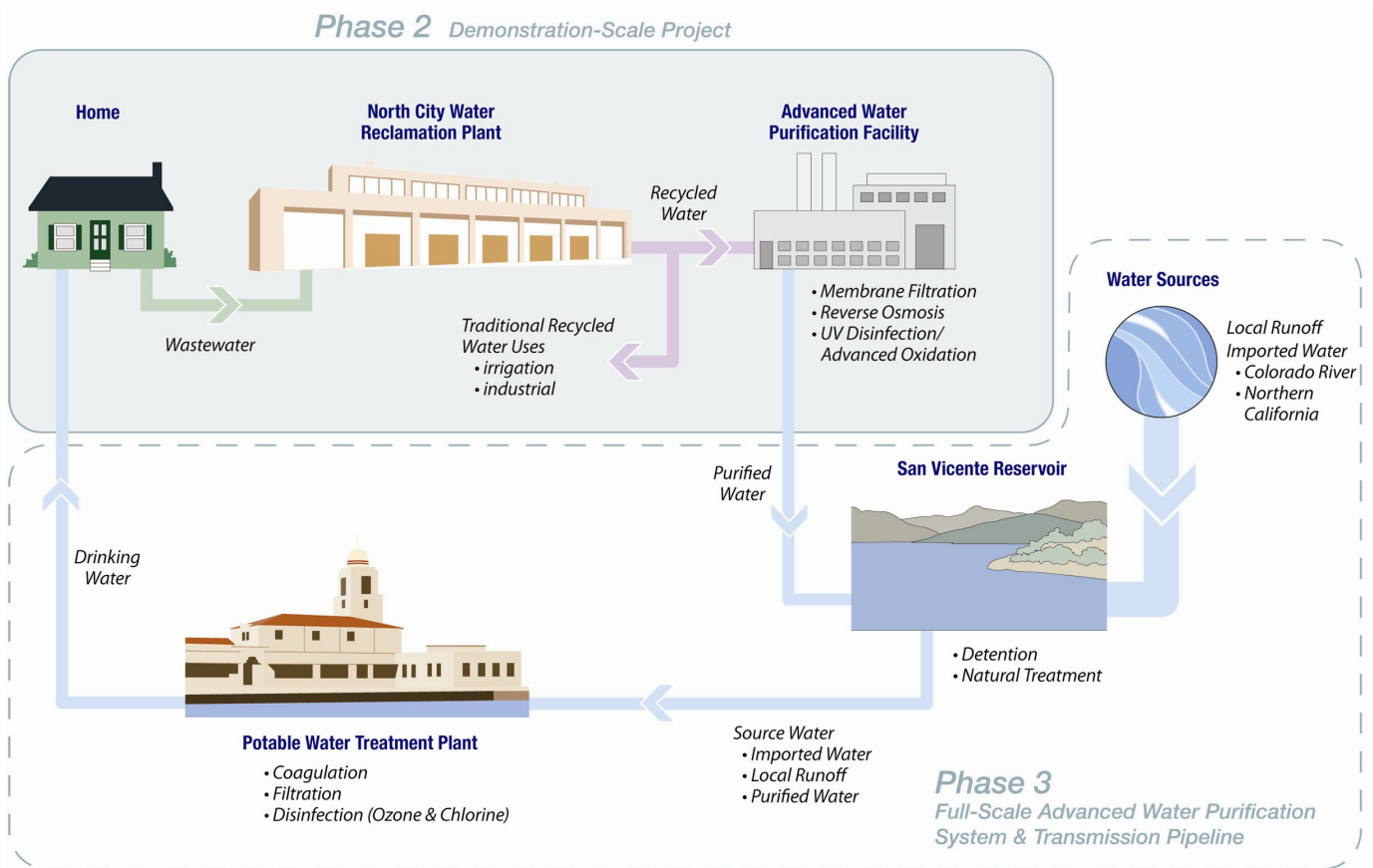
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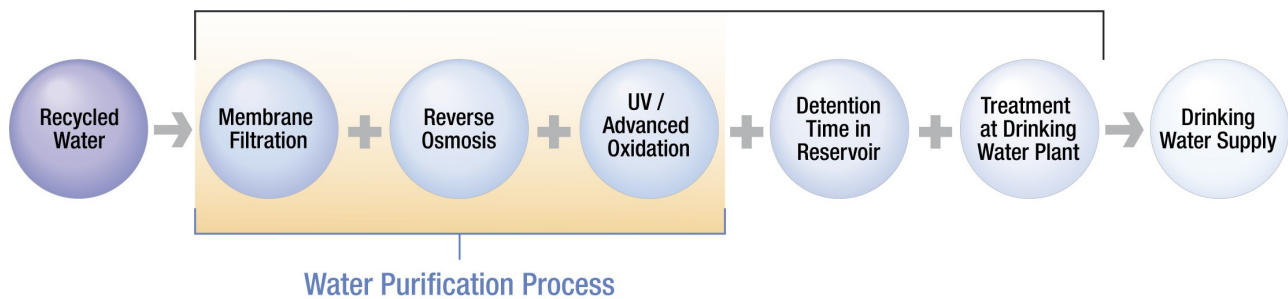
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Water Purification Demonstration Project

Advanced Water Purification Process



Multi-Barrier Water Treatment Steps



The multiple barrier approach is a proven means to protect public health. Each barrier or step must have frequent and continuous water quality monitoring. Safeguards are built into the process to insure that a failure or error at any given treatment step would not compromise public health.

Fact Sheet

Water Reuse Program

Proyecto de Demostración de Purificación de Agua

The City of San Diego • Public Utilities Department

Water Purification | Demonstration Project



Agua Reciclada

La Ciudad de San Diego cuenta con limitados recursos de agua, y tiene que importar aproximadamente entre el 85 y el 90 por ciento de su suministro de agua. En el pasado, la opción de importar agua del Río Colorado y del Norte de California ha sido una opción confiable y baja en costo, pero los retos ambientales y las restricciones impuestas por los tribunales relativas a la posibilidad de bombeo, han contribuido a una reducción adicional sobre la cantidad de agua que puede ser distribuida a San Diego. Dichas circunstancias y la amenaza de limitaciones adicionales sobre nuestro suministro de agua han intensificado la necesidad de identificar nuevas fuentes de agua. Como parte del esfuerzo de la Ciudad en proveer un suministro de agua local y confiable, el Proyecto de Demostración de Purificación de Agua analiza el uso de tecnología avanzada de purificación de agua para proveer agua confiable y segura para el futuro de San Diego.

El Proyecto de Demostración es la segunda fase de un proceso que evalúa las formas en que la Ciudad puede incrementar su uso de agua reciclada. La primera fase consistió en el Estudio de Reuso de Agua de la Ciudad del 2005, misma que identificó como opción preferida la de aumentar el nivel de agua en los embalses artificiales como vía para desarrollar fuentes de agua reciclada. El Proyecto de Demostración determinará si el aumentar la capacidad de los embalses artificiales es una opción factible para San Diego.

El aumentar el agua en los embalses artificiales es un proceso de múltiples pasos que incluye:

- Utilizar tecnología avanzada de purificación de agua para aguas residuales altamente tratadas.
- Enviar el agua purificada para almacenarse en un embalse artificial para ser mezclado con suministros de agua actuales
- Tratar el agua mezclada nuevamente para ser distribuido como agua potable

Actualmente se lleva a cabo el Proyecto de Demostración, el cual concluirá a principios del 2013. Durante dicho período, las Instalaciones Avanzadas de Purificación de Agua operarán durante aproximadamente un año y producirán 1 millón de galones de agua purificada al día. Se está realizando un estudio del Embalse Artificial San Vicente para evaluar las funciones claves relacionadas con aumentar la capacidad del agua en los embalses artificiales así como determinar la viabilidad de un proyecto a gran escala. No se enviará agua purificada al embalse artificial durante la fase de demostración.

Un panel asesor independiente integrado por expertos supervisará la investigación del proyecto para determinar si (1°) el sistema de purificación satisface todos los requisitos de calidad, seguridad y normatividad del agua del Departamento de Salud Pública de California, y (2°) el comportamiento del embalse artificial y de lo que ocurriría si se agregase el agua purificada. Un informe resumido que detalla los resultados del Proyecto de Demostración se entregará al Alcalde y al Cabildo de la Ciudad de San Diego. Si se considera técnicamente factible y es seguido por la autorización de parte del Alcalde y del Cabildo, se llevaría a cabo un proyecto para aumentar la capacidad del agua en un embalse artificial a gran escala.

Posible beneficios generados al aumentar el agua en los embalses artificiales en San Diego:

- Proveer una fuente local y sustentable de agua potable de alta calidad para San Diego.
- Incrementar el uso de agua reciclada.
- Reducir la dependencia sobre al agua importada.
- Proveer un abastecimiento de agua que utiliza menos energía que el agua importada.
- Mejorar la calidad del agua en el Embalse Artificial de San Vicente.
- Surtir un impacto positivo sobre el medio ambiente al producir menos descarga al mar y trabajar para reducir las emisiones de carbón.

Para mantener informados a los ciudadanos sandieguinos sobre este importante proyecto, el programa de difusión pública ofrecerá recorridos de cortesía de las Instalaciones Avanzadas de Purificación del Agua, y se podrán organizar presentaciones sobre el proyecto a grupos que así lo soliciten. Para mayor información, favor de comunicarse al (619) 533-7572 o enviar un correo electrónico a purewatersd@sanidiego.gov.

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.

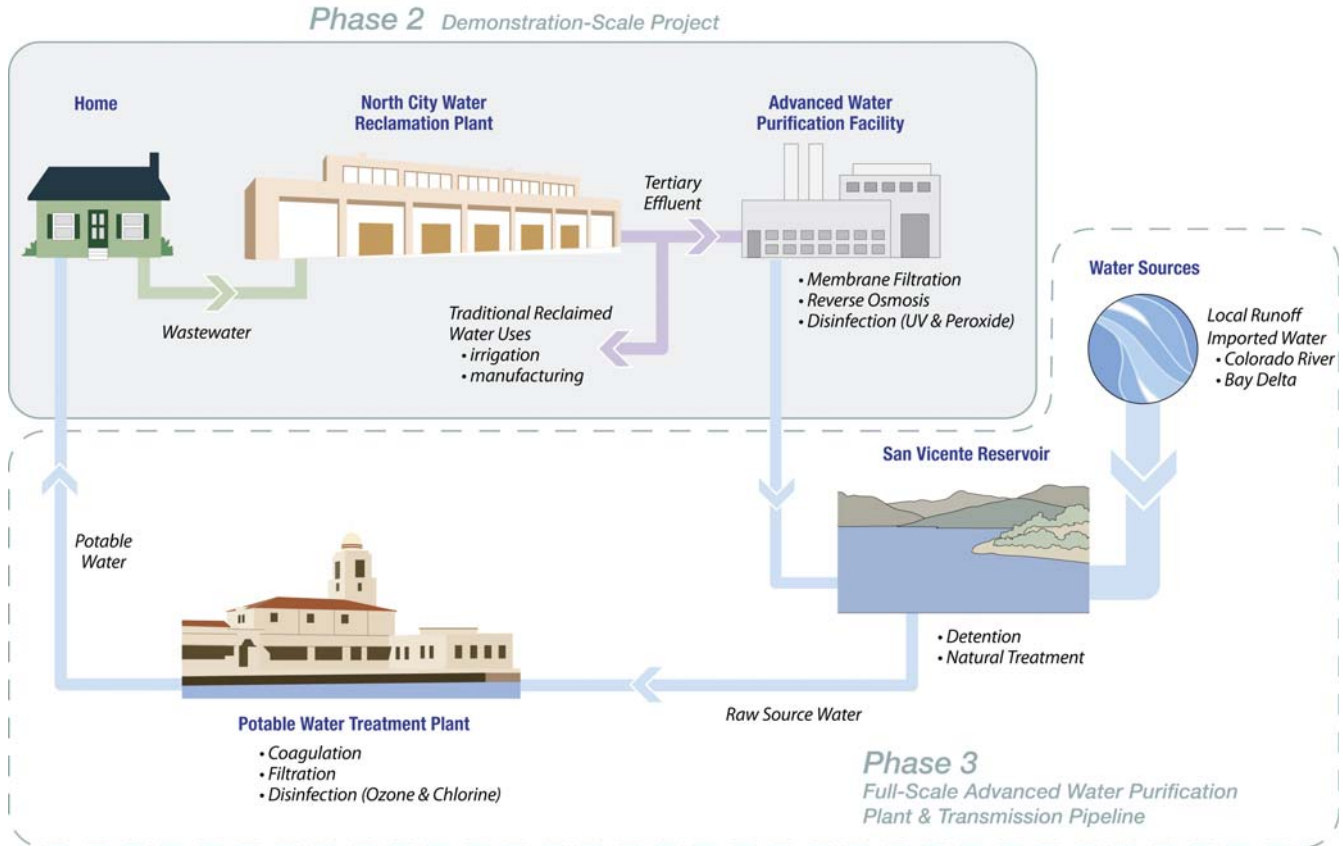


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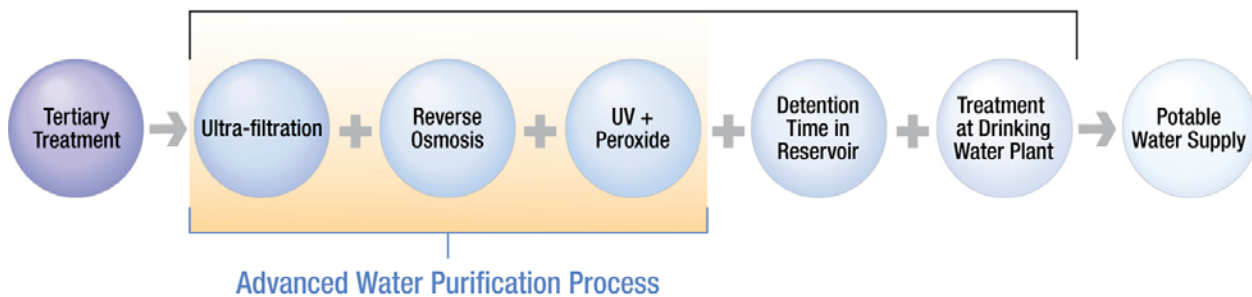
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Proceso Avanzado de Purificación del Agua



Toda el agua potable se recicla en algún momento. El agua Purificada a Niveles Avanzados se aproxima a la calidad de agua destilada y es más limpia que el agua que actualmente se encuentra en el Embalse Artificial de San Vicente.

Pasos para la Purificación Avanzada del Agua



Fact Sheet

Water Reuse Program

Dự án lọc nước thí điểm Bản thông tin chung về các giai đoạn

The City of San Diego • Public Utilities Department

Water Purification | Demonstration Project



Recycled Water

Thành phố San Diego có rất ít nguồn cung cấp nước tại địa phương và phụ thuộc vào việc nhập khẩu khoảng 85% đến 90% trong tổng số lượng nước cần để cung cấp. Trong thời gian qua, việc nhập khẩu nước từ sông Colorado và phía Bắc tiểu bang California là một lựa chọn có chi phí thấp, đáng tin cậy; tuy nhiên, những yếu tố gây bất lợi đến môi trường cùng với lệnh giới hạn việc bơm nước từ tòa án đã liên tục làm giảm đi lượng nước có thể đưa vào San Diego. Những thực trạng như vậy và nguy cơ có các hạn chế khác ảnh hưởng đến nguồn cung cấp nước cho San Diego đã làm nhu cầu về việc có những nguồn nước khác thay thế trở nên cấp thiết hơn. Dự án lọc nước thí điểm, một phần trong nỗ lực của Thành phố nhằm tạo nguồn cung cấp nước dài hạn ngay tại địa phương, sẽ xem xét việc sử dụng công nghệ lọc nước tiên tiến để cung cấp nguồn nước an toàn và lâu dài trong tương lai cho San Diego.

Dự án thí điểm là giai đoạn thứ hai của quá trình đánh giá các phương thức giúp Thành phố gia tăng khả năng sử dụng nguồn nước tái chế. Giai đoạn đầu, được thực hiện vào năm 2005 thông qua “Chương trình nghiên cứu khả năng tái sử dụng nguồn nước” của Thành phố, đã xác định việc gia tăng lượng nước trong hồ chứa là lựa chọn được ưu tiên dành cho việc phát triển các nguồn nước tái chế. Dự án thí điểm này sẽ quyết định liệu việc tăng lượng nước trong hồ chứa có phải là một lựa chọn khả thi cho San Diego.

Gia tăng lượng nước trong hồ chứa là một quá trình có nhiều bước gồm:

- Sử dụng công nghệ lọc nước tiên tiến để làm sạch nước thải đã qua xử lý kỹ
- Đưa nguồn nước đã được lọc sạch vào hồ chứa để hòa chung với nguồn nước hiện có
- Xử lý lại nguồn nước đã pha trộn để làm nước sinh hoạt đưa đi phân phối

Dự án thí điểm đang được tiến hành và sẽ kết thúc vào đầu năm 2013. Trong thời gian này, hệ thống lọc nước thí điểm (Water Purification Demonstration Facility) sẽ hoạt động trong khoảng thời gian một năm và sẽ sản xuất một triệu gallon (gallon) nước được lọc sạch mỗi ngày. Một cuộc khảo sát nghiên cứu về khu vực hồ chứa nước San Vicente (the San Vicente Reservoir) đang được tiến hành để kiểm tra những bước vận hành quan trọng trong quá trình làm tăng lượng nước trong hồ chứa và để đánh giá tính khả thi của toàn bộ dự án. Trong giai đoạn thí điểm, nước sau khi được lọc sạch sẽ không được đưa vào hồ chứa.

Một ủy ban cố vấn độc lập gồm các chuyên gia đang giám sát việc nghiên cứu dự án để xác định (1) liệu hệ thống lọc nước có thỏa mãn các yêu cầu về chất lượng, độ an toàn và các quy định của Sở Y Tế tiểu bang California, và xác định (2) trạng thái của hồ chứa và những gì sẽ xảy đến nếu đưa thêm nước được lọc sạch vào hồ chứa. Một bản báo cáo tóm lược gồm chi tiết kết quả của dự án thí điểm sẽ được đệ trình lên ngài Thị trưởng và Hội đồng thành phố San Diego. Nếu được xem là khả thi về mặt khoa học kỹ thuật, và được Hội đồng thành phố và Thị trưởng chấp thuận thì toàn bộ các bước trong dự án bổ sung thêm lượng nước trong hồ chứa sẽ được thực hiện.

Những lợi ích tiềm năng khi thực hiện việc tăng lượng nước trong hồ chứa tại San Diego:

- Cung cấp cho San Diego nguồn nước sinh hoạt chất lượng cao, lâu dài và có sẵn tại địa phương
- Tăng cường hiệu quả sử dụng nước tái chế
- Bớt phụ thuộc vào nước nhập khẩu
- Tạo ra một nguồn cung cấp nước sử dụng ít năng lượng hơn so với nước nhập khẩu
- Cải thiện chất lượng nước trong hồ chứa San Vicente
- Có tác động tích cực đối với môi trường nhờ xả ít chất thải ra biển hơn và góp phần làm giảm chất khí thải carbon

Với nỗ lực nhằm thông báo đến cư dân thành phố San Diego về dự án quan trọng này, chương trình tiếp cận cộng đồng sẽ tổ chức các buổi tham quan (tour) miễn phí “Hệ thống lọc nước thí điểm” (Water Purification Demonstration Facility); và sẽ có những buổi thuyết trình về dự án này cho từng nhóm theo yêu cầu. Để biết thêm thông tin, xin gọi số máy (619) 533-7572 hoặc gửi email theo địa chỉ purewatersd@sandiego.gov.

A water resource strategy that includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection is helping to meet future water needs.

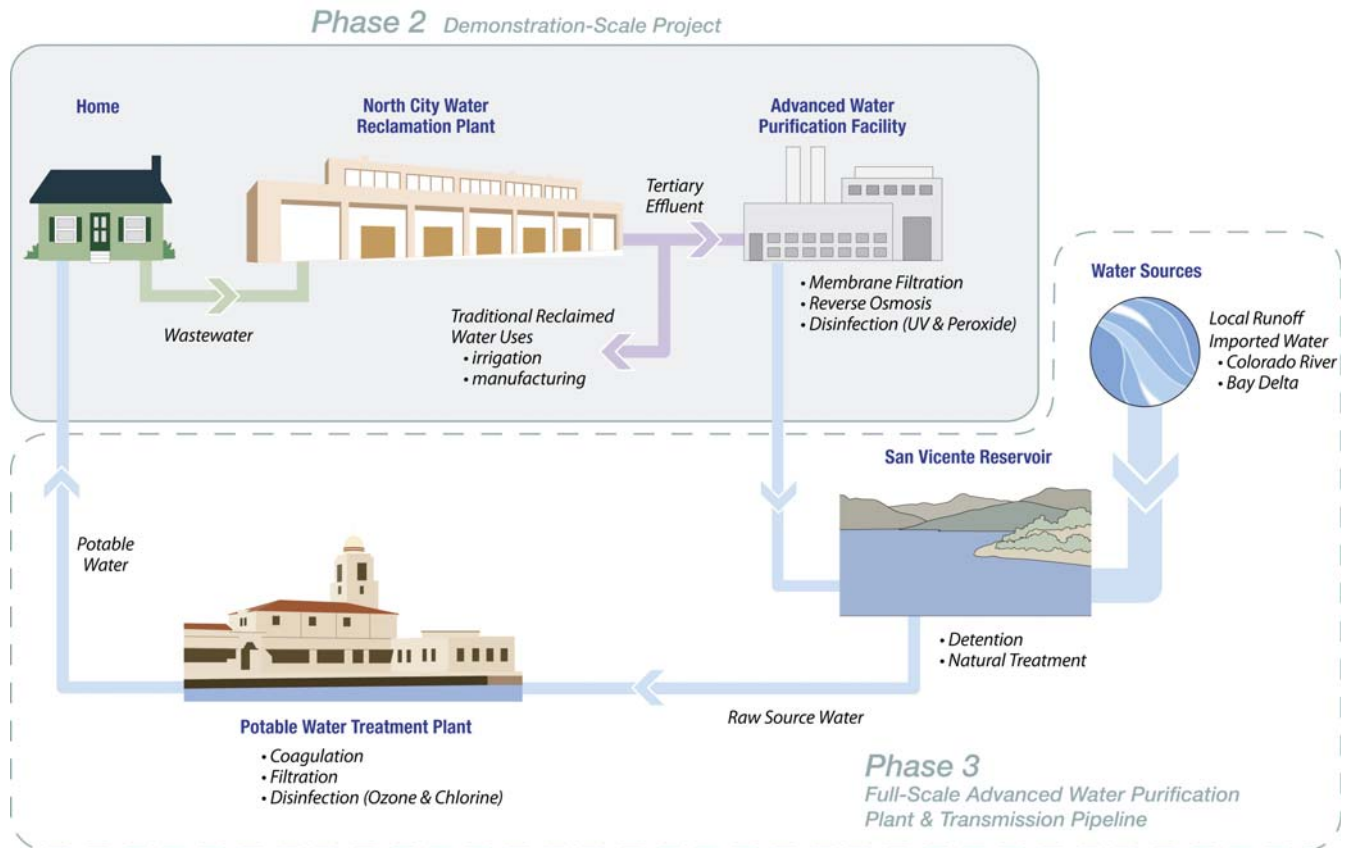


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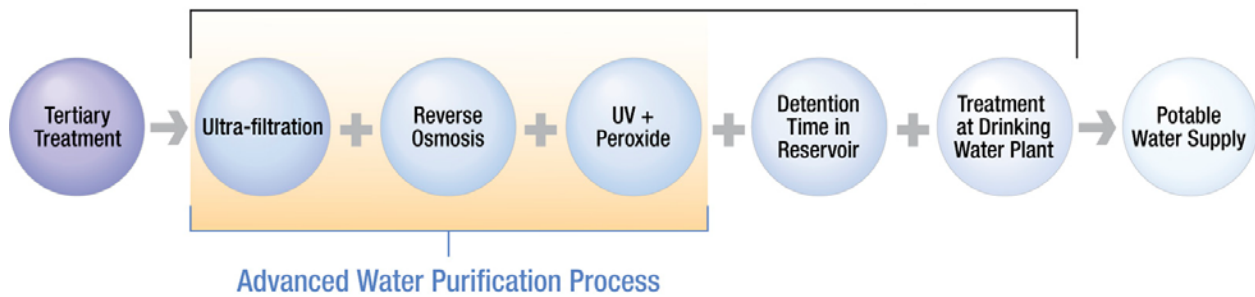


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Water Purification Demonstration Project Advanced Water Purification Process



Multi-Barrier Water Treatment Steps



The multiple barrier approach is a proven means to protect public health. Each barrier or step must have frequent and continuous water quality monitoring. Safeguards are built into the process to insure that a failure or error at any given treatment step would not compromise public health.

Quick Facts Document

Quick Facts

Water Reuse Program

Water Purification Demonstration Project

The City of San Diego • Public Utilities Department

Water Purification | Demonstration Project



Recycled Water

San Diego's water supply:

- 85-90 percent imported from Northern California and the Colorado River
- Environmental stresses & pumping restrictions make importing water unreliable & expensive
- A 2005 Water Reuse Study identified reservoir augmentation as the preferred option for further developing recycled water sources

Reservoir augmentation:

- Uses water purification technology on recycled water
- Blends purified water with existing supplies in a local reservoir
- Treats the blended water further before distribution as drinking water

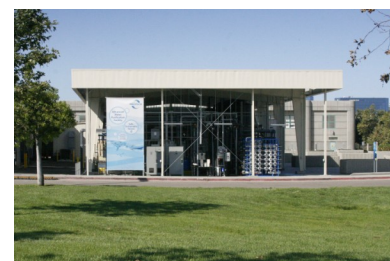


San Diego's Water Purification Demonstration Project (Demonstration Project):

- A test project examining the use of water purification technology
- Will determine if reservoir augmentation is a feasible option for San Diego
- Uses a multi-barrier approach in which safeguards insure that a failure at any treatment step would not compromise public health
- Purified water is not added to the drinking water system during this test phase; instead it is returned to the recycled water system

Advanced Water Purification Facility:

- Purifies one million gallons of recycled water per day as part of the Demonstration Project
- Treats recycled water with a multi-barrier process of membrane filtration, reverse osmosis and ultraviolet light/advanced oxidation
- Has hosted numerous tours for local and international visitors since June 2011



Potential benefits of implementing reservoir augmentation in San Diego:

- Provide a local and sustainable supply of purified drinking water
- Improve the quality of water in the San Vicente Reservoir
- Decrease dependence on imported water
- Increase use of recycled water



The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.



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Frequently Asked Questions (FAQ)

FAQ

Water Reuse Program

Water Purification Demonstration Project

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North City Water Reclamation Plant

Does San Diego need more water?

Water is essential to our quality of life. The City of San Diego imports approximately 85 to 90 percent of its water supply from Northern California and the Colorado River. For the past few years, California has been affected by a historic dry period and a drought on the Colorado River. In addition, legal and regulatory decisions to protect endangered species in the Sacramento – San Joaquin Delta have resulted in restrictions on the amount of water that can be imported from Northern California. Population projections predict the City will need more water in the future than is used today. Since San Diego is at the end of the imported water pipeline, and receives an average of 10 inches of rain each year, we need to develop local water supplies to secure a reliable supply of water for present and future City of San Diego water customers.

Why can't we just conserve enough water to meet future needs?

Using water wisely through conservation practices should always be the first step in preserving the City's precious water supplies. The average water demand (which includes local surface water, imported water, conservation and recycled water) for the City of San Diego for the last six fiscal years has been approximately 260,000 acre-feet per year. The City's conservation programs have helped reduce its dependence on imported water by saving more than 34,000 acre-feet of drinking water a year. That's enough water to meet the needs of 68,000 average families of four for one year. Nonetheless, by 2030 the City will need an additional 43,000 acre-feet of water per year to meet the needs of current and future public utilities customers. So while conservation is important, efforts to save water need to be combined with other sustainable strategies if we are to have enough water for all of our needs.

Doesn't the City already recycle water?

Yes. The City of San Diego operates two water recycling facilities capable of treating 45 million gallons per day of wastewater to secondary and tertiary treatment levels. Recycled water treated to a secondary level is safe for distribution into the environment, while recycled water treated to a tertiary level undergoes further treatment so the water is safe for use in irrigation and industrial purposes.

The recycled water produced by these plants is primarily used for irrigation and industrial purposes. A separate distribution system of "purple pipes" is required to keep the recycled water separate from drinking water pipelines. Constructing additional purple pipe distribution systems is costly. Also, using recycled water for irrigation is seasonal – it is not used in rainy periods or when it is cooler. This means less than half of all wastewater available for recycling is beneficially reused. The remainder of recycled water is treated to a secondary level and discharged into the ocean. Because of the cost and the limited use of existing recycled water, the City is examining other ways to use more recycled water, including reservoir augmentation.

Does the City plan to use more recycled water?

Yes, the City has a recycled water master plan and is always looking for ways to reuse existing water supplies. In 2005 the City conducted a comprehensive, balanced, impartial and science-based Water Reuse Study of all recycled water opportunities. The study included a public

- more -

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.



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participation component and concluded that Indirect Potable Reuse through Reservoir Augmentation was the preferred method of implementing the expanded use of recycled water in San Diego.

The Water Reuse Study was the first phase of the City's plan to expand the use of recycled water. The second phase is now underway to examine the feasibility of reservoir augmentation through a demonstration project.

What is Reservoir Augmentation?

Reservoir augmentation is a multi-step process that is being examined by the Water Purification Demonstration Project. It includes using advanced water purification processes on recycled water which can be blended with existing "raw" water supplies. The Demonstration project will not send purified recycled water to a local reservoir. The concept of Reservoir Augmentation is to add purified recycled water to a local reservoir which can be treated to drinking water standards and distributed to the public.

What is the Water Purification Demonstration Project?

The Demonstration Project is the second phase of the City's plan to expand the use of recycled water. It will evaluate the use of advanced water purification technology and the feasibility of producing water that can be sent to blend with existing water in a local reservoir. The Demonstration Project includes a study of San Vicente Reservoir, research to determine a pipeline alignment, a public outreach education program and the construction and operation of a pilot scale advanced water purification facility.

Is this project toilet-to-tap?

Although "toilet-to-tap" has been used to describe this project in the past, it is not an accurate description. The notion that wastewater can be sent directly to drinking water taps is inaccurate. "Toilet-to-tap" is misleading because it ignores key treatment steps and strict testing requirements that are involved in the recycling process. In California, all forms of water are highly regulated and monitored to ensure safety. Since there is no new water on Earth, all water goes through a natural cycle and is essentially recycled water before it is treated and tested before being sent to drinking water taps. This project is strictly a demonstration and at no point during the demonstration phase will recycled water be distributed to drinking water taps.

What is the latest in water purification technology?

The Demonstration Project is using a state-of-the-art purification process that purifies treated wastewater to a level similar to distilled water quality. This process includes membrane filtration, reverse osmosis, and advanced oxidation through the use of ultraviolet light and hydrogen

peroxide. The resulting purified water is of higher quality than existing raw water sources and can be used as a locally controlled source to augment reservoir supplies.

Is reservoir augmentation safe?

Yes. There are many public health protection steps that must be taken before highly purified recycled water can be used for reservoir augmentation. A state-of-the-art process of water purification produces water that is similar to distilled water quality. After this water is put in the reservoir, it blends with existing supplies of untreated or raw water. All water that is distributed to public drinking water taps must meet strict state and federal drinking water standards. Water stored in open reservoirs (lakes) is processed through a drinking water treatment plant. After this final treatment, the water meets drinking water standards before it can be distributed to homes and businesses. The water treatment and distribution system is also monitored regularly to ensure safety.

Will recycled water be added to our drinking water now?

No. The Demonstration Project will test the key functions of reservoir augmentation on a small scale and no recycled water will be sent to the reservoir or distributed to customers during the demonstration phase. The City will operate a pilot scale facility for at least one year to analyze water quality and monitoring methods. At the same time, an independent advisory panel of experts will provide oversight of project research to determine if the treatment system meets all water quality, safety and regulatory requirements necessary to determine the viability of a full-scale project.

What are the benefits of reservoir augmentation?

Reservoir augmentation can provide a locally controlled, drought-proof supply of high-quality water. If implemented, a full-scale project will increase the utilization of recycled water and save energy by reducing San Diego's dependence on imported water. Reservoir augmentation could also improve the water quality in the San Vicente Reservoir and have a positive impact on the environment by producing less discharge into the ocean.

Would you like to know more?

In an effort to keep San Diegans informed about this important project, the public outreach program is offering free tours of the Advanced Water Purification Facility and project presentations will be made to groups upon request.

For more information, please call (619)533-7572 or email purewatersd@sandiego.gov.

To register for a tour, please visit www.purewatersd.org.

FAQ

Water Reuse Program

Proyecto de Demostración de Purificación de Agua

The City of San Diego • Public Utilities Department

Water Purification | Demonstration Project



North City Water Reclamation Plant

Requiere San Diego de un mayor abastecimiento de agua?

El agua es esencial para nuestra calidad de vida. La Ciudad de San Diego (Ciudad) importa aproximadamente entre el 85 y el 90 por ciento de su suministro de agua del Norte de California y del Río Colorado. Durante los últimos años, California ha sido afectado por un período histórico árido, así como por una sequía en el Río Colorado. Adicionalmente, las decisiones legales y normativas a favor de la protección de las especies en peligro de extinción en la Delta San Joaquin – Sacramento, han generado restricciones sobre la cantidad de agua que se podrá importar del Norte de California. Proyecciones demográficas pronostican que la Ciudad necesitará más agua en futuro que la cantidad que se consume hoy día. Siendo que San Diego se encuentra al final del sistema de conducción de agua importada, y que, en promedio, recibe 10 pulgadas de lluvia cada año, tendremos que desarrollar todas las posibles fuentes de agua locales para garantizar un suministro confiable de agua para residentes y negocios sandieguños actuales y futuros.

Porqué no podemos simplemente conservar más agua?

El primer paso en la protección de nuestro suministro local de agua siempre debe ser consumir menos agua por medio de la conservación. Los programas de conservación de la Ciudad han logrado reducir nuestra dependencia sobre el agua importada generando ahorros de más de 33,000 pies-acre de agua potable en forma anual, que resulta ser cantidad suficiente para satisfacer las necesidades de aproximadamente 66,000 familias típicas durante un año. Sin embargo, reconociendo la importancia de la conservación, las iniciativas para generar ahorros en el consumo del agua tendrán que combinarse con otras estrategias sustentables para cubrir las necesidades de agua que San Diego tendrá en un futuro.

Actualmente recicla agua La Ciudad?

Sí, la Ciudad opera dos instalaciones para producir agua reciclada, mismas que son capaces de tratar 45 millones de galones de aguas negras a niveles secundarios y terciarios. Agua reciclada tratada a niveles secundarios se puede descargar al medio ambiente, mientras que agua tratada a niveles terciarios pasa por un tratamiento adicional, es entonces donde el agua se puede utilizar para riego y usos industriales.

El uso primordial de el agua reciclada producida en estas plantas es para uso de riego o industrial. La distribución de agua reciclada requiere de un sistema de conducción independiente del sistema de agua potable, para diferenciarlo, la tubería de agua reciclada es morada, construir otro sistema de agua es costoso. Además, el uso de agua reciclada para riego es por temporadas, existe menos uso durante época de lluvia o de frío. Esto significa que menos de la mitad de aguas negras disponible se usa y es tratada a niveles terciarios, el resto solo es tratada a niveles secundarios y tirada al mar. Por el costo y el uso limitado de el agua reciclada, la Ciudad esta analizando otras formas de usar agua reciclada, incluyendo la posibilidad de mandar agua reciclada a las presas.

Cuenta la Ciudad con un plan de consumo de agua reciclada?

Sí, la Ciudad cuenta con un plan maestro para el uso de agua reciclada, y siempre está al pendiente de identificar formas en que se pueda reutilizar el suministro de agua existente. En el 2005 la Ciudad realizó un Estudio de Reuso de Agua que abarco todas las oportunidades para reutilizar el agua reciclada, basado en una metodología científica que fuera completa, equilibrada e imparcial. El estudio integró un componente de participación pública y concluyó que la Reutilización Indirecta de Agua Potable a base de Aumentar los Niveles de Agua en las Presas, sería el método preferido para ampliar el mayor uso de agua reciclada en San Diego.

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.



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El Estudio de Reuso de Agua representó la primera etapa del plan de la Ciudad en ampliar el uso de agua reciclada. La segunda fase actualmente se realiza con un proyecto de demostración donde se analiza la factibilidad de aumentar los niveles de agua en las presas.

En qué consiste el Aumentar los Niveles de Agua en una presa?

El proceso de aumentar los niveles de agua en las presas abarca múltiples pasos, mismos que actualmente están siendo analizados por el Proyecto de Demostración de Purificación de Agua. Incluye utilizar procesos avanzados de purificación de agua utilizando agua reciclada que podrá mezclarse con los suministros de aguas crudas actuales. El proyecto de Demostración no enviará agua reciclada purificada a una presa local. El concepto de aumentar los niveles de agua en una presa es agregar agua reciclada purificada a una presa local que podrá ser sometido a un tratamiento para cumplir con estándares locales de agua potable y ser distribuida al público.

En qué Consiste el Proyecto de Demostración de Purificación de Agua?

El Proyecto de Demostración es la segunda fase del plan de la Ciudad en ampliar el uso de agua reciclada. Este evaluará el uso de tecnología avanzada para la purificación de agua y la factibilidad de producir agua que podrá ser distribuida para mezclarse con agua actual en una presa local. El Proyecto de Demostración incluye un estudio de la Presa de San Vicente, investigación para determinar la alineación con el sistema de conducción, un programa de difusión al público y la construcción y operación de una instalación avanzada de purificación de agua a nivel piloto.

Es este proyecto “del escusado a la llave” (toilet- to-tap)?

Aunque el uso de “del escusado a la llave” (“toilet- to-tap”) el escusado a la llave”) ha sido usado en el pasado para describir este proyecto, la descripción no es correcta. La idea que las aguas negras se puedan enviar directamente a la llave de agua potable es errónea tratándose de cualquier proyecto de agua reciclada, ya que deja fuera los pasos claves de tratamiento así como los análisis rigurosos requeridos. En California, todo tipo de agua es altamente regulada y monitoreada para asegurar la salud pública. Ya que no hay nuevas fuentes de agua en el mundo, toda el agua pasa por un proceso natural y básicamente es agua reciclada antes de ser tratada y analizada antes de ser enviada a las llaves de agua. Este proyecto es estrictamente un proyecto de demostración y en ningún momento se enviará agua reciclada a las llaves de agua.

Cual es la tecnología mas avanzada de la purificación de agua ?

La purificación de agua avanzada es un proceso vanguardista que purifica las aguas negras sumamente tratadas hasta lograr un nivel de calidad similar a el de agua destilada. Este proceso incluye filtración por membranas, ósmosis inversa, y la desin-

fección a través del uso de luz ultra violeta y peróxido. El agua purificada que resulte es de mayor calidad que las fuentes actuales de aguas crudas, y podrá utilizarse como una fuente localmente controlada para incrementar el abastecimiento de agua en las presas.

Es un proceso seguro el aumentar los niveles de agua en las presas?

Sí. Existen muchos pasos para la protección de la salud pública que deberán cumplirse antes de que el agua reciclada altamente purificada se pueda utilizar en aumentar los niveles de agua en las presas. Un proceso con tecnología de punta en la purificación de agua produce agua que cumple con niveles de calidad de agua destilada. Después de que está agua se envía a la presa, se mezcla con el abastecimiento de agua actual de aguas crudas o no tratadas. Toda el agua que se distribuya a las llaves de agua deberá cumplir con estrictos estándares de agua potable a nivel estatal y federal. El agua es almacenada en depósitos abiertos (lagos) y se procesa a través de una planta de tratamiento de agua potable que elimina todas las sustancias nocivas. Después del tratamiento final, el agua cumplirá con estándares de agua potable antes de que pueda ser distribuida a casas residenciales o negocios. El sistema de tratamiento y conducción de agua se monitorea regularmente para garantizar la seguridad pública.

Se incorporará el agua reciclada a nuestra agua potable ahora?

No. El Proyecto de Demostración analizará las funciones claves mediante las cuales se aumentará el nivel de agua en las presas a pequeña escala y no se enviará agua reciclada a ninguna presa ni se distribuirá a los clientes durante la fase de demostración. La Ciudad operará esta instalación a escala piloto por lo menos durante un año para analizar las operaciones. Al mismo tiempo, un panel asesor independiente integrado por expertos supervisará la investigación del proyecto para determinar si el sistema de tratamiento cumple con todos los requisitos de calidad de agua, seguridad y los reglamentos necesarios para determinar si un proyecto a gran escala sería viable.

Cuáles son las ventajas de aumentar los niveles de agua en los reservorios?

El aumentar los niveles de agua en las presas ofrece maneras de control local, contra sequias el suministro de agua de alta calidad. Si esto es implementado, un proyecto a gran escala, incrementara la utilización de agua reciclada y generara ahorros de energía al reducir la dependencia que San Diego tiene sobre al agua importada. El aumentar los niveles de agua en las presas también podría mejorar la calidad de agua en el Presa San Vicente así como generar un impacto positivo al medio ambiente al producir menos descarga de aguas negras parcialmente tratadas al mar.

Desea mayor información?

El personal de la ciudad quiere llegar con su mensaje al mayor número de sandieguinos y presentarles información sobre el Proyecto de Demostración a su organización.

FAQ

Water Reuse Program

Dự án lọc nước thí điểm Các câu hỏi thường gặp

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North City Water Reclamation Plant

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.

Thành phố San Diego có cần thêm nước?

Nước là yếu tố không thể thiếu cho chất lượng cuộc sống. Thành phố San Diego nhập khẩu từ miền Bắc tiểu bang California và sông Colorado khoảng 85% đến 90% trong tổng lượng nước cần để cung cấp. Trong vài năm qua, tiểu bang California đã bị ảnh hưởng bởi thời kỳ khô hạn hiếm thấy từ trước đến nay và một đợt hạn hán xảy đến cho sông Colorado. Bên cạnh đó, những quyết định pháp lý và mang tính bắt buộc để bảo vệ các loài động thực vật đang bị đe dọa tại vùng châu thổ Sacramento - San Joaquin (Sacramento - San Joaquin Delta) đã dẫn đến hạn chế về lượng nước có thể được nhập khẩu từ miền Bắc California. Những thống kê dự đoán về dân số cho thấy Thành phố sẽ cần nhiều nước hơn trong tương lai so với lượng nước được sử dụng hiện nay. Vì San Diego nằm ở khu vực cuối của đường ống dẫn nước nhập khẩu, và có lượng mưa trung bình mỗi năm vào khoảng 10 inch, chúng ta cần phải phát triển tất cả các nguồn cung cấp nước có thể sử dụng được ngay tại địa phương để bảo đảm việc cung cấp nước lâu dài cho dân cư và các doanh nghiệp trong hiện tại và tương lai ở San Diego.

Tại sao chúng ta không thể tiết kiệm nước nhiều hơn (như là một cách để có thêm nước)?

Sử dụng nước ít hơn bằng cách tiết kiệm luôn là bước đầu tiên trong việc bảo vệ nguồn cung cấp nước địa phương của chúng ta. Những chương trình tiết kiệm nước của Thành phố đã giúp giảm sự phụ thuộc của chúng ta vào nước nhập khẩu bằng cách tiết kiệm được hơn 33 ngàn acre-feet (33,000 acre-feet) nước dùng cho sinh hoạt một năm, đủ để đáp ứng nhu cầu sử dụng nước cho một năm của khoảng 66 ngàn hộ gia đình. Tuy nhiên, trong lúc việc bảo tồn nước là quan trọng, những nỗ lực để tiết kiệm nước cần được kết hợp với các chiến lược dài hạn khác để đáp ứng nhu cầu sử dụng nước của San Diego trong tương lai.

Không phải là Thành phố đã sử dụng nước tái chế rồi?

Đúng. Thành phố San Diego điều hành hai hệ thống hiện đại tái xử lý nước có khả năng sản xuất gần 45 triệu gallon nước tái chế một ngày nhằm mục đích phục vụ cho trồng trọt và các hoạt động công nghiệp. Việc phân phối nước tái chế đòi hỏi một hệ thống đường ống dẫn riêng bao gồm những ống màu tím để phân biệt với các đường ống dùng để dẫn nước sinh hoạt. Hệ thống phân phối nước tái chế của thành phố hiện đang tiếp tục được mở rộng. Tuy nhiên, việc sử dụng nước tái chế cho trồng trọt chỉ mang tính mùa vụ; do đó, lượng nước dư được thải ra biển trong suốt những mùa mưa. Xây dựng hệ thống dẫn nước với đường ống màu tím lại tốn kém, do vậy thành phố đang xem xét những phương cách khác để sử dụng được nhiều nước tái chế hơn, trong đó gồm có cả việc tăng lượng nước tích trữ trong hồ chứa.

Thành phố hiện đã có kế hoạch cho việc sử dụng nước tái chế chưa?

Có, Thành phố có một kế hoạch tổng thể về sử dụng nước tái chế và luôn tìm cách để tái sử dụng nguồn nước hiện có. Năm 2005, Thành phố tiến hành một cuộc nghiên cứu tái sử dụng nước chi tiết toàn diện, khách quan, dựa trên các thông số và mang tính khoa học nhằm xem xét tất cả những cơ hội sử dụng nước tái chế. Cuộc nghiên cứu thăm dò đó có cả phần tham gia của công chúng và đi đến kết luận rằng “Kế hoạch gián tiếp dùng lại nguồn nước lưu động” (Indirect Potable Reuse) hay còn được gọi là “Tăng lượng nước được tích trữ trong hồ chứa” là phương pháp ưu tiên để thực hiện quá trình mở rộng việc sử dụng nước tái chế tại San Diego.



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Điều gì đã được thực hiện từ khi có cuộc nghiên cứu tái sử dụng nước vào năm 2005?

Cuộc nghiên cứu tái sử dụng nước là giai đoạn đầu trong kế hoạch của Thành phố nhằm mở rộng việc sử dụng nước tái chế. Giai đoạn thứ hai đang được tiến hành để kiểm tra tính khả thi của việc tăng lượng nước tích trữ trong hồ chứa thông qua một dự án thí điểm.

“Tăng lượng nước tích trữ trong hồ chứa” là một quá trình như thế nào?

Việc tăng lượng nước tích trữ trong hồ chứa là một quá trình gồm nhiều bước đang được khảo sát thông qua Dự án lọc nước thí điểm. Quá trình đó bao gồm việc sử dụng các quy trình lọc nước tiên tiến để làm cho nước tái chế có thể pha trộn được với nguồn nước “tự nhiên” hiện có. Dự án thí điểm sẽ không đưa nước tái chế được lọc sạch vào một hồ chứa nào tại địa phương. Khái niệm của quy trình “Tăng lượng nước tích trữ trong hồ chứa” là nhằm đưa thêm nước tái chế sau khi được tinh lọc vào hồ chứa địa phương để có thể được xử lý theo tiêu chuẩn nước sinh hoạt và phân phối cho cộng đồng.

“Dự án lọc nước thí điểm” thực ra là gì?

Dự án thí điểm là giai đoạn thứ hai trong kế hoạch của Thành phố nhằm mở rộng việc sử dụng nước tái chế. Dự án sẽ đánh giá việc sử dụng công nghệ lọc nước tiên tiến và tính khả thi của việc xử lý nước để có thể đưa vào pha trộn với nước hiện có trong hồ chứa địa phương. Dự án thí điểm bao gồm nghiên cứu đánh giá hồ chứa nước San Vicente, nghiên cứu để xác định đường liên kết ống dẫn nước, chương trình tiếp cận cộng đồng nhằm phổ biến thông tin, và xây dựng cũng như vận hành thử nghiệm một hệ thống lọc nước tiên tiến.

Có phải đây là dự án biến nước thải thành nước dùng trong sinh hoạt?

Không, dự án này hoàn toàn là một khảo sát thí điểm và sẽ không có lượng nước tái chế nào được phân phối đến nguồn nước dùng cho sinh hoạt vào bất kỳ thời điểm nào trong quá trình của dự án. Hơn nữa, việc tin rằng nước thải có thể được đưa trực tiếp đến các vòi nước dùng cho sinh hoạt là hiểu biết sai lệch về bất kỳ dự án nước tái chế nào vì nhận định như vậy đã bỏ qua các bước xử lý then chốt và các quy định kiểm tra nghiêm ngặt. Tại California, tất cả các loại nước đều được quy định và giám sát chặt chẽ để đảm bảo độ an toàn. Do không có nguồn nước mới trên trái đất, tất cả các loại nước trải qua một quá trình xử lý theo tự nhiên và được tái sinh một cách tất yếu trước khi được xử lý và kiểm tra thông qua một số quy trình, rồi sau đó được đưa đến các vòi nước dùng sinh hoạt hằng ngày.

Thế nào là “Lọc nước tiên tiến”?

Lọc nước tiên tiến là một quá trình phức tạp về mặt kỹ thuật để thanh lọc kỹ lưỡng nước thải đạt đến chất lượng nước cất. Quá trình này bao gồm xử lý qua màng lọc, thẩm thấu ngược, và khử trùng thông qua việc sử dụng tia cực tím và chất peroxyl. Nước tinh khiết sau khi xử lý có chất lượng cao hơn nguồn nước “tự nhiên” hiện có và có thể sử dụng như nguồn nước được kiểm soát tại địa phương để tăng thêm nguồn cung cấp nước cho hồ chứa.

Việc tăng lượng nước tích trữ trong hồ chứa có an toàn không?

Có. Có rất nhiều bước bảo vệ sức khỏe cộng đồng phải được thực hiện trước khi nước tái chế được tinh lọc kỹ, có thể được sử dụng để đưa vào hồ chứa làm tăng lượng nước tích trữ. Một quá trình lọc nước dùng kỹ thuật cao sẽ tạo ra nguồn nước có chất lượng như nước cất. Sau khi loại nước này được đưa vào hồ chứa, nó được pha trộn với nguồn nước tự nhiên sẵn có chưa qua xử lý hay còn gọi là nước “thô”. Toàn bộ lượng nước được đưa đến các vòi nước phục vụ cho sinh hoạt của người dân phải đáp ứng các tiêu chuẩn nghiêm ngặt về nước uống của tiểu bang và liên bang. Nước được lưu trữ trong các hồ chứa lộ thiên được xử lý qua một nhà máy xử lý nước dùng sinh hoạt nhằm loại bỏ tất cả các chất có hại. Sau bước xử lý cuối cùng, nguồn nước sẽ đáp ứng được tiêu chuẩn của nước uống trước khi nó có thể được phân phối cho các gia đình và doanh nghiệp. Việc xử lý nước và hệ thống phân phối cũng được giám sát định kỳ thường xuyên để đảm bảo độ an toàn.

Có phải nguồn nước tái chế sẽ được bổ sung vào nước sinh hoạt của chúng ta hiện nay?

Không. Dự án thí điểm sẽ kiểm tra các bước vận hành quan trọng của quá trình tăng cường lượng nước tích trữ cho hồ chứa trên một quy mô nhỏ và sẽ không có lượng nước tái chế nào được đưa vào hồ chứa hay phân phối cho người sử dụng trong giai đoạn thí điểm. Thành phố sẽ điều hành một hệ thống thử nghiệm trong vòng ít nhất một năm để phân tích các hoạt động. Đồng thời, một hội đồng tư vấn độc lập bao gồm các chuyên gia cũng giám sát việc nghiên cứu của dự án để xem xét liệu hệ thống xử lý có đáp ứng được các yêu cầu về chất lượng nước, độ an toàn và quy định pháp lý cần thiết để quyết định tính khả thi của toàn bộ dự án đầy đủ các giai đoạn.

Có những lợi ích gì trong việc tăng lượng nước tích trữ trong hồ chứa?

Việc tăng lượng nước tích trữ trong hồ chứa có thể tạo ra một nguồn cung cấp nước chất lượng cao có thể kiểm soát tại địa phương và chống lại hạn hán. Nếu được thực hiện, một dự án hoàn chỉnh với đầy đủ các giai đoạn sẽ làm tăng khả năng sử dụng nước tái chế và tiết kiệm năng lượng bằng cách giảm sự phụ thuộc của San Diego vào nguồn nước nhập khẩu. Tăng lượng nước tích trữ trong hồ chứa cũng có thể cải thiện chất lượng nước ở khu vực hồ chứa San Vicente và có một tác động tích cực đến môi trường nhờ xả ít chất thải hơn ra biển.

Bạn cần biết thêm thông tin?

Nhân viên làm việc cho Thành phố đang tiếp cận với càng nhiều cư dân San Diego càng tốt để trình bày về dự án thí điểm này. Chúng tôi mong muốn được đến tận nơi để cung cấp cho bạn thêm thông tin về việc tăng lượng nước tích trữ trong hồ chứa. Xin vui lòng gọi đến số điện thoại (619) 533-7572 hoặc vào trang web của dự án tại địa chỉ www.purewatersd.org để biết thêm thông tin.

Information (Fact) Card



THE CITY OF SAN DIEGO

Water Purification | Demonstration Project

www.purewatersd.org

Potential benefits of the Demonstration Project

- Provide a local and sustainable supply of high-quality drinking water for San Diego
- Increase utilization of recycled water
- Decrease reliability on imported water
- Provide a supply of water that uses less energy than imported water
- Improve the quality of water in the San Vicente Reservoir
- Have a positive impact on the environment by producing less discharge into the ocean & working toward lower carbon emissions

2011 City of San Diego Public Utilities

Did You Know...

1. San Diego needs to develop local, reliable and sustainable sources of water to lessen our dependence on imported water due to multiple factors affecting California's water supply.
2. The Water Purification Demonstration Project is examining the use of advanced water purification technology on high-quality recycled wastewater to determine the feasibility of a full-scale reservoir augmentation project in the future.
3. The water produced by the purification process goes through multiple steps of advanced treatment and will be tested to meet all water quality, safety and regulatory requirements.*

* No purified water will be added to the San Vicente Reservoir or San Diego's drinking water system during the Demonstration Project.

(619) 533-7572

purewatersd@sandiego.gov



Interest and Information Card

The latest version of the card is displayed. Similar cards with varying formatting were developed for events.

Water Purification | Demonstration Project



THE CITY OF SAN DIEGO

INFORMATION CARD



Please check all that apply:

- I am **interested** in the Water Purification Demonstration Project as a reliable local water source.
- I would like a project representative to make a **presentation to my organization.**
- I would like to receive **periodic updates** about the Demonstration Project.
- I **support** the City of San Diego pursuing the Demonstration Project.

Please send information to:

Name: _____ Organization: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ E-mail: _____

purewatersd@sandiego.gov • (619) 533-7572 • www.purewatersd.org 

Website

The screenshot is from February 2012 of the home page for the Water Purification Demonstration Project website.

WATER PURIFICATION DEMONSTRATION PROJECT

WEBSITE HOME PAGE (www.purewatersd.org)

[WATER HOME](#) | [GENERAL INFO](#) | [LAKES AND RECREATION](#) | [WATER & SEWER BILL/RATES](#) | [WATER CONSERVATION](#) | [RECYCLED WATER](#) | [WATER QUALITY](#) | [CAPITAL IMPROVEMENTS](#) | [WATER REUSE](#)

[Water Home](#) • [Water Reuse](#) • [Water Purification Demonstration Project](#)

Water Reuse

- [Water Reuse Home](#)
- [Water Reuse Study](#)
- [Water Purification Demonstration Project](#)
 - [News and Publications](#)
 - [General Information](#)
 - [Public Involvement](#)
 - [Independent Advisory Panel](#)
 - [Links & Resources](#)
- [Full-Scale Reservoir Augmentation](#)

Project Objective

Evaluate the feasibility of using advanced treatment technology to produce water that can be sent to San Vicente Reservoir and later distributed as potable water.

Determine if the Demonstration Project provides evidence of viability for a full-scale IPR/RA project.

[The Yuck Factor: Get Over It](#)

Water Purification Demonstration Project

City of San Diego's
Water Purification Demonstration Project
Purification Process

[View Larger](#)

As part of the City's water resource strategy, the [Water Purification Demonstration Project](#) (PDF) is examining the use of advanced water purification technology to provide safe and reliable water for San Diego's future. The Demonstration Project will determine the feasibility of a full-scale reservoir augmentation project, which would diversify San Diego's water supply, reduce its dependence on imported water and provide a safe source of drinking water for residents.

In an effort to keep San Diegans informed about this important project, free public [tours](#) of the Advanced Water Purification Facility are available, as well as project presentations to all interested groups and opportunities to learn more about the project at community events throughout San Diego. For more information, please call (619) 533-7572 or email purewatersd@sandiego.gov

(No purified water will be added to San Diego's drinking water supply during this demonstration phase.)

PureWaterSD.org

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TOUR
THE ADVANCED WATER PURIFICATION FACILITY

Advanced Water Purification Facility

[Watch Video of Advanced Water Purification Facility](#)

Watch Video of Huell Howser's California's Water (2010)

[Water Home](#) | [General Information](#) | [Lakes and Recreation](#) | [Water & Sewer Bill/Rates](#) | [Water Conservation](#) | [Recycled Water](#) | [Water Quality](#) | [Capital Improvements](#) | [Water Reuse](#)

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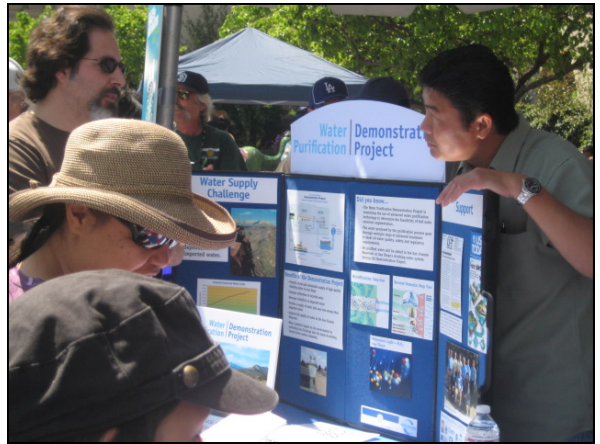
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Photographs

Community Events



Advanced Water Purification Facility Tours



eUpdate

E-Update

Water Reuse Program

Water Purification Demonstration Project

The City of San Diego • Public Utilities Department

Water Purification | Demonstration Project

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.

The City of San Diego's Water Purification Demonstration Project is underway to examine the use of advanced water purification technology on high quality recycled wastewater. The Demonstration Project will determine the feasibility of a full-scale reservoir augmentation project, which would diversify San Diego's water supply, reduce its dependence on imported water and provide a safe source of drinking water for residents.

The San Diego Public Utilities Department invites you to visit the Water Purification Demonstration Project website at www.purewatersd.org to learn more. The project's public education and outreach program is offering informative presentations to all groups upon request and free tours of the Advanced Water Purification Facility following its completion in 2011. For more information, please call (619) 533-7572 or email purewatersd@sandiego.gov.

We hope that you will become informed and get involved in this important project for San Diego's future!



Recycled Water

WPDP

In the News

[New Source of Drinking Water Hinges on Pilot Project](#)

(PDF)

San Diego Union Tribune, October 11, 2010

City of San Diego Public Utilities Department • Long-Range Planning & Water Resources Division
600 B Street, Suite 600, San Diego, CA 92101 • (619)533-7572 www.purewatersd.org

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The City of San Diego | Public Utilities Department

E-Update #2 February 2011

Under Construction

In January, work crews poured the foundation for the new Advanced Water Purification Facility (AWP Facility) located at the North City Water Reclamation Plant. Construction on the testing facility will continue throughout the spring.



Upon completion of the AWP Facility in summer 2011, the City will begin demonstrating advanced purification technology for approximately one year. During the demonstration period, 1 million gallons of purified water per day will be produced. The public will have the opportunity to visit the facility throughout the testing phase. To schedule a tour, please call (619) 533-7572 or email purewatersd@sandiego.gov.

In the News



[The Yuck Factor: Get Over It](#)

San Diego Union-Tribune, January 23, 2011

Upcoming Event

The Demonstration Project staff will be hosting an informational booth at the following community event:

[San Diego Science Festival - Expo Day](#)
 Saturday, March 26, 10 a.m. - 5 p.m.
 Petco Park

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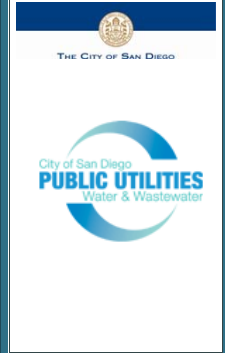
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The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.



The City of San Diego | Public Utilities Department

E-Update #3 May 2011

Coming Attraction

The City of San Diego opens the doors this summer to its Advanced Water Purification Facility (AWP Facility). Located at the North City Water Reclamation Plant, this facility is part of the City's Water Purification Demonstration Project, which is examining the use of water purification technology on recycled water.



The AWP Facility will operate for one year and will produce approximately 1 million gallons of purified water every day. Purified water will not be added to the drinking water supply during this testing period; it will be added to the existing recycled water distribution system. Members of the public are invited to tour the AWP Facility and see how this technology can transform wastewater into one of the purest sources of water in San Diego.

Keep an eye out for an email in June inviting you to sign up for a tour!

In the News

[From Toilets to Tap](#)
USA Today, March 3, 2011

[Wastewater Getting New Life Across County](#)
San Diego Union-Tribune, May 15, 2011

Recent Events

The Demonstration Project staff recently hosted informational booths at the San Diego Science Festival Expo Day, Lao New Year Festival, Qualcomm Earth Day Fair, EarthFair, City of San Diego Take Your Son or Daughter to Work Day, Sally Ride Science Festival and RiverFest. Thank you to everyone who visited our booths. We hope to see you at future community events!



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 <h2 style="margin: 0;">Water Reuse Program</h2> <h1 style="margin: 0;">Water Purification Demonstration Project</h1>	
<p>The City of San Diego Public Utilities Department</p>	
<p>Quick Links</p> <p>Water Purification Demonstration Project</p> <p>City of San Diego</p> <p>Forward email to a friend</p> <p>Sign up for emails</p>	<p>AWP Facility Tour</p> <p>Dear Danielle,</p> <p>The City of San Diego opens the doors this summer to its Advanced Water Purification Facility (AWP Facility). You are invited to tour the AWP Facility, where you will see how this technology can transform wastewater into one of the purest sources of water in San Diego. If you are one of the few guests who has already previewed this facility, now is the time to encourage friends and family to register for a tour.</p> <p>Located at the North City Water Reclamation Plant, this facility is part of the Water Purification Demonstration Project, which is examining the use of water purification technology for San Diego's future water supply. The AWP Facility will operate for one year and will produce approximately 1 million gallons of purified water every day. Purified water will be added to the recycled water distribution system and not to the drinking water supply during this demonstration phase.</p>
<p>Contact Us</p> <p>(619) 533-7572</p> <p>Email</p> <p>Facebook</p>	<p>Register Today</p> <ul style="list-style-type: none"> • Register for a tour of the Advanced Water Purification Facility at www.purewatersd.org/tours.shtml. • Email purewatersd@sandiego.gov or call (619) 533-6638 to schedule a presentation for your organization.
<p>Water Purification Demonstration Project</p> <p>The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.</p> 	<p>Register Today</p> <ul style="list-style-type: none"> • Register for a tour of the Advanced Water Purification Facility at www.purewatersd.org/tours.shtml. • Email purewatersd@sandiego.gov or call (619) 533-6638 to schedule a presentation for your organization. <p>I hope that you will take advantage of this exclusive opportunity. I look forward to your participation in the AWP Facility tour!</p> <p>Sincerely, Marsi A. Steirer Water Purification Demonstration Project Director City of San Diego, Public Utilities Department</p>
<p>The Demonstration Project has been funded in part by grants from the U.S. Bureau of Reclamation and from a Proposition 50 grant administered by the California Department of Water Resources.</p>	

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<p>Contact Us</p> <p>(619) 533-7572</p> <p>Email</p> <p> </p>	<p>Dear Danielle,</p> <p>As part of sweeps week, ABC affiliate 10 News in San Diego is promoting a segment scheduled to air tonight at 5 p.m. called "Toilet to Tap Reality." If you miss the segment when it airs, it should be viewable online following the broadcast. This segment proposes to examine the process of purifying recycled water at the Orange County Groundwater Replenishment System in relation to how a similar process may eventually be used in San Diego.</p> 
<p>Water Purification Demonstration Project</p> <p>The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.</p>  	<p>Learn More</p>  <p>If you are interested in learning more about water purification in San Diego, call the City's Water Purification Demonstration Project information line at (619) 533-7572 or visit the project website at www.purewatersd.org. An excellent way to learn more about the project is through a tour of the Advanced Water Purification Facility at North City Water Reclamation Plant. Reservations can be made online.</p> <p>Speakers bureau presentations to your organization are also available by calling (619) 533-6638.</p> <p>For those who want to find out more about what Orange County is already doing for water purification, visit www.gwrsystem.com/.</p>

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THE CITY OF SAN DIEGO



The City of San Diego | Public Utilities Department

Dear Danielle,

Find Us, "Like" Us & Follow Us!

We hope you have been following our project updates on Facebook and Twitter, and now the Water Purification Demonstration Project is sharing videos on YouTube. Please take a moment to subscribe to our YouTube page where you can take a virtual tour of the Advanced Water Purification Facility and see what goes on inside our water purification equipment.

Click the image to view the virtual tour:




[Water Purification Demonstration Project](#)


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Sincerely,
Marsi A. Steirer
 Water Purification Demonstration Project Director
 City of San Diego, Public Utilities Department

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Happy Holidays

A special greeting to express our sincere appreciation for your interest in, and support of, the Water Purification Demonstration Project.



Wishing you a happy holiday season and a healthy and prosperous New Year,

The Water Purification Demonstration Project Team

In acknowledgement of the City's ongoing drive for sustainability, we have opted to further reduce our paper usage and send you this eCard.

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February 2012

Demonstration Project Goes National

First it was [USA Today](#). Then [TIME](#). Now the New York Times has taken notice.

Today's New York Times cover story "[As 'Yuck Factor' Subsides, Treated Wastewater Flows From Taps](#)" highlights the nationwide interest in water purification as part of the solution for limited water supplies. The story features San Diego's Water Purification Demonstration Project along with several full-scale projects already in place.

As 'Yuck Factor' Subsides, Treated Wastewater Flows From Taps

As the nation's water shortage... (text continues)



The Demonstration Project is exploring the use of advanced water purification technology on recycled water to determine the feasibility of a full-scale reservoir augmentation project in the future. Currently, no purified water is being added to the drinking water supplies; instead the water is being returned to the City's recycled water distribution system.

Read the full story [here](#). Already saw the story? Get involved in the conversation on [Twitter](#) and [Facebook](#)!

National Research Council Report

Read the latest report from the National Research Council on the expansion of water reuse (the full report and a report in brief are offered on this page):

[Water Reuse: Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater](#)

It's All About the Science

SDSA High Tech Fair

Students and other visitors at the San Diego Science Alliance High Tech Fair learned about the water purification process at the Public Utilities Department's informational booth.


San Diego Festival of Science & Engineering EXPO Day




The Demonstration Project team is planning to make another science-related appearance at the [San Diego Festival of Science & Engineering EXPO Day](#) in PETCO Park on Saturday, March 24. Be sure to stop by our booth!



Contact Us

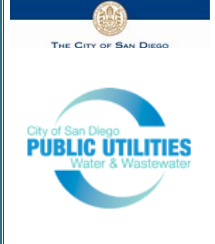
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Community Involvement
February 2012

Dear [NAME],

Education and community involvement are at the forefront of our mission to inform San Diegans about the benefits of the Water Purification Demonstration Project. Many community groups and organizations have taken advantage of the project's speakers bureau and nearly 2,000 people have toured the Advanced Water Purification Facility.

To keep members of City of San Diego informed about this important project, we would like to present the Demonstration Project at one of your upcoming meetings and invite you to sign up for a tour. Your group will learn about San Diego's water supply challenges and the City's efforts to pursue locally controlled, sustainable water supply options.

The Water Purification Demonstration Project is examining the use of advanced purification technology on recycled water as an option to supply safe and reliable water for San Diego's future.

Water Purification Demonstration Project

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.



THE CITY OF SAN DIEGO



Schedule a Presentation

Please call (619) 533-6638 or reply to this email to schedule a presentation.

We are happy to answer any questions you may have, and we hope to speak to your group about the Water Purification Demonstration Project in the near future.



Tour the Advanced Water Purification Facility

In addition to presentations, free tours of the Demonstration Project's Advanced Water Purification Facility are also available. Guests are guided on a walking tour through the water purification facility to view the treatment process and compare samples of water. Interested community members may register for a tour [online](#).



Spread the News

Water issues impact everyone. Share information about the Demonstration Project with City of San Diego. A template article is [available](#) for inclusion in your organization's newsletter or community paper. Please [email us](#) if you need the document in another format or would like photos to include with the article.

Also [available](#) is a flier publicizing the presentations and tours. Please share it with members of your organization.

Wrong Contact?

Although we do our best to update our contact information, we are aware that people often change roles within an organization or leave an organization. If you are not the appropriate person to schedule a presentation or tour, please let us know who we should contact.

Many thanks,
 Water Purification Demonstration Project
PureWaterSD.org

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	<p>Water Reuse Program</p> <h1>Water Purification Demonstration Project</h1>
<p>Quick Links</p> <p>Water Purification Demonstration Project</p> <p>City of San Diego</p> <p>Sign up for emails</p> <p>Forward email to a friend</p>	<p>The City of San Diego Public Utilities Department</p> <p>March 2012</p>
<p>Contact Us</p> <p>(619) 533-7572</p>    	<p>Dear [NAME],</p> <p>In 2004, you participated in the City of San Diego Water Reuse Study American Assembly Workshops in which participants endorsed reservoir augmentation as the preferred option for developing recycled water sources. In response to the Water Reuse Study, the Water Purification Demonstration Project is underway to examine the use of advanced purification technology on recycled water as an option to supply safe and reliable water for San Diego's future.</p> <p>Education and community involvement are at the forefront of our mission to inform San Diegans about the Water Purification Demonstration Project. Many community groups and organizations have taken advantage of the project's speakers bureau and nearly 2,000 people have toured the Demonstration Project's Advanced Water Purification (AWP) Facility.</p> <p>Since you played such a vital role in the Water Reuse Study, we want to ensure you remain informed about the project. Below are some ways for you to remain involved and to share project information with friends and colleagues.</p>
<p>Water Purification Demonstration Project</p> <p>The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.</p>	<p>Schedule a Presentation</p> <p>If you are a member of an organization, please call (619) 533-6638 or reply to this email to schedule a presentation.</p>  <p>We are happy to answer any questions you may have, and we hope to speak to your group about the Water Purification Demonstration Project in the near future.</p>
 <p>The City of San Diego</p> 	<p>Tour the Advanced Water Purification Facility</p>  <p>In addition to presentations, free tours of the Demonstration Project's Advanced Water Purification Facility are also available. Guests are guided on a walking tour through the water purification facility to view the treatment process and compare samples of water. Interested community members may register for a tour online.</p>
	<p>Spread the News</p> <p>Water issues impact everyone. Share information about the Demonstration Project with your organization or business. A template article is available for inclusion in your organization's newsletter or community paper. Please email us if you need the document in another format or would like photos to include with the article.</p> <p>Also available is a flier publicizing the presentations and tours. Please share it with colleagues, friends and family.</p>
	<p>Show Your Support</p> <p>If you are interested in further supporting water purification, you are welcome to write a letter of support. A sample letter of support can be found here for your reference.</p>
	<p>Thank You</p> <p>We appreciate the time and energy you put into participating in the Water Reuse Study American Assembly Workshops. We hope you remain involved in the Demonstration Project.</p> <p>Many thanks, Water Purification Demonstration Project PureWaterSD.org</p>

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You're receiving this email because you have expressed interest in the City of San Diego's Water Purification Demonstration Project. Please [confirm](#) your continued interest in receiving email from us. To ensure that you continue to receive emails from us, add purewatersd@sandiego.gov to your address book today.

You may [unsubscribe](#) if you no longer wish to receive our emails.

	<p>Water Reuse Program</p> <h1>Water Purification Demonstration Project</h1>
<p>Quick Links</p> <p>Water Purification Demonstration Project</p> <p>City of San Diego</p> <p>Sign up for emails</p> <p>Forward email to a friend</p>	<p>The City of San Diego Public Utilities Department</p> <p style="text-align: right;">April 20, 2012</p>
<p>Contact Us</p> <p>(619) 533-7572</p>    	<p>Dear Danielle,</p> <p>To celebrate Earth Day on April 22, 2012, the Water Purification Demonstration Project team will be participating in the following community events this weekend:</p> <p>Linda Vista Multicultural Festival Saturday, April 21, 10 a.m. - 5 p.m. Linda Vista Road (between Comstock St. and Ulric St.)</p> <p>Logan Heights Library Earth Day Event Saturday, April 28, 11 a.m. - 1 p.m. Logan Heights Branch Library, 567 S. 28th Street, San Diego</p> <p>San Diego Earth Fair Sunday, April 22, 10 a.m. - 5 p.m. Balboa Park</p>
<p>Water Purification Demonstration Project</p> <p>The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.</p>  	<p>Please stop by our booth to learn about how the City is examining the use of purification technology to provide a local and reliable source of Earth's most precious resource: water.</p>  <p>We will also be attending the following events next week: Scripps Research Institute Employee Fair City of San Diego Take Your Sons and Daughters to Work Day BD Biosciences Earth Day Event</p>
	<p>Upcoming Open House</p>
	<p>On Saturday, May 12, the Water Purification Demonstration Project will host an Open House event at the Advanced Water Purification Facility to celebrate Drinking Water Week. A total of six tours will be held every half hour from 10 a.m. until 12:30 p.m. Invite your colleagues, family and friends to join us for a tour, refreshments and giveaways. Please register for the event by May 7 at purewatersd.org/tours.shtml.</p>   <p>Learn More</p>

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You're receiving this email because you have expressed interest in the City of San Diego's Water Purification Demonstration Project. Please [confirm](#) your continued interest in receiving email from us. To ensure that you continue to receive emails from us, add purewatersd@sandiego.gov to your address book today.

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Water Reuse Program

Water Purification Demonstration Project

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Contact Us

(619) 533-7572



Water Purification Demonstration Project

The City of San Diego's water resource strategy includes planning, conservation, recycled water, groundwater, water reuse, and watershed and resource protection to help meet future water needs.





The City of San Diego | Public Utilities Department

Dear Danielle,

In case you missed it yesterday, Larry Himmel's Neighborhoods of CBS 8 visited the City of San Diego's Advanced Water Purification Facility. Watch the clip on the [CBS 8 website](#).



Learn More

If you are interested in learning more about water purification in San Diego, visit the project website at www.purewatersd.org.

Experience the project firsthand with a tour of the Advanced Water Purification Facility. Reservations can be made [online](#).

Speakers bureau presentations are also available for organizations by calling (619) 533-6638.



Upcoming Events

Visit the Demonstration Project's informational booths at the following events:

[San Diego Horticultural Society meeting](#)
Monday, August 13
6 - 8 p.m.
Del Mar Fairgrounds

[New ERAA Back to School Conference, Rally for Education and Festival](#)
Saturday, August 25
1-3 p.m.
Lincoln High School

The Demonstration Project has been funded in part by grants from the U.S. Bureau of Reclamation and from a Proposition 50 grant administered by the California Department of Water Resources.

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City of San Diego | 600 B Street | Suite 600 | San Diego | CA | 92101

Pure News

Welcome to Pure News!

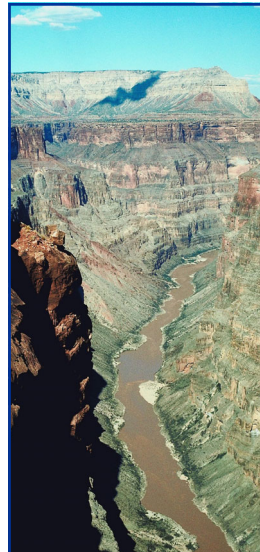
Welcome to Pure News, a newsletter to keep you informed about the latest happenings with the City of San Diego's Water Purification Demonstration Project. Please invite your friends and colleagues to sign up to receive this newsletter and other project-related updates at www.purewatersd.org.

Do you know where your water comes from?

San Diego is renowned for its sunny skies and ideal climate. What many may not know is that because of the region's semi-arid climate, the City of San Diego has limited local water sources and relies on importing approximately 85 to 90 percent of its water supply each year.

In the past, importing water from the Colorado River and Northern California has been a low-cost, dependable option, but these water sources have become less reliable and more expensive in recent years. Environmental stresses, including the ongoing drought in the Colorado River basin and reduced snow pack and runoff in Northern California, have decreased the available water supply. In addition, court-ordered pumping restrictions to protect threatened fish species have severely reduced the amount of water that can be delivered by the California State Water Project. This has a significant effect on San Diego, which sits at the end of the various pipeline systems that deliver the imported water. These conditions have intensified the need to identify new, locally controlled water sources.

To address this critical water supply situation, the City is actively pursuing ways to diversify San Diego's water supply options. One of these options



Colorado River

is water conservation. The City declared a Level 2 Drought Alert in effect as of June 2009, which enforces many mandatory water restrictions and water conservation practices. Water customers in the City of San Diego have done a great job from July 2009 to June 2010, reducing water use by 11.6 percent compared to July 2008 to June 2009. Although conserving water is an important aspect of the City's water supply initiative, conservation alone is not enough. Therefore, the City is implementing a three-phase Water Reuse Program to explore local solutions for San Diego's future water supply reliability.



Sacramento-San Joaquin Delta

As the City continues to diversify San Diego's water supply portfolio and increase the amount of water available to us in the future, efforts are focused on providing information about the water supply to residents of San Diego. To learn more about the City's current water supply situation, drought conditions, conservation practices and water reuse options, please visit

www.sandiego.gov/water.



Did you know...

Why can't we just conserve enough water to meet future needs?

Using water wisely through conservation practices should always be the first step in preserving the City's precious water supplies. The average water demand (which includes local surface water, imported water, conservation and recycled water) for the City of San Diego for the last six fiscal years has been approximately 260,000 acre-feet per year. The City's conservation programs have helped reduce its dependence on imported water by saving more than 34,000 acre-feet of drinking water a year. That's enough water to meet the needs of 68,000 average families of four for one year. Nonetheless, by 2030 the City will need an additional 43,000 acre-feet of water per year to meet the needs of current and future water customers. So while conservation is important, efforts to save water need to be combined with other sustainable strategies if we are to have enough water for all of our needs.

A look at new, local options for water

Today, the majority of San Diego's water supply comes from imported sources that are becoming more expensive and less reliable. In 2004, the City launched a three-phased Water Reuse Program (Program) to address the water supply crisis by exploring local solutions for future water supply reliability.

Phase one of the Program was the City's 2005 Water Reuse Study (Study). The Study provided a comprehensive evaluation of all viable options to maximize the use of recycled water produced by the City's two water reclamation plants. In addition, the Study analyzed and researched the health effects of various water reuse options. The Study concluded that reservoir augmentation at the City's San Vicente Reservoir is the preferred option for maximizing the use of the City's recycled water supply. Reservoir augmentation is a multi-step process that includes sending the advanced purified water to a reservoir to blend with existing water

supplies and then treating the blended water again to be distributed as drinking water. A broad-based group of City residents participated in an American Assembly process to review the Study findings. The American Assembly reached the same conclusion that reservoir augmentation was the most viable use of highly treated recycled water for San Diego and that it could provide a local, reliable supply of water crucial to the City's future.



San Vicente Reservoir

Based on the final draft report that summarized the Study results, the San Diego City Council commissioned the second phase of the Program: the Water Purification Demonstration Project (Demonstration Project). The purpose of this phase is to further explore the option of reservoir augmentation by demonstrating the project on a small scale. The Demonstration Project, which is currently underway, is examining the use of advanced water purification technology to purify highly treated recycled wastewater that could potentially be added to the "raw" water (water prior to being treated) in a local reservoir. During this testing phase, purified water will not be added to the drinking water supply.

An Advanced Water Purification Facility (AWPF) is being built in Sorrento Mesa, a community in the northern region of the City, and will operate for about one year to produce approximately 1 million gallons of purified water per day. A study of the San Vicente Reservoir is also being conducted to test the key functions of reservoir augmentation and an independent advisory panel of experts is providing oversight on project research. The research will determine if the purification system satisfies all water quality, safety and regulatory requirements of the California Department of Public Health, and what will happen if the purified water is added to the reservoir. The Demonstration Project is scheduled to conclude at the end of 2012.

If the Demonstration Project meets regulatory requirements and provides evidence that a full-scale project would be viable, the mayor and city council will decide whether to implement a full-scale reservoir augmentation project. This would potentially be the third and final phase of the Water Reuse Program. In this potential phase, the advanced treated water would be added to the San Vicente Reservoir. The blended water from the reservoir would go to the Alvarado Water Treatment Plant where it would be treated for potable use. This water would become part of the drinking water supply for the City of San Diego.

Visit www.purewatersd.org to learn more about the Demonstration Project.

Did you know...

Doesn't the City already recycle water?

Yes. The City of San Diego operates two water recycling facilities capable of treating 45 million gallons per day of wastewater to secondary and tertiary treatment levels. Recycled water treated to a secondary level is safe for distribution into the environment, while recycled water treated to a tertiary level undergoes further treatment so the water is safe for use in irrigation and industrial purposes.

The recycled water produced by these plants is primarily used for irrigation and industrial purposes. A separate distribution system of "purple pipes" is required to keep the recycled water separate from drinking water pipelines. Constructing additional purple pipe distribution systems is costly. Also, using recycled water for irrigation is seasonal – it is not used in rainy periods or when it is cooler. This means less than half of all wastewater available for recycling is beneficially reused. The remainder of recycled water is treated to a secondary level and discharged into the ocean. Because of the cost and the limited use of existing recycled water, the City is examining other ways to use more recycled water, including reservoir augmentation.

Demonstrating Advanced Water Purification Technology

A key component of the Demonstration Project is the Advanced Water Purification Facility (AWPF). Construction on the AWPF will begin in early 2011. Following testing, the AWPF is expected to be operational in spring 2011. The facility will be located at the North City Water Reclamation Plant and will be the centerpiece of the Water Purification Demonstration Project.

The AWPF is very different from a wastewater treatment facility. First, the water entering the AWPF has already been “reclaimed” through a series of treatment processes. At the North City Water Reclamation Plant, sewage is screened multiple times before being chemically treated to a safe level for discharging into the environment. After these treatment steps the wastewater is considered recycled water and is safe enough to be used for all irrigation and industrial purposes.



North City Water Reclamation Plant

At the AWPF, the City will start with recycled water and, using advanced water purification technology, will purify it to a level equivalent to distilled water. Advanced water purification technology includes membrane filtration, reverse osmosis, and disinfection by ultraviolet light and hydrogen peroxide. The resulting purified water is of higher quality than any of the City’s existing raw water supplies.

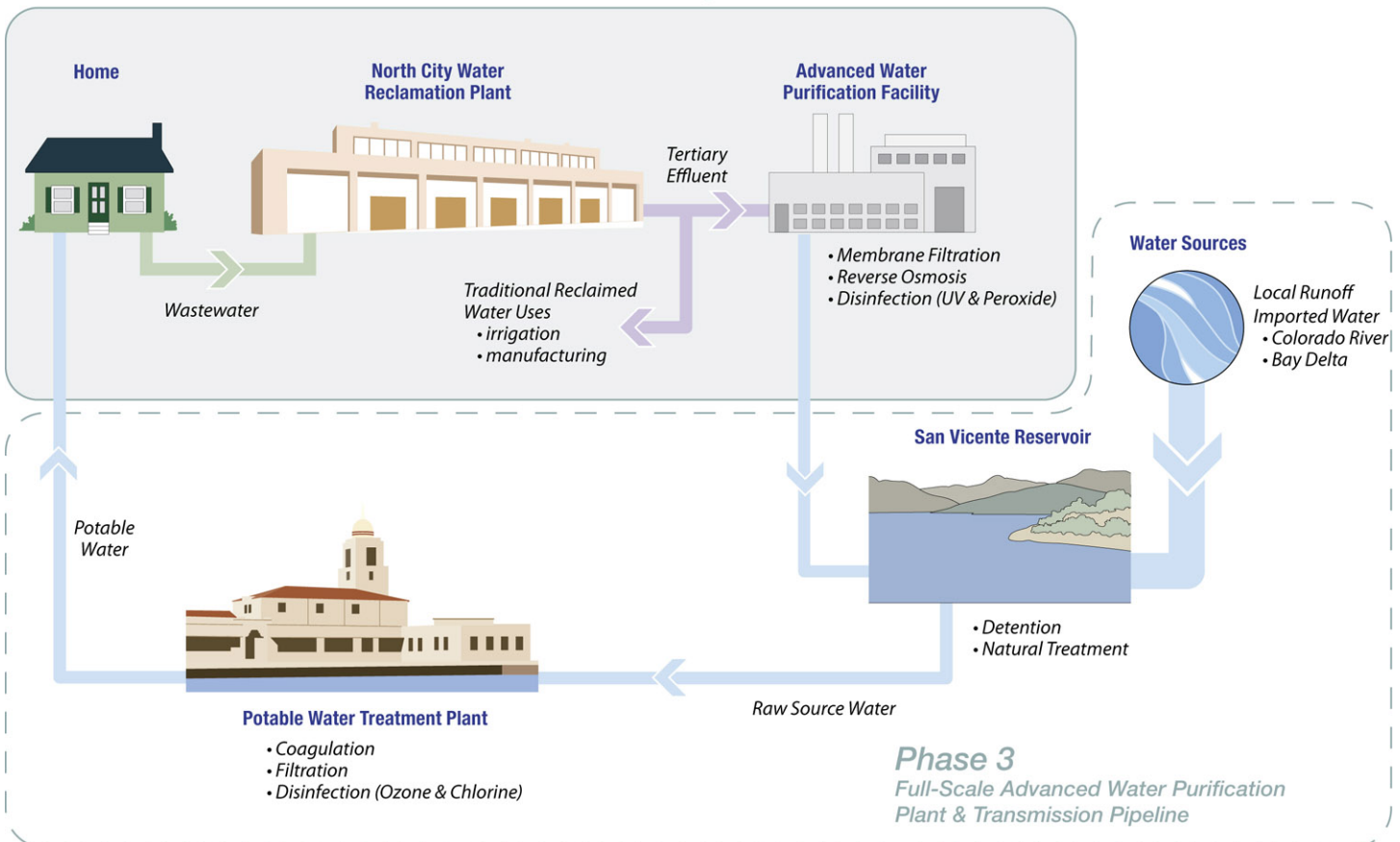
The AWPF will produce approximately 1 million gallons of purified water per day for about a year. During the demonstration phase, the water produced at the facility will be used for irrigation, the same way the existing recycled water is

used. It will not be added to the existing drinking water supply during the demonstration phase.

Free tours of the AWPF will be offered to the public when construction is complete. Details will be posted on www.purewatersd.org as the facility completion date nears.

City of San Diego's Demonstration Project Water Purification Demonstration Process

Phase 2 Demonstration-Scale Project



Community Involvement

A major component of the Water Purification Demonstration Project is an extensive public education and outreach program that is being implemented throughout the City of San Diego. This program includes public presentations, the distribution of information at community events and on the project website, and tours of the AWPf once it is completed in the spring of 2011.

Since its launch in July, the Demonstration Project speakers bureau has been actively seeking opportunities to make presentations to civic, business and community groups as a way to engage the public and gather feedback on project information. Information about the project is presented by a member of the City's Demonstration Project team and includes information about San Diego's need for a

local and reliable water supply, the purpose of the Demonstration Project, a description of the advanced water purification process, and the potential use of advanced purified water for reservoir augmentation in the future. Presentations are followed by an opportunity to ask questions or focus on an area of interest to a particular group.

To schedule a presentation for your organization or business, please contact the speakers bureau at (619) 533-6638 or email purewatersd@sandiego.gov. A calendar of upcoming presentations that are open to the public is available on the project website, which also includes more detailed project information and a list of past presentations.



Upcoming Events

Learn more about the Demonstration Project at one of the following community events. Project team members will be present to answer questions about the project and to share the latest project news.

13th Annual San Diego Multicultural Festival
Martin Luther King Jr. Promenade
(Downtown San Diego along Harbor Drive
across the street from the Convention Center)
Saturday, Jan. 15
www.ccdc.com

**6th Annual San Diego Lunar New Year
Tet Festival 2011**
Balboa Park
Saturday, Jan. 29
www.sdtet.com

Stay tuned for tours of the
Advanced Water Purification Facility
beginning in Spring 2011



North City Water Reclamation Plant



THE CITY OF SAN DIEGO

PureWaterSD.org

Visit our project website to sign up for email versions of Pure News and to keep informed about this important project.



Pure News: Issue 2

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.

Why rain isn't enough

Every winter after a storm, you hear the same question: with all this rain, why doesn't San Diego have enough water?

The answer is related to San Diego's climate and population. From year to year, San Diego's rainfall is anything but dependable. In the past decade, rainfall in the City of San Diego has been as low as 4 inches to as high as 14 inches, which is not enough to meet the demands of San Diego's population. Since rainfall is so varied, so is runoff into the City's nine reservoirs where raw water is stored. Lower Otay Reservoir, the City's oldest, has records dating back more than 100 years, which tell the story of San Diego's water runoff challenges. Years go by with little runoff – some years none at all – and then there are wet years that fill the reservoir with water, followed again by very dry years.



"Normal rainfall in the San Diego region can range from very dry to very wet," said Jeff Pasek, San Diego Public Utilities Department Watershed Manager. "If you look at the records of rainfall and runoff over the years, you'll see extremes in fluctuation. We can't count on any certain amount of rainfall."



The situation is exacerbated by the City's ever-growing population. San Diego's system of local reservoirs was built from about 1900 to 1950. These reservoirs amply supplied San Diego through the first half of the last century, but because of population growth, the demand for

water has quadrupled over the last 60 years. San Diegans have diligently conserved water over the past 20 years, steadying the water demand despite continued population growth. Nevertheless, even if rainfall in the San Diego region was consistently above average, the local runoff would not be enough to sustain the City.

Even in a wet year, natural runoff accounts for a small percentage, roughly 15 percent, of San Diego's annual water supply; the rest has to be imported. Countywide, the



Did you know...

Does San Diego need more water?
The City of San Diego imports approximately 85 percent of its water supply from Northern California's Bay-Delta and the Colorado River. For the past few years, California has been affected by a historic dry period and a drought on the Colorado River. Legal and regulatory decisions to protect endangered species have resulted in restrictions on the amount of imported water from Northern California. Population projections predict the City will need more water in the future than is used today. For all of these reasons, the City needs to develop local water supplies to secure a reliable supply for present and future City of San Diego water customers.

Continues on Page 3

AWPF construction begins!

In January, work crews poured the foundation for the new Advanced Water Purification Facility (AWP Facility) located at the North City Water Reclamation Plant. Construction on the testing facility will continue throughout the spring.



The Advanced Water Purification Facility's canopy is now installed.

Ahrens Corporation completed construction on the concrete pad for the AWP Facility in January 2011. The facility canopy, which will cover the advanced water treatment equipment, was completed in late February.

Upon completion of the AWP Facility this summer, the City will begin testing advanced purification technology for approximately one year. During the demonstration period, 1 million gallons of purified water per day will be produced. Concurrently, the San Vicente Reservoir is being studied to examine the viability of adding the advanced purified water to

the reservoir to augment drinking water supplies. Other studies, including cost analysis, will be completed at the same time. Together these studies and tests will determine if the project concept is feasible for full scale.

In the community

If you've been to a community event recently, there's a good chance the Water Purification Demonstration Project was there, too. Beginning in early 2011, the Demonstration Project team staffed informational booths at several community events.

In January and February, the Demonstration Project staff teamed up with the City's Conservation team to reach out to San Diegans with important messages about water at the San Diego Multicultural Festival, the San Diego Lunar New Year Tet Festival and the San Diego Chinese New Year Food and Cultural Fair. In February and March, the Demonstration Project team struck out on their own to participate in the Heritage Weekend Festival and the San Diego Science Festival Expo Day.

Hundreds of passersby stopped by the booth to learn more and ask questions about the Demonstration Project. Staff explained the details of the project and provided fact sheets to them. After learning about the project, these visitors were invited to spin the prize wheel for a chance to win the Demonstration Project's highly coveted reusable tote bag. Many interested participants (including some of you who are reading this right now) signed up to receive email updates about the project.

"By participating in these events, we are able to talk to a wider variety of San Diegans, not just those who have an interest in water issues," said Alma Rife, Public Information Officer for the Demonstration Project. "These events have been great opportunities to share information about the Demonstration Project and eliminate misinformation and confusion about it."

In April and May, the Demonstration Project staff will be at the Lao New Year at Market Creek Plaza on Saturday, April 2, and the EarthFair in Balboa Park on Sunday, April 17. Hope to see you there!



Guests visit the Demonstration Project booth at the Tet Festival.

Why rain isn't enough (Continued from Page 1)

portion of water supply from local runoff is even lower. This supply is not only low because of the fluctuating amount of rainfall, but also because San Diego's watersheds extend less than a thousand square miles from the western slopes of our mountains to the coastal plain. When compared to the watershed of the Colorado River – hundreds of thousands of square miles in seven states with the snowcap of the Rocky Mountains draining into it – the San Diego watersheds are not a very big area to capture water.

When San Diego does get rain, most of the rain runoff in the region occurs in the back country and mountains, and flows down streams to be captured in reservoirs. San Diego's reservoirs are sized and situated to capture almost all of the runoff that's available from rain events. If all the reservoirs are full, they can hold nearly two years' worth of water supply for the City. Just this winter, Barrett and Hodges reservoirs received so much runoff they filled and overflowed into the ocean. However, because major rainstorms are infrequent, the reservoirs are not often full or even close to full. In fact, the last time all of San Diego's reservoirs were completely full was 1983.

Compared to cities that sit next to the Great Lakes, the Mississippi River or atop massive aquifers, San Diego's water supply has always been rather precarious. That's part of life in Southern California. Rainfall is iffy, rivers are scanty, watersheds are small, reservoirs are few and groundwater is limited. Since San Diego cannot depend on local rainfall, the City must depend on importing about 85 percent of its water supply. As imported supplies become more expensive and less reliable, it is time to diversify San Diego's local water sources to supplement the small supply produced by the rain.

Treating water right: Part I

When it comes to wastewater treatment, there is no "one-size-fits-all" approach. In fact, there are several levels for "cleaning" wastewater. Regulatory requirements determine



Point Loma Wastewater Treatment Plant

which level of treatment the wastewater will undergo: primary, secondary or tertiary treatment. Tertiary treated water is considered "recycled water" and can be used for many applications.

At San Diego's Point Loma Wastewater Treatment Plant, sewage goes through what is called "advanced primary treatment." In this process, water is separated from grit or large particles.

Following grit removal, the wastewater is pumped into sedimentation tanks. With

the assistance of chemical treatment, solids or "primary sludge" settle to the bottom of the tanks and "scum" (primarily cooking grease and oil) float to the surface. At this point, approximately 80 percent of the suspended solids have been removed. The waste is separated from the water and is disposed offsite. After a final screening, the treated wastewater is discharged from the Point Loma Wastewater Treatment Plant through a long pipeline 4.5 miles out into the ocean.

Wastewater may continue on to secondary treatment. If this occurs, bacteria are added to the wastewater. Air is pumped into this mixture, and the bacteria ingest and digest the organic solids. Next, the wastewater is pumped into secondary clarifiers,

Terms to Know

Potable Water:

Water that has been treated to drinking water standards. This is the water delivered to consumers' taps.

Raw Water:

Water from rain, snow, rivers, and lakes/reservoirs that has not been treated at a drinking water plant.

Storm Water:

Urban runoff water from rainfall and irrigation. In most of San Diego, this water is untreated and flows into creeks, bays, lagoons, and ultimately the ocean.

Wastewater:

Water collected in the sewer system from residences and business. It is mostly water with some impurities.

Continues on Page 4

Treating water right *(Continued from Page 3)*



North City Water Reclamation Plant

where the bacteria and digested solids settle to the bottom as "secondary sludge." Similar to primary treatment, the sludge is removed for further treatment, and the treated wastewater can either be moved along to tertiary treatment to produce reclaimed water or may be discharged.

After going through primary and secondary treatment processes, tertiary-treated wastewater is produced by filtering to remove any remaining solids, chlorination to disinfect, and demineralization to reduce the amount of salt in the water. The resulting product is known in California as "recycled water." Recycled water produced

at the North City Water Reclamation Plant is safe for industrial uses and outdoor irrigation.

Water treatment doesn't end there. Stay tuned because in the next Pure News we will talk about how recycled and raw water can go through additional treatment steps.

Schedule a presentation for your group or organization
Contact the speakers bureau at (619) 533-6638 or email purewatersd@sandiego.gov.

Upcoming Events

Learn more about the Demonstration Project at one of the following community events. Project team members will be present to answer questions about the project and to share the latest project news.

Lao New Year
Market Creek Plaza
(310 Euclid Avenue, San Diego, 92114)
Saturday, April 2
10 a.m. - 6 p.m.
www.LCCCSD.com

EarthFair
Balboa Park
Sunday, April 17
10 a.m. - 5 p.m.
www.earthdayweb.org/

Coming soon:

Tours of the Advanced Water Purification Facility.
Watch for an email in the coming months.



North City Water Reclamation Plant



THE CITY OF SAN DIEGO

PureWaterSD.org

Visit our project website to sign up for project updates.



Pure News: Issue 3

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.

Get a Glimpse of the Future at the Advanced Water Purification Facility

The City of San Diego opens the doors this summer to its Advanced Water Purification Facility (AWP Facility). Starting in June, groups and individuals can tour the site of a small-scale, state-of-the-art treatment facility that could contribute to the future of San Diego's water supply. This facility, located at the North City Water Reclamation Plant, represents the focal point of the City of San Diego's Water Purification Demonstration Project (Demonstration Project). It has been under construction since early 2011.

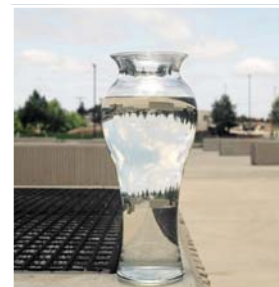
Here visitors will learn about the advanced technologies being demonstrated by the City to purify one million gallons of recycled water per day. The purification process employs three treatment methods: microfiltration/ultrafiltration, reverse osmosis, and advanced oxidation with ultraviolet disinfection and hydrogen peroxide. More simply put, the AWP Facility is demonstrating the purification of water using technology that is able to produce one of the most pristine sources of water available anywhere.

Visitors will learn how such purity is established through

this multi-barrier approach of consecutive treatment steps, which work together to remove or destroy all unwanted materials in the water. Each barrier includes frequent, continuous water quality monitoring and safeguards built into the process to ensure that an error at any given treatment step is caught and corrected to protect public health.

Why here, and why now? California's water supply is subject to climate variations, droughts and regulatory restrictions, all of which affect the amount of water delivered to San Diego at the end of the pipelines that carry water imported from hundreds of miles away. The City needs to develop local, reliable sources of water to lessen its dependence on imported supplies. The Demonstration Project is exploring this proven technology that is already used to produce purified water for a full-scale project in Orange County.

With this effort, the City of San Diego joins other cities and water agencies throughout the United States and around the world, standing on the leading edge of water technology. Visitors will end their tour of the AWP Facility with a better understanding of the promise of these technologies to help ensure a drought-proof water supply independent of less reliable and constrained imported water sources.



About the Tours

Guests who participate in the AWP Facility tour will gain a better understanding of the Demonstration Project and what role the facility plays in this testing phase.

Following an introductory presentation, guides will lead a walking tour through the facility. Guests will see the microfiltration/ultrafiltration, reverse osmosis and UV disinfection/advanced oxidation equipment up close. At the end of the tour, guests can view the purified water produced at the facility and will have a chance to compare it to drinking water and recycled water samples.

To register for a tour, visit www.purewatersd.org/tours.shtml. If you would prefer to schedule a presentation for your organization, email purewatersd@sandiego.gov or call (619) 533-6638. We hope you will take advantage of this unique opportunity to visit the AWP Facility.

The Urban Water Cycle

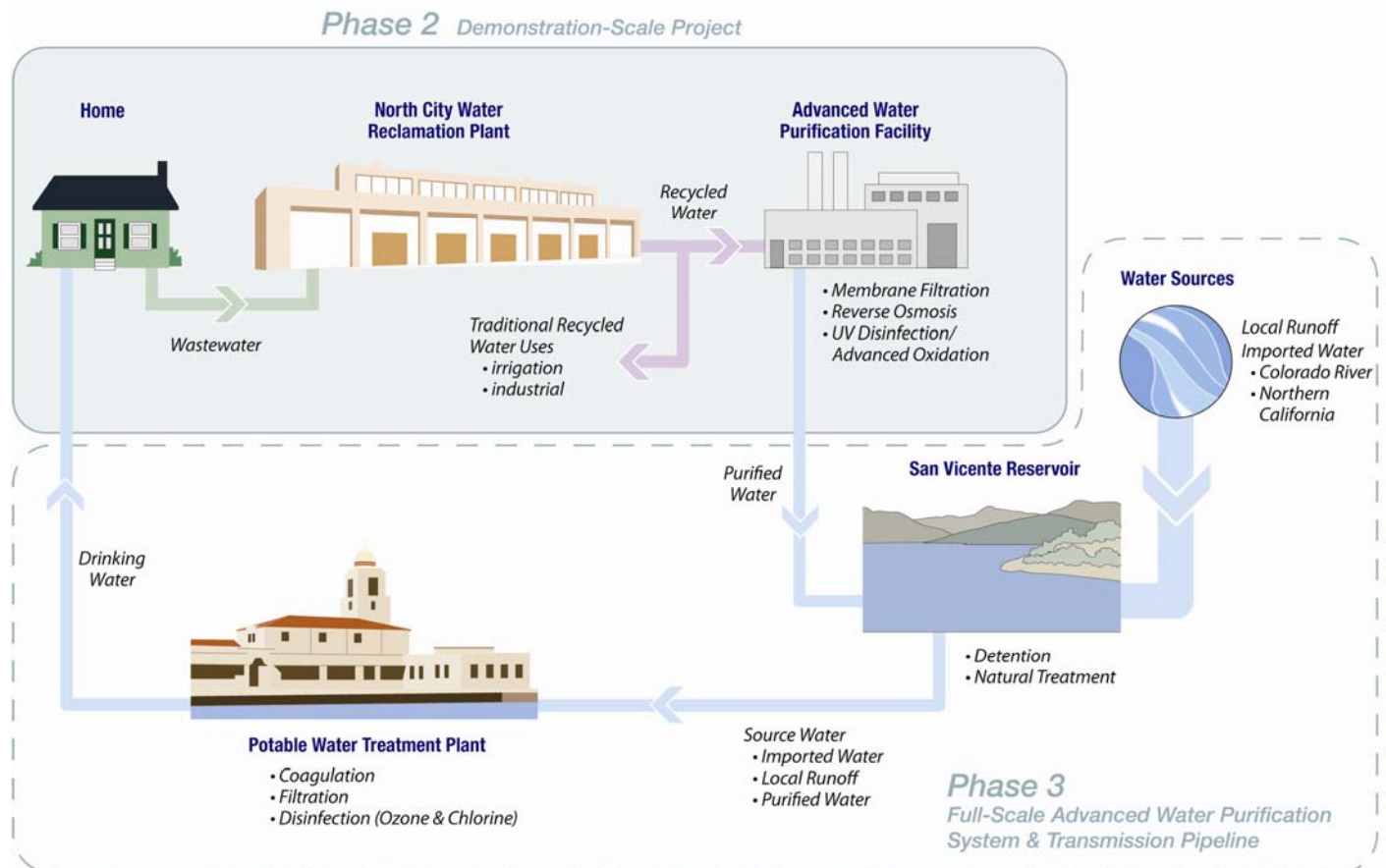
When we think back to our fourth grade science lessons about the natural cycle of water, it becomes clear that all water is as old as the Earth itself. This means that all water is naturally recycled - including the water we drink. The urban water cycle is a similar, man-made system that works to create the continuous movement of water to import and export our local supply of one of the Earth's most precious resources: water.

Modern technology has enhanced the urban water cycle with the ability to clean up and recycle the water we use. Recycled water can be treated to various levels for use in irrigation and manufacturing, and the most advanced water treatment can purify recycled water for drinking. This technology can be especially beneficial in a city like San Diego that has limited local water sources and relies on importing approximately 85 percent of its water supply.

San Diego's urban water cycle features multiple water treatment facilities that make up an extensive treatment system that water travels through before reaching your faucet. Water treatment plants, such as the Alvarado Water Treatment Plant, provide drinking water treatment. The treated water is then distributed to residents and businesses all over the City.

The Point Loma Wastewater Treatment Plant handles wastewater treatment and disposal for the City of San Diego. In addition to this wastewater treatment plant, the City has two wastewater reclamation plants: the North City and South Bay water reclamation plants. Instead of simply disposing treated wastewater, these plants treat the wastewater even further to produce recycled water. Recycled water is distributed through designated "purple pipes" and is used for irrigation and industrial purposes.

The newest member of San Diego's urban water cycle is the state-of-the-art Advanced Water Purification Facility (AWP Facility) that purifies the recycled water produced at the North City Water Reclamation Plant. The AWP Facility is demonstrating the latest in water purification technology as part of the Water Purification Demonstration Project. The outcome of the Demonstration Project will determine whether or not the City will close the loop on its urban water cycle to provide a source of purified water to supplement drinking water supplies. In a world where water reuse is inevitable and water purification technology is available, enhancing the urban water cycle is the key to a sustainable future.



Permanent Water-Waste Restrictions Still in Place
New Watering Times Started June 1

When the San Diego City Council approved Mayor Sanders' proposal in May to end mandatory water-use restrictions, the move did not affect several water-waste restrictions that remain permanent year-round. Water-waste restrictions refer to City restrictions on wasteful water use. Starting on June 1, one of the permanent restrictions--the timing for when landscape watering is allowed -- shifts to after 6 p.m. and before 10 a.m.

"San Diegans have done a tremendous job by saving water when we were faced with mandatory cutbacks," said Mayor Jerry Sanders, who has demonstrated both at home and at work that water conservation is a priority. "While the drought may be officially over, waste is never an option. Using water wisely throughout the year needs to remain a permanent way of life," added Mayor Sanders.

The City's permanent water-waste restrictions also address issues such as excessive irrigation, washing

Continues on Page 4

Treating water right: Part II

Terms to Know

Drinking Water:

Water that has been treated to federal and state drinking water standards. This is the water delivered to consumers' taps. Also called potable water.

Raw Water:

Water from rain, snow, rivers, lakes, and reservoirs that has not been treated at a drinking water plant. San Diego's raw water is primarily imported from sources such as the Colorado River or collected in the City's reservoirs from rainfall.

Recycled Water:

Wastewater that has undergone a high level of treatment at a reclamation facility so that it can be reused for irrigation and industrial purposes.

Storm Water:

Urban runoff water from rainfall and irrigation. In most of San Diego, this water is not treated and flows into creeks, bays, lagoons, and ultimately the ocean.

Wastewater:

Water collected in the sewer system from the drains of residences and business. Wastewater is more than 99% water along with impurities.

In the Spring 2011 edition of Pure News, we explained the process for treating wastewater. In this edition, we will focus on drinking water treatment.

Since approximately 85 percent of the City of San Diego's drinking water is imported from unreliable and increasingly expensive sources, San Diego is considering purification of recycled water to develop a new, local source of drinking water. Through the Water Purification Demonstration Project (Demonstration Project), the City is demonstrating water purification technology that purifies recycled water even further. This technology includes membrane filtration, reverse osmosis, and disinfection through the use of ultraviolet light and hydrogen peroxide. The resulting purified water is of higher quality than our imported water and local runoff. During this demonstration phase, the water produced at the AWP Facility will not be added to any drinking water supplies, but will instead be added to the recycled water system. If the concept proves feasible and is approved by the City Council, the City would then build a full-scale water purification project to blend purified water with raw water in San Vicente Reservoir.

All of San Diego's drinking water, which includes water from San Vicente Reservoir, undergoes drinking water treatment. This is the final step of treatment before arriving at the tap. At the water treatment plant, any particles are removed and contaminants are eliminated through the combined processes of flocculation, sedimentation, filtration, chlorination and ozonation. Before the water is sent to homes and businesses around San Diego, it is tested to make sure it meets all health and safety requirements set forth by the U.S. Environmental Protection Agency and the California Department of Public Health. Thanks to these behind-the-scenes treatment processes, San Diegans can dependably turn on their faucet for reliable, clean water.



Alvarado Water Treatment Plant

Learn more about water sources, treatment and distribution at "Source to Tap" (www.sandiego.gov/water/quality).

Permanent Water-Waste Restrictions Still in Place (Continued from Page 3)

down sidewalks and patios, overfilling swimming pools and using re-circulating pumps on decorative fountains. Additional restrictions pertain to car washing, cooling systems and hospitality industry water use. To help customers eliminate water waste, the City's Public Utilities Department offers a number of programs and services, providing the tools needed to save water and money. Some examples include the following:

- Free residential and commercial water surveys through the Public Utilities Department can pinpoint water-saving options at your home or business, including identifying possible leaks. Call (619) 570-1999, email water@sandiego.gov or visit the City's website.
- Citizens can play an important role in preserving our water and maintaining our water system by reporting any water leaks. Water loss is often caused by leaks from service lines, main breaks and fire hydrants knocked over by a vehicle. The City counts on residents to help proactively identify and report all types of leaks or other problems on the City water system. To report leaks, call the City's 24-hour emergency hotline at 619-515-3525.
- Customers are also encouraged to report water waste. Just send the City the location, date and time the waste was observed. Customers can provide their contact information for follow-up questions or remain anonymous. Either send an email to waterwaste@sandiego.gov or call (619) 515-3500 (press 5) or (619) 533-7485.

For more information on the City's permanent water-waste restrictions and a comprehensive listing of available conservation resources and tips, visit WasteNoWater.org or call the Public Utilities Department at (619) 515-3500.

SAN DIEGANS
**WASTE
NO WATER**

ALL DAY.
EVERY DAY.



Upcoming Event

Learn more about the Demonstration Project at the following community event. Project team members will be present to answer questions about the project and to share the latest project news.

Fiesta del Sol
Cesar Chavez Park on San Diego Bay
Saturday, August 13
11 a.m. - 7 p.m.
www.fiestadelsolsandiego.org/

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 a tour of the AWP Facility.

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



PureWaterSD.org

Visit our project website to sign up for project updates.



Pure News: Issue 4

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.



A new site to see in San Diego



San Diego Mayor Jerry Sanders, Councilmember David Alvarez, Public Utilities Director Roger Bailey, and Water Purification Demonstration Project Director Marsi Steirer welcomed media to the AWP Facility on June 30.

Since the Advanced Water Purification (AWP) Facility opened for tours in July, City staff has hosted more than 102 tours for approximately 1,200 people. The City is pleased to welcome community members and others who have toured the AWP Facility. People from all over San Diego have visited and many guests bring their family, friends and co-workers. Various groups from graduate school classes to the Audubon Society to senior citizen organizations to a fifth grade science class have toured the facility. It's not just local folks who visit, though. Because many countries around the globe are interested in water purification technology as a potential solution to water supply issues, international visitors have come all the way from Mexico, Vietnam, Australia and Eurasian countries.

and community group representatives were among the visitors. Elected official visitors include San Diego Mayor Sanders, San Diego Councilmembers Alvarez, Faulconer, Gloria, and Lightner, and the mayors of Del Mar and Solana Beach. In addition, staff from the offices of U.S. Senator Boxer, U.S. Representative Issa, State Senator Anderson, and Assemblymember Jones have also toured the facility. Staff from the San Diego Regional Water Quality Control Board, California Department of Health, U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, U.S. Department of the Interior, and the U.S. Office of Management and Budget have also visited.

If you haven't already, we hope you will tour the AWP Facility by registering at www.purewatersd.org/tours.shtml. If you can't make it out to the facility, you can watch a video about the purification process online at www.purewatersd.org. Another option to learn more about the Demonstration Project is to schedule a speaker's bureau presentation for your group or organization by calling (619) 533-6638 or emailing purewatersd@sandiego.gov. Through these and other methods, the City wants to provide opportunities for San Diegans to learn more about the water purification process.

In early July, elected officials, water agency boards,



Students from the Elementary Institute of Science compare beakers filled with tap, recycled and purified water.

San Diego recycles...its water

City of San Diego Water and Wastewater Treatment Facilities

Drinking Water Treatment Plant:

Alvarado, Miramar, & Otay Water Treatment Plants

Cleans water from rain, snow, rivers, lakes, and reservoirs to a level safe for drinking. The water from these plants is then sent to faucets around San Diego.

Wastewater Treatment Plant:

Point Loma Wastewater Treatment Plant

Treats wastewater from homes and businesses and releases the cleaned wastewater into the ocean.

Water Reclamation Plant:

North City Water Reclamation Plant & South Bay Water Reclamation Plant

Treats wastewater from homes and businesses to a level that is safe enough to be reused for irrigation and industrial purposes.

Advanced Water Purification Facility:

AWP Facility at North City Water Reclamation Plant

Purifies the recycled water produced at a water reclamation plant using micro/ultrafiltration, reverse osmosis and ultraviolet disinfection/advanced oxidation. Currently this water is sent back to the recycled water system for irrigation and industrial purposes. If it is approved for a full-scale project, the purified water would be added to San Vicente Reservoir.

Have you ever driven by a San Diego golf course and thought about how much water must be used to keep a golf course green? This question might occur to many people as San Diegans are reminded of the importance of water conservation. While it may seem like a lot of water, there is a good chance that the water you see coming out of golf course sprinklers is recycled water. This type of water is an essential part of San Diego's diverse "water portfolio."



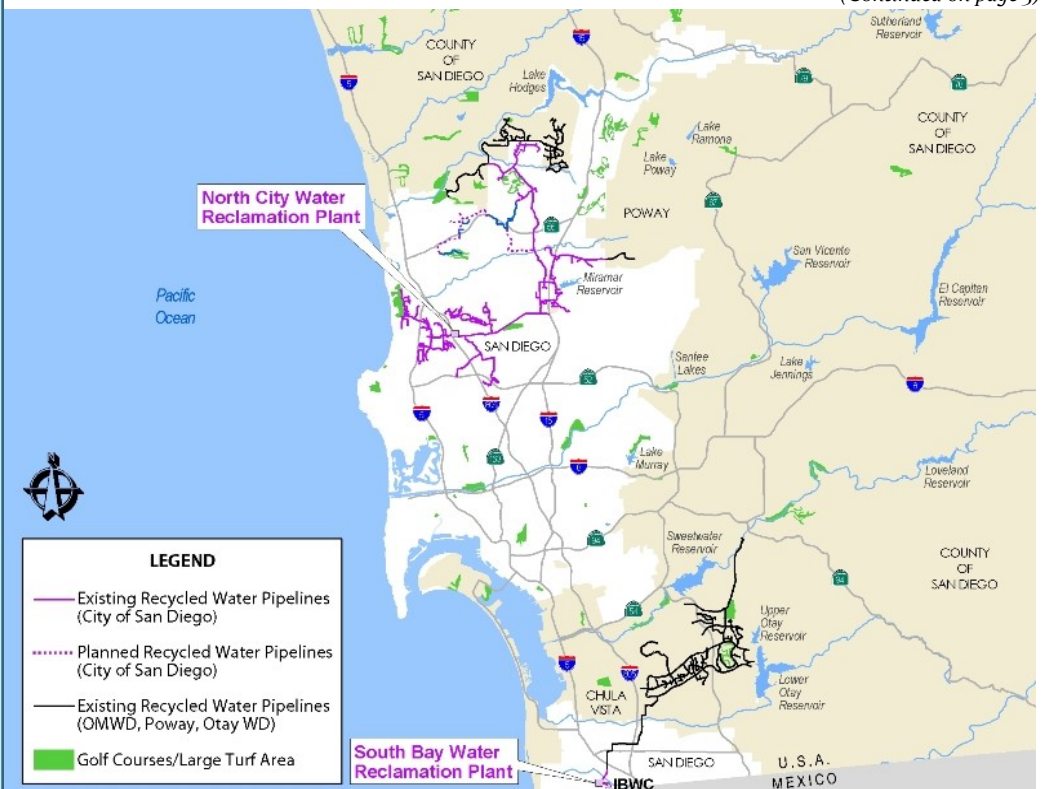
Recycled water is wastewater that has been treated to meet standards for use in a range of non-drinking applications. Landscape irrigation is the single largest use for recycled water within the City of San Diego. Recycled water is also

used for industrial processes, cooling towers, soil compaction, dust suppression, and toilet flushing. It is reliable, drought-proof, good for the environment and has the added bonus of being a locally controlled water resource that is dependable year-round.

Two plants are responsible for producing recycled water for the northern and southern regions of the City: the North City Water Reclamation Plant built in 1997 and the South Bay Water Reclamation Plant built in 2002. Together, they have the capacity to treat up to 45 million gallons of wastewater per day. The City is not alone in recycling its wastewater—other water agencies in San Diego County also produce recycled water for irrigation and industrial purposes.

This year, recycled water has come to serve another function as the source water for San Diego's Water Purification Demonstration Project. That's right! The water that is

(Continued on page 3)



San Diego recycles... its water [continued from page 2]

being purified to a level similar to distilled water quality is already treated before it undergoes a three-step purification process at the Advanced Water Purification Facility.

And since the Demonstration Project is just that—a demonstration—the purified water is currently being put back into the recycled water system. So while you won't be able to drink it, those thirsty blades of grass on the 14th hole will.

For more information about the City's Recycled Water Program visit sandiego.gov/water/recycled.

Limnology study: A look at the San Vicente Reservoir

Why send the purified water to a reservoir?

Reservoir augmentation allows the water to be diluted with the existing water supply as part of the [multi-barrier treatment process](#). The detention time in a reservoir is one of the many safeguards built into the process to insure that a failure or error at any given treatment step would not compromise public health. The reservoir also provides further, natural treatment by exposing the water to sunlight and allowing it to blend with minerals existing in the reservoir.

Why San Vicente Reservoir?

Following the completion of the San Vicente Dam Raise in 2014, the San Vicente Reservoir will be the largest reservoir in the San Diego region at 247,000 acre-feet. Blending the purified water in a large reservoir allows it to be diluted with San Diego's imported water supply before being treated again for use as drinking water.

While the Advanced Water Purification Facility has been the center of attention since it opened in July, there is additional and equally important behind-the-scenes work being done on the Water Purification Demonstration Project. If approved to be a full-scale project, the City of San Diego would add purified water to San Vicente Reservoir, a process known as reservoir augmentation. Therefore, a scientific undertaking, called a limnology study, is now being conducted to examine the key functions of the reservoir as it pertains to its physical, geological, and biological attributes. Although no purified water is being added to the reservoir during the study, a computer model of San Vicente is being used to determine the behavior of the reservoir and what will happen if purified water is added.

The reservoir aspect of the Demonstration Project is unique to San Diego's approach. Water purification technology has been established in areas around the world and is being used in California, specifically at the 70-million-gallon-per-day Groundwater Replenishment (GWR) System in Orange County. One way that a full-scale project in San Diego would differ from the GWR System is that Orange County injects its purified water into existing groundwater

basins as part of the multi-barrier treatment process before the water becomes part of their drinking water supply. San Diego does not have large groundwater basins, so the City is working with the San Diego Regional Water Quality Board and the California Department of Public Health to consider blending the purified water with surface water and develop the necessary regulations to do so. The project and regulators want to validate that the purified water has no negative effect on the reservoir as a source of water supply to the City or on the ecological balance of the reservoir and its surrounding environment.

The limnology study uses a state-of-the-art computerized model of the San Vicente Reservoir to predict the behavior of the reservoir throughout the year. The model is calibrated and validated using existing data from testing and monitoring the actual reservoir.

...a computer model of San Vicente is being used to determine the behavior of the reservoir and what will happen if purified water is added.



San Vicente Reservoir

A reason to celebrate



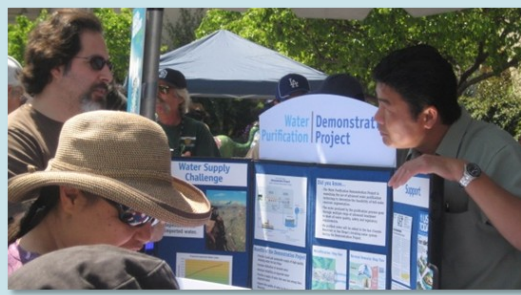
Demonstration Project Direct Marsi Steirer accepts the WateReuse Association Public Outreach and Education award in September.

One of the goals of the Water Purification Demonstration Project is to inform the public about the science behind the water purification process. In September, the WateReuse Association recognized the City of San Diego's outreach efforts in achieving this goal by honoring the Demonstration Project with the **2011 WateReuse Association Public Outreach and Education award**. The City appreciates the WateReuse Association's recognition of the Demonstration Project team's efforts to keep the public informed and involved in this important project for San Diego's future.

The Demonstration Project team earned this award by providing information to thousands of San Diegans over the last year through nearly 100 speakers bureau presentations, more than 100 tours of the City's treatment facilities, informational booths at nearly two dozen community events, approximately 100 meetings with leaders of various organizations and communities throughout San Diego, and information

shared through print and electronic materials.

Sharing information about San Diego's need for more local water supply sources cannot be done alone. We are grateful to those of you who have taken the time to listen to our messages, tour our facilities, invite staff to present at your organizations' meetings, read our informational materials, provide us with valuable feedback, and share this information. with friends and family. Our work is far from over, but with your help, we hope to reach all San Diegans.



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 a tour of the AWP Facility.

 @PureWaterSD



Get the latest online

For our smartphone-savvy readers, we have included quick response (QR) barcodes in this newsletter, so you can quickly and easily follow us on Twitter or Facebook. Just use your barcode-scanning app of choice, and scan the 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



THE CITY OF SAN DIEGO

PureWaterSD.org



City of San Diego Public Utilities Department • Long-Range Planning & Water Resources Division
600 B Street, Suite 600, San Diego, CA 92101 • (619)533-7572 • www.purewatersd.org

Pure News: Issue 5

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.



Putting the AWP Facility to the Test

What's being tested

Below are a few of the many parameters being tested at the AWP Facility:

Conductivity: corresponds to the concentration of dissolved salts and metals

Nitrogen: an element that can promote algae growth in a reservoir

Total organic carbon: a measurement of the amount of natural and synthetic organic materials dissolved in water

Turbidity: a measurement of water clarity

Ultraviolet transmittance: the ability of an ultraviolet light to pass through water

To ensure water quality, monitoring is essential at any water treatment facility. At the Advanced Water Purification Facility, automated and manual testing is regularly performed in order to ensure the water purification process is properly functioning and the water produced meets all safety regulations.

One method of ensuring the integrity of the equipment is the use of automated meters. There are more than a dozen meters throughout the facility that continuously measure various water quality parameters throughout the treatment process. In the event an anomaly is detected, the monitoring system would either trigger an alarm or automatically shut down the plant. In a full-scale plant, this would prevent any water that does not meet the water quality requirements from being added to the San Vicente Reservoir.

Operators also manually test water from sampling ports to verify the equipment is functioning correctly. The water samples are tested to ensure that contaminants are removed and that the water meets drinking water standards. These compounds include all of those regulated under the federal and state drinking water acts, as well as unregulated contaminants of emerging concern, such as pharmaceuticals and personal care products. Laboratory analysis is able to detect many compounds in concentrations as low as 5 parts per trillion. One part per trillion is comparable to one drop of water in 20 Olympic-size swimming pools.



Reverse osmosis sampling station

In addition to monitoring water quality, each piece of equipment undergoes specific tests. For example, an automatic pressure decay test is performed daily on the membrane filters. This test is sensitive enough to detect even one broken fiber and helps confirm that more than 99.99 percent of all solid particles are consistently removed by the membranes. The integrity of the reverse osmosis is confirmed by continuous tracking of water quality levels before entering and after exiting the equipment. If the quality of the water produced by the reverse osmosis units were to decline, operators can test each individual pressure vessel to locate the membrane breach. At the ultraviolet disinfection/advanced oxidation stage, the amount of power being applied tells operators whether the lamps are functioning properly. Operators also measure the hydrogen peroxide dose rate to verify that the appropriate amount of hydrogen peroxide is used.

The testing and monitoring performed at the Demonstration Project's AWP Facility not only ensures the safety of the water produced at the facility, but has the added benefit of allowing the City to determine which equipment is the most effective for purifying water. Similar water quality monitoring performed at the demonstration-scale facility would be provided at a full-scale facility. If a full-scale facility were approved, the City's priority would be to ensure only the purest and safest water is added to the San Vicente Reservoir. Additionally, all of the City's drinking water is and will continue to be tested at the City's drinking water plants before being sent to customers' taps.

Water Purification Demonstration Project: 2011 YEAR-IN-REVIEW

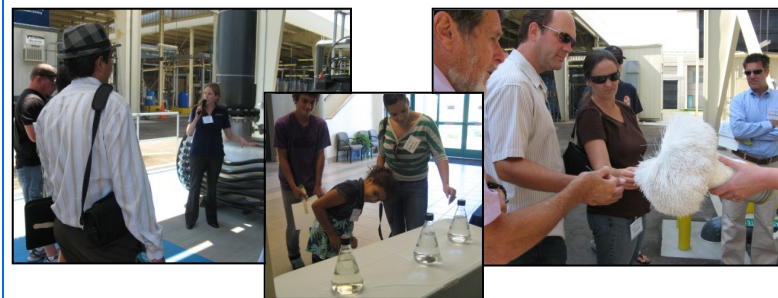
It has been an exciting and eventful year for the Water Purification Demonstration Project. In an effort to demonstrate that water purification can be a reliable, sustainable source of local water for San Diego, the project team strives to inform San Diegans about this important project. To this end, the project team reaches out to community members throughout the City by providing informational presentations, inviting residents to tour the Advanced Water Purification (AWP) Facility, and ensuring accessibility to information on the project website and social media platforms. The Demonstration Project and the AWP Facility have received positive feedback from project stakeholders in San Diego and internationally from Mexico, Vietnam, Australia, the United Kingdom, and Eurasian countries. Take a look at some of our 2011 highlights, including the unveiling of the state-of-the-art AWP Facility:



After months of planning, design and construction, the AWP Facility was completed and began operation in June 2011.



The AWP Facility kicked off public tours with a visit from Mayor Jerry Sanders, Public Utilities Director Roger Bailey, Project Director Marsi Steirer, Councilmember David Alvarez and many local media outlets.



The Demonstration Project team has hosted more than 100 tours for over 1,500 people since the AWP Facility opened its doors. The facility has attracted San Diego residents, government leaders, and stakeholders from around the world.



Hundreds of San Diegans learned about water purification at the Demonstration Project's informational booths at citywide community events. The City hosted exhibits at the San Diego Multicultural Festival, Earth Fair, Science Expo Day, Tet Festival, FilAmFest, and a dozen other events.



More than 100 groups throughout San Diego have invited the Demonstration Project speakers bureau to present to their members. To schedule a speaker for an organization's meeting, email purewatersd@sandiego.gov or call (619) 533-6638.



Many media outlets have covered stories on the Demonstration Project, including the Union-Tribune, USA Today, Huffington Post and TIME Magazine.

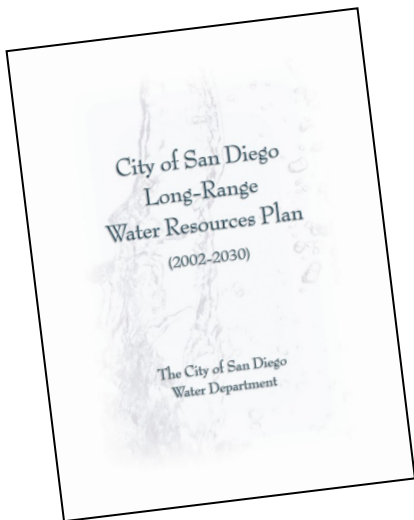


In September, the WateReuse Association honored the Demonstration Project with the 2011 WateReuse Association Public Education Program of the Year award.

Thank you to all who have taken the time to become informed and involved in this important project for San Diego's future.

Planning for a Sustainable Future

In an area where water is so scarce, strategic planning is essential to ensure water sustainability. The City of San Diego's 1997 Strategic Plan for Water Supply prompted the City to be more engaged in the planning and development of its water supply in order to become less reliant on imported water. Previously, the City depended almost entirely on the San Diego County Water Authority (SDCWA) to plan for and acquire necessary water supplies.



2002 Long-Range Water Resources Plan

In 2001, the City, with the assistance of a citizen's advisory committee, initiated an update of its Long-Range Water Resources Plan (Long-Range Plan), which was adopted by the City Council in 2002. The objectives of the Long-Range Plan were to extend water demand projections through 2030 and to develop a decision-making framework for evaluating water supply options to meet these demands. The water supply options identified in the Long-Range Plan included water conservation, water reclamation, groundwater desalination, groundwater storage, ocean desalination, marine transport, Central Valley water transfers, and imported supply. Various water supply options were evaluated. It was determined that no single supply source would be sufficient to meet the City's future water demand.

2012 Long-Range Water Resources Plan

In April 2011, the City began work on the 2012 Long-Range Water Resources Plan (2012 Plan) to update the 2002 Long-Range Plan. In developing the 2012 Plan, the City has convened a stakeholder committee, who will provide guidance and input on alternative strategies for meeting San Diego's water needs through 2035. The 2012 Plan will address various concerns, including those related to population growth, water resource diversification, climate change and

other issues affecting water reliability. The 2012 Plan is anticipated to be complete in summer 2012.

2010 Urban Water Management Plan

While the Long-Range Plan provides a foundation for water options for San Diego, other planning is continually taking place. The City's 2010 Urban Water Management Plan (UWMP) describes long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands. For the UWMP, the City coordinated with SDCWA and with local water agencies and cities that receive water from the City. The 2010 UWMP assesses current demands, lays out supply expectations over a 20-year period, and details plans for various drought scenarios.

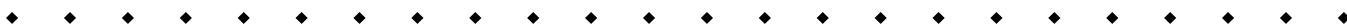


Recycled Water Study

In addition to sustaining water supplies, the City is examining ways to limit the discharge of wastewater from the Point Loma Wastewater Treatment Plant (WWTP). In order to do this, the City is conducting a Recycled Water Study to identify opportunities and provide recommendations to increase recycling of wastewater, reduce wastewater discharged into the ocean, lessen the complexity of secondary upgrades to Point Loma WWTP, and determine implementation costs. This study is the result of a cooperative agreement the City entered with two local environmental groups in 2009. The agreement requires the City to conduct the Recycled Water Study and find ways to minimize Point Loma WWTP discharges by maximizing reuse. In return, the environmental groups supported the City's waiver application

to operate the Point Loma WWTP as an advanced primary treatment plant. A final Recycled Water Study project report is expected to be complete in spring 2012.

One component of the Recycled Water Study is the completion of the 2010 Recycled Water Master Plan Update (2010 RWMP). The City must update its Recycled Water Master Plan every five years to define, encourage, and develop the use of recycled water. If all of the projects identified in the Recycled Water Study are not pursued, the 2010 RWMP evaluates other opportunities to maximize the reuse of water for non-potable purposes.



Thanks to these and other long-range water resource plans, the City has expanded its recycled water system, developed the Water Purification Demonstration Project, dramatically increased water conservation, and continued to ensure safe and reliable water for San Diego. With the continued development and implementation of these and other plans, San Diegans can count on a reliable source of water for years to come.

California's Bay-Delta: Fragile and Tapped Out



Few places in the world are as essential to their region as the Sacramento-San Joaquin Bay-Delta is to the State of California. Located on the western edge of the Central Valley where the Sacramento and San Joaquin rivers feed into the San Francisco Bay, the Bay-Delta is a capillary-like expanse of natural and manmade channels that serve as the heart of California's ecosystem and economy. Depending on the current water situation, San Diego relies on the Bay-Delta for anywhere from 25 to 60 percent of its water supply.

The Bay-Delta is also an estuary, funneling freshwater runoff from the Sierra Nevada mountain range to the ocean, resulting in a beautiful, sensitive and complex ecology. This watery marsh creates a fertile peat soil that supports California's agricultural industry. Some of the freshwater that flows into the estuary is diverted to provide drinking water to communities statewide. Water imported from today's Bay-Delta system is fully allotted with no additional water available for future demands. Local supplies must support future water demands.

In recent years, attention has focused on the fragility of the Bay-Delta system. The levee system created in the late 19th century to reclaim farmland, control flooding, and divert water for local irrigation and consumption purposes is very delicate as a result of soil erosion and deferred maintenance. During the last century, nearly 200 Delta levee failures led to island inundations. In 1998, exterior levee breaches inundated over 22,000 acres of land and threatened State Water Project and Central Valley Project facilities.

Additionally, there are concerns that human activities are causing declines in fish populations. One species impacted is the delta smelt. This two-inch fish is considered an environmental indicator—meaning the health of the delta smelt population might be a reflection of the health of the Delta itself. In 2009 the California Fish and Game Commission reclassified the delta smelt from “threatened” to “endangered.” In an effort to address the declining population of the delta smelt and other indicator fish species, court-ordered pumping restrictions have curtailed how much water gets sent through the California Aqueduct to Central and Southern California.

This means that a once reliable source of San Diego's water supplies now faces challenges limiting its accessibility. San Diego is particularly vulnerable to a shortage of imported water due to its limited local groundwater and surface water supplies. Developing local water supplies is critical to our economy and quality of life. One of these potential local water sources is purified water, which is the process being examined by the Water Purification Demonstration Project. By purifying recycled water and augmenting local reservoirs, the City can ensure a sustainable water source for San Diego, mitigate its dependence on imported Bay-Delta water, and lessen the environmental impact to a magnificent natural resource.

Did You Know?

Why do we need more water after the recent rain?

Even though winter rain helps, San Diego is located in a semi-arid desert climate and periodic droughts are inevitable in California. It is always important to use water wisely. Developing local reliable water sources, along with conservation efforts, are key components in San Diego's plan for a sustainable future.

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THE CITY OF SAN DIEGO

PureWaterSD.org



City of San Diego Public Utilities Department • Long-Range Planning & Water Resources Division
600 B Street, Suite 600, San Diego, CA 92101 • (619)533-7572 • www.purewatersd.org



Pure News: Issue 6

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.

Moving Right Along



It's hard to believe it has been one year since the Advanced Water Purification (AWP) Facility began operation in June 2011. This demonstration facility purifies one million gallons of recycled water a day for testing and analysis before being diverted back to the City's recycled water system. The purification process uses microfiltration and ultrafiltration, reverse osmosis, and ultraviolet disinfection with advanced oxidation. The AWP Facility will continue to operate and offer tours through next year.

Although the AWP Facility is the centerpiece of the Demonstration Project, other behind-the-scenes work has been taking place as part of the project. For more than two years, staff have been conducting a study of the San Vicente Reservoir, working with California Department of Public Health and the San Diego Regional Water Quality Control Board to define regulatory requirements, and determining the cost of a full-scale project.

A final report compiling the results of the project's components is scheduled for completion at the year's end. The report will be available to the public following its release to the Mayor and City Council.

Pulling Out All the Stops for Purified Water

When it comes to water purification, many people refer to it as "toilet-to-tap." Although that is a catchy alliteration, it fails to indicate the comprehensive treatment process of purifying recycled water. In fact, recycled water would go through multiple treatment steps before reaching customers' faucets in a full-scale project. These steps provide multiple safety barriers so that public health is protected.

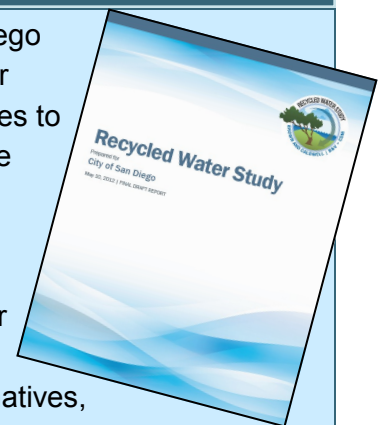
Pre-AWP Facility Barrier: Recycled Water

Before the purification process, wastewater from homes and businesses is treated at a water reclamation facility to a level suitable for irrigation, manufacturing and other non-drinking purposes. This treated water is called recycled water and is safe for human contact. The Water Purification Demonstration Project further treats the recycled water at the AWP Facility.

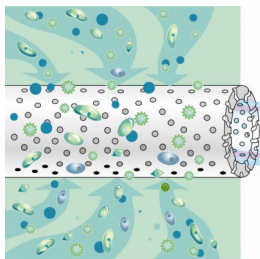
(Continued on page 2)

Expanding Recycled Water Use

In 2009, the City of San Diego launched a Recycled Water Study to look at opportunities to maximize wastewater reuse and reduce the amount of treated wastewater discharged into the ocean via Point Loma Wastewater Treatment Plant. The Study features reuse alternatives, including water purification, to increase the use of recycled water and to decrease the City's reliance on imported water. A report on the Study's findings was presented to the San Diego City Council on July 17. They are also available online at sandiego.gov/water/waterreuse/pdf/recycledfinaldraft120510.pdf.



Pulling Out All the Stops for Purified Water *(continued)*



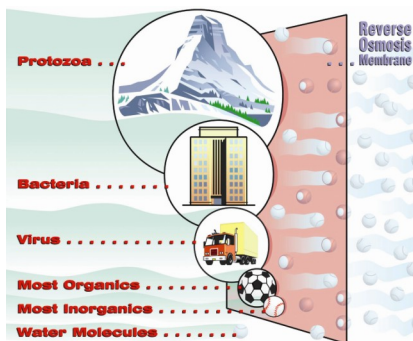
AWP Facility Barrier 1: Membrane Filtration

The first step upon entering the AWP Facility is membrane filtration. Recycled water is pushed by pumps through the membrane filtration's

thousands of hollow fibers. These fibers have very fine pores that filter out bacteria, protozoa and particles. Microfiltration and ultrafiltration are two types of membrane filtration.

AWP Facility Barrier 2: Reverse Osmosis

The water treated by membrane filtration then enters the reverse osmosis units. In this step, water is pumped through semi-permeable membranes which let water molecules pass through, but blocks microorganisms, such as viruses.



AWP Facility Barrier 3:

Ultraviolet Disinfection/Advanced Oxidation

After reverse osmosis, hydrogen peroxide is mixed into the water before undergoing ultraviolet treatment. The added hydrogen peroxide reacts with ultraviolet light to form powerfully reactive molecules that destroy any remaining organic matter in the water. This advanced oxidation process completely disinfects the water of any remaining organisms in addition to destroying any remaining contaminant chemicals.

Post-AWP Facility Barrier: San Vicente Reservoir

Now that the water has gone through membrane filtration, reverse osmosis, and ultraviolet disinfection

with advanced oxidation, the resulting water is similar to distilled water quality. During the Demonstration Project, this water is returned to the recycled water distribution system for irrigation and industrial uses; it is not currently added to the drinking water supply. If a full-scale water purification project were approved, the purified water would be sent to San Vicente Reservoir via a 23-mile pipeline.



At San Vicente Reservoir, the purified water would mix with and be diluted by

the existing water supply. The reservoir also provides further treatment by exposure to sunlight and other natural cleansing processes.

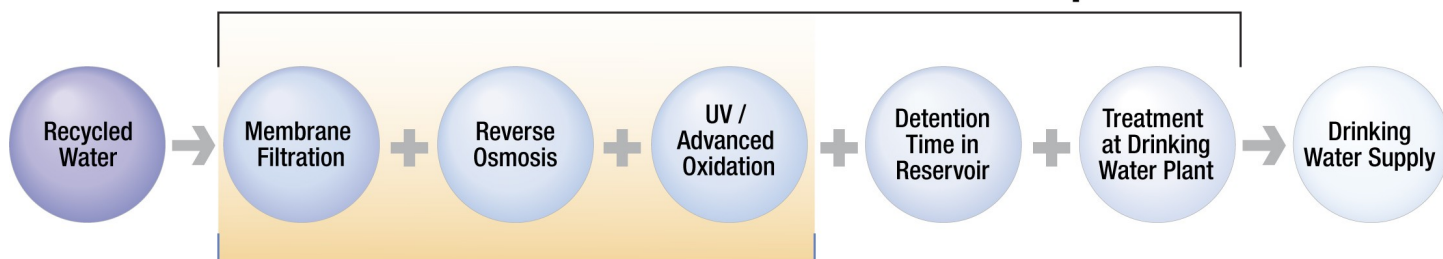
Post-AWP Facility Barrier: Drinking Water Treatment Plant

The final step for the blended water (raw water from the reservoir and the purified water) before reaching customers would be a drinking water treatment plant. There the blended water would undergo additional treatment to make it safe to drink.

Testing & Monitoring

Throughout the entire process, water would be tested and monitored to ensure contaminants are removed and the final product meets state regulations. If any anomalies were detected with the water quality at any point, the process would be halted and the water would not reach customers. Although the multiple barrier process may seem excessive, these safeguards ensure that San Diegans would receive the highest quality and safest water possible.

Multi-Barrier Water Purification Steps



Water Purification Process

Celebrating a Year of Tours

When the AWP Facility opened in June 2011, the City supplemented its existing outreach program with something more tangible: a tour experience. From the very first tours of the facility, tour guides have engaged visitors and explained the need for a local and reliable water supply, led them through an up-close experience with the water purification equipment, and challenged them with a quiz comparing purified water to tap and recycled water. Almost 200 tours later, the tour program continues to provide guests a unique insight into water purification.

Nearly 2,500 guests have toured the AWP Facility since its opening. Visitors range from members of the public to elected officials; from elementary school classes to fourth-year medical students; from Girl Scout troops to professional societies; from people who live down the street from the facility to people all the way from Australia, the UK, India, and other countries.

The Demonstration Project has welcomed many San Diegans to the AWP Facility, and it's not stopping yet. Tours are expected to continue through summer 2013.

So gather your friends, family, neighbors, coworkers and organizations to come for a look at what may be one of San Diego's future



water sources. To register for a tour, visit purewatersd.org/tours.shtml. If you can't make it out for a tour, staff would be happy to make a presentation to your organization. Contact purewatersd@sandiego.gov to schedule a presentation or to register a large group for a tour. Hope to see you soon!

Out of the Mouths of Babes:

Dear Tour Leader,

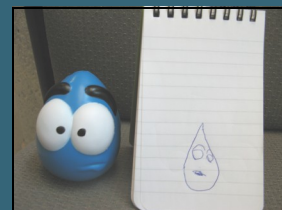
I Love the raindrop. I liked The Tours
I Love the part when they changed from
badwater to clean water. Thank you for the
Tour.



Dear tour leader,

I enjoyed the movie and the droplets. Thank you for taking some of your time to give my class a tour of the plant.

Thank you for teaching me how to use less water. I enjoyed when you showed me what stages it goes through until it goes to my house.



Get Social

The Demonstration Project is social-media savvy! We are on Facebook, Twitter and YouTube and want your participation. By “liking,” following, and subscribing to the Demonstration Project on Facebook, Twitter, and YouTube, you can interact with the Demonstration Project team and find out what’s going on with the future of San Diego water.



Find us on Facebook at [facebook.com/SanDiegoWPDP](https://www.facebook.com/SanDiegoWPDP). There you can read the latest information about the project, view photos of the AWP Facility and tour participants, ask questions of the Demonstration Project team and find links to interesting articles about water issues in California and around the globe. Our Facebook page is a great first step to learning about the Demonstration Project.

Follow us on Twitter [@PureWaterSD](https://twitter.com/PureWaterSD) to not only keep current on the Demonstration Project, but to also participate in the dialogue of the sustainable water community. Tweet at us for a direct reply, and retweet to your followers what you find interesting.

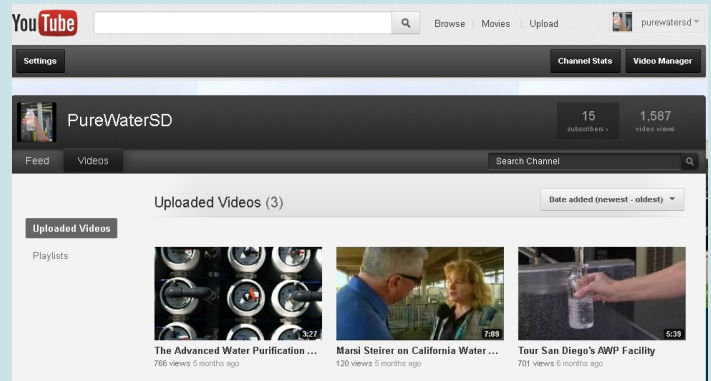


Subscribe to our YouTube page at [youtube.com/PureWaterSD](https://www.youtube.com/PureWaterSD) and view a virtual tour of the AWP



Facility. You can also watch how the multi-barrier filtration process works to

produce clean, clear water from recycled water. There is also a clip from California’s Gold with Huell Howser featuring project director Marsi Steirer explaining the water purification process. Comment on the videos and let us know what you think.



Your participation on our social media platforms ensures your active contribution toward the future of San Diego’s water supply. We look forward to hearing from you!

[@PureWaterSD](https://twitter.com/PureWaterSD)



Get the latest online

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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



Orange County's water purification facility

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.

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 WaterReuse Association, an international group of organizations and individuals working together to improve and increase local water supplies, honored the Demonstration Project with the 2012 WaterReuse 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 WaterReuse Association recognized the Demonstration Project's outreach program as the 2011 WaterReuse 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

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.

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.

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.

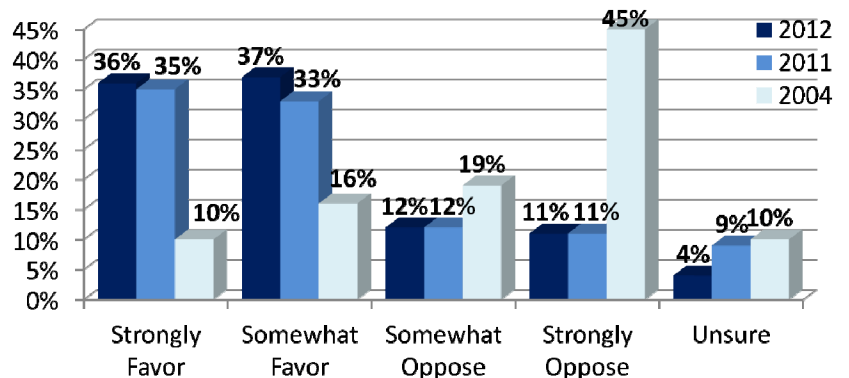
Understanding Local Water Attitudes

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:

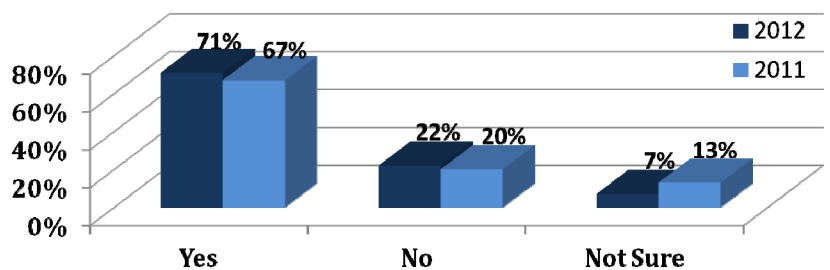
How would you feel about using advanced treated recycled water as an addition to the supply of drinking water?

- 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



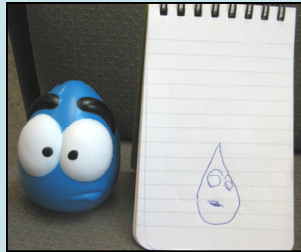
Despite these positive findings, many respondents were still unaware that San Diego is testing water purification locally. Additionally, the majority of respondents also did not know that Orange County’s drinking water supply is supplemented with purified water produced using the same purification process 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



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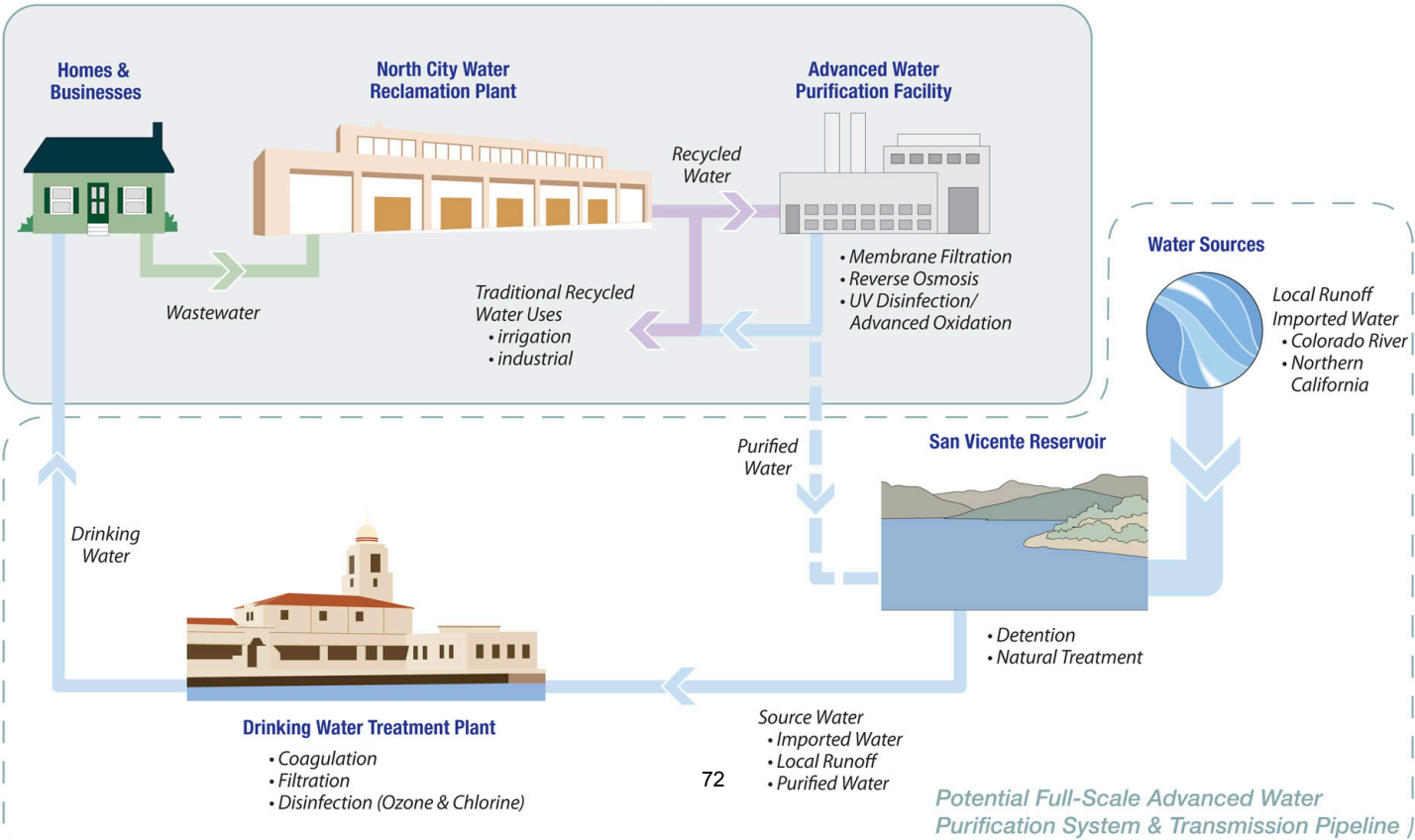


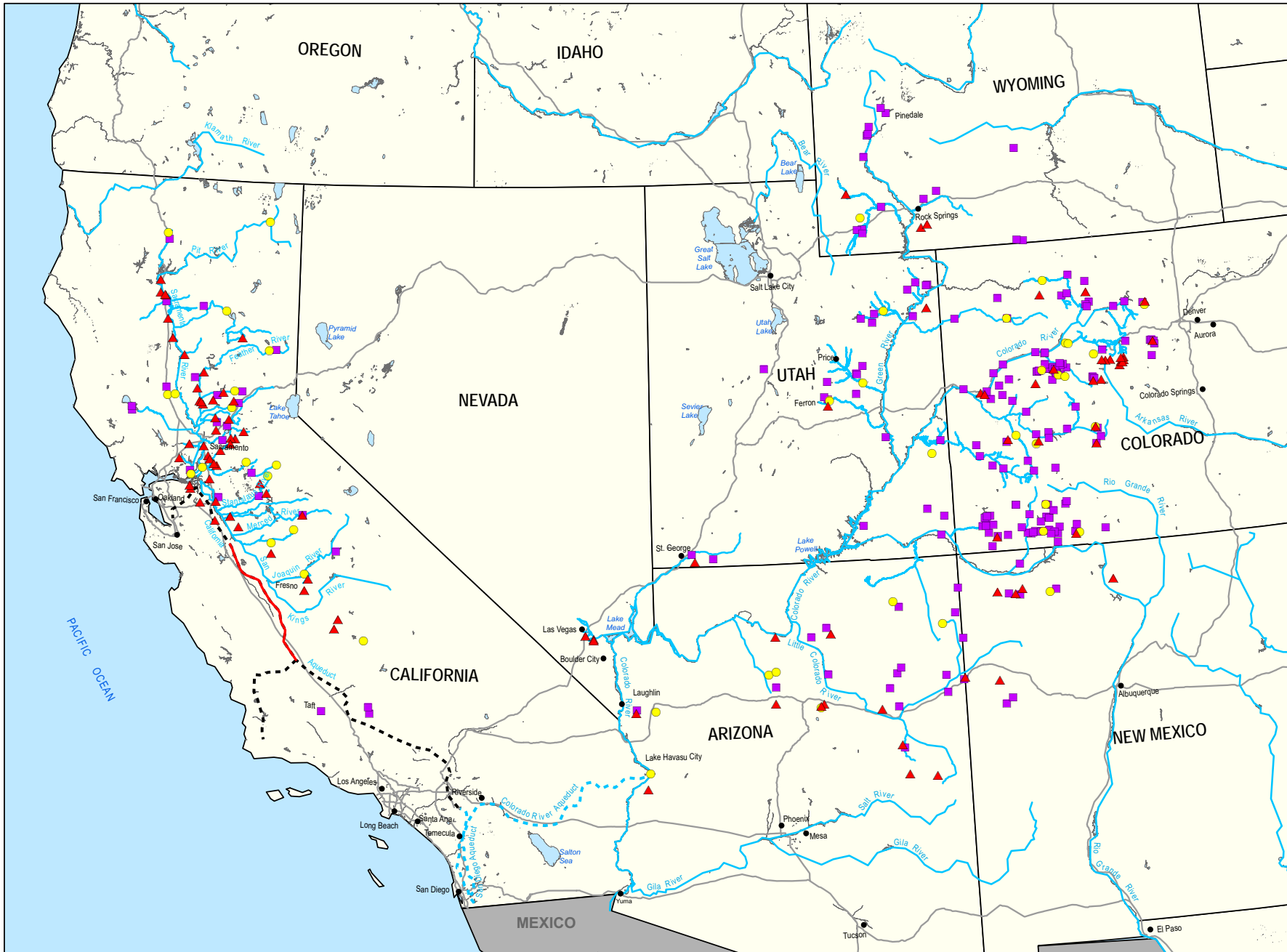
Poster Boards

City of San Diego's Water Purification Demonstration Project

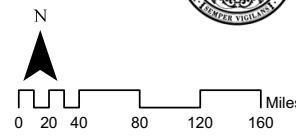
Purification Process

Demonstration-Scale Project





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 Geographic Data based on maps obtained from The National Atlas of the United States of America & Environmental Systems Research Institute, Inc. (ESRI) data.



LEGEND

- ▲ 1.0 > MGD
- .5 < 1.0 MGD
- < .5 MGD
- FREEWAYS
- RIVERS
- COLORADO/SAN DIEGO AQUEDUCT
- SWP AQUEDUCT
- STATE-FEDERAL WATER PROJECT

MGD = Flow in million gallons per day*
 Facility locations are approximate

* Source for flow rate: Colorado Salinity Forum Oct 31, 2008 & California Department of Water Resources & U.S Environmental Protection Agency

Note:
 At any given time many of the permits identified in this map are being reviewed, reissued, and/or terminated, and new discharge permits are being filed, this data must be considered as being subject to frequent changes



Municipal Wastewater NPDES Facilities
Colorado River & State Water Projects

N:\Resources & Planning\Water Purification Demonstration Project\Public Outreach\Outreach Materials\Graphics\Discharge Map NPDES Facilities_2011.pdf coordinates_1/24/11.mxd

In the World of Water, We are All Downstream

Throughout the United States, nearly every major metropolitan area is downstream of other cities so water sources nationwide contain treated wastewater. In various states, including California, Georgia, Texas and Virginia, advanced water treatment projects have been underway for many decades and have proven to be highly successful in augmenting drinking water supplies.

Multiple wastewater treatment facilities discharge into New York City's drinking water sources.

The Thames River (England) includes discharge from hundreds of wastewater treatment plants, yet more than millions of customers use this water daily as their source of drinking water.

Wastewater treatment plants discharge into the Rhine River, which is a source of drinking water for millions of people including those in Bonn and Cologne, Germany and Rotterdam, Netherlands.

Wulpen, Belgium is a coastal tourist area near the French Border. Treated wastewater undergoes microfiltration, reverse osmosis and ultraviolet disinfection before entering an infiltration basin from which the local water supply is collected.

Chelmer Wastewater Reuse, Essex, England

LONDON PARIS

NEW YORK WASHINGTON, D.C.

The Upper Ocoquan Services Authority near Washington, D.C. discharges high quality effluent into the Ocoquan Reservoir, which is a source of drinking water for over a million people.

Clayton County Water Authority, Morrow, GA

NEW ORLEANS

It is often said that by the time it reaches New Orleans, each drop of Mississippi River water has been recycled up to seven times.

The Helix Water District is exploring the addition of purified recycled water to its existing groundwater supplies in the El Monte Valley, CA.

The Colorado River receives wastewater discharges from hundreds of communities before it becomes a source of drinking water for many cities including Los Angeles and San Diego, CA

The Water Purification Demonstration Project is exploring the possibility of using purified recycled water to augment reservoir water. San Diego, CA

West Basin Water Recycling, Carson, CA

SAN DIEGO

The Orange County Water District provides drinking water for more than 2 million people, using multiple sources including groundwater that is replenished with purified recycled water.

Orange County Water District Groundwater Replenishment Program, Orange County, CA

Montebello Forebay, Los Angeles, CA

Scottsdale Water Campus, AZ

F. Wayne Hill Water Resources Center, Gwinnett County, GA

Brisbane Western Corridor Project, South East Queensland, Australia

In October 2008, three wastewater treatment plants added water purification processes for South East Queensland's water in preparation for adding it to the drinking water supply if the need arises.

Sydney, Australia

Singapore PUB, Singapore

Singapore has become an international model for water reuse because of its state-of-the-art NEWater facilities that treat recycled water to standards above drinking water. NEWater is also in great demand by high technology manufacturing plants that require purified water.

Perth, in Western Australia, is currently testing a groundwater replenishment program adjacent to its Beenyp Wastewater Treatment Plant. The facility uses ultra-filtration, reverse osmosis and ultraviolet disinfection before the water is injected into an aquifer.

New Goreangab Water Reclamation Plant, Namibia

Since 1969, Namibia's capital city Windhoek, has used a reservoir augmented with treated wastewater as its drinking water source.

○ Water from advanced water treatment facilities

● Major cities

⊕ Exploratory advanced water purification projects



1962

LACSD Montebello Forebay Groundwater Recharge Project

1976 - 2008

OCWD Water Factory 21 Seawater Barrier

2005
IEUA Chino Basin Recycled Water Groundwater Recharge Project



2005

Los Angeles County Dept. of Public Works (LACDPW) Alamitos Seawater Barrier

2005

UOSA WRF capacity is expanded to 54 MGD



2008

OCWD GWR System Seawater Barrier & Groundwater Recharge Project starts and Water Factory 21 is discontinued

Timeline for Potable Reuse Projects in U.S.

1960

1970

1980

1990

2000

2010

1978

Upper Occoquan Service Authority WRF (UOSA WRF) in Fairfax, Virginia starts operation to improve water quality in the Occoquan Reservoir, a major potable water source



1985

Hueco Bolson Recharge Project in El Paso, TX



1995

LACDPW West Coast Basin Seawater Barrier

2006

LACDPW Dominguez Gap Seawater Barrier



2011

Prairie Waters Project in Aurora, CO anticipated to start operation of indirect potable reuse



2011

San Diego Water Purification Demonstration Project in San Diego, CA anticipated to start operation of indirect potable reuse demonstration project

2011

El Monte Groundwater Recharge Project in San Diego County, CA anticipated to start operation of indirect potable reuse



Potable Reuse Project Details

Project	Level of Treatment	Start Year	WRF Rated Capacity (MGD)	Actual Delivery
LACSD Montebello Forebay Groundwater Recharge Project¹ Los Angeles County, CA	Tertiary with Soil Aquifer Treatment	1962	47.5	50,000
OCWD Water Factory 21 Seawater Barrier Orange County, CA	Tertiary with Microfiltration and Reverse Osmosis	1976	15	17,000
UOSA Occoquan Reservoir Indirect Potable Reuse² Fairfax, VA	Tertiary with High-lime Process, Chlorination & Dechlorination	1978	54	47,000
Hueco Bolson Recharge Project El Paso, TX	Tertiary with Activated Carbon, Lime Process, Ozone Disinfection	1985	10	2,000
LACDPW West Coast Basin Seawater Barrier³ Los Angeles County, CA	Tertiary with Microfiltration, Reverse Osmosis & UV	1995	30	5,000
LACDPW Alamitos Seawater Barrier⁴ Los Angeles County, CA	Tertiary with Microfiltration, Reverse Osmosis & UV	2005	3	3,000
IEUA Chino Basin Groundwater Recharge Project⁵ San Bernardino County, CA	Tertiary with Soil Aquifer Treatment	2005	84.4	10,000
LACDPW Dominguez Gap Seawater Barrier⁶ Los Angeles County, CA	Tertiary with Microfiltration and Reverse Osmosis	2006	4.5	1,000
OCWD GWRs Seawater Barrier & Groundwater Recharge Project Orange County, CA	Tertiary with Microfiltration, Reverse Osmosis & AOP	2008	70	75,000
Aurora Prairie Waters Project Aurora, CO	Riverbank Filtration, Advanced UV Oxidation, GAC Adsorption	2011	50	10,000
Helix WD El Monte Groundwater Recharge Project⁷ San Diego County, CA	Tertiary with Microfiltration, Reverse Osmosis, Advanced UV Oxidation	2011	x	5,000
San Diego Water Purification Demonstration Project⁸ San Diego, CA	Tertiary with Microfiltration, Reverse Osmosis, Advanced UV Oxidation	2011	1	N/A

Notes:

- 1 Recycled water is provided by Sanitation Districts of Los Angeles County's Whittier Narrows and San Jose Creek (100 MGD) WRFs.
- 2 Recycled water is provided by the regional Upper Occoquan Service Authority's WRF.
- 3 Recycled water is provided by Water Replenishment District that is purchased from West Basin MWD Edward C. Little WRF. It is blended with MWD imported water.
- 4 Recycled water is provided by the Water Replenishment District of Southern California's Long Beach WRF (Tert.) and Leo J. Vander Lans WTF (Adv).
- 5 Recycled water is provided by four Inland Empire Utility Agency water reclamation facilities; Regional Plants Nos. 1, 4 and 5 and the Carbon Canyon WRF.
- 6 Recycled water is provided by the Los Angeles County Flood Control District's Terminal Island Treatment Facility.
- 7 Recycled water to be provided by the Padre Dam Municipal Water District or the City of San Diego.
- 8 Recycled water to be provided by the City of San Diego North City WRF. As this is a demonstration facility only, no water will be delivered for indirect potable consumption.



North City Water Reclamation Plant to San Vicente Reservoir



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North City Water Reclamation Plant to San Vicente Reservoir

Prepared by City of San Diego Public Utilities Department
 Watershed and Resource Protection Team, June 29, 2011

Bookmarks

Three types of bookmarks were produced for the Demonstration Project.



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79

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Did you know...

- San Diego needs local, reliable and sustainable sources of water to lessen our dependence on imported water.
- The Water Purification Demonstration Project is examining the use of advanced water purification technology to determine the feasibility of full-scale reservoir augmentation.
- The water produced by the purification process goes through multiple steps of advanced treatment to meet all water quality, safety and regulatory requirements.
- No purified water will be added to the San Vicente Reservoir or San Diego's drinking water system during the Demonstration Project.





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84



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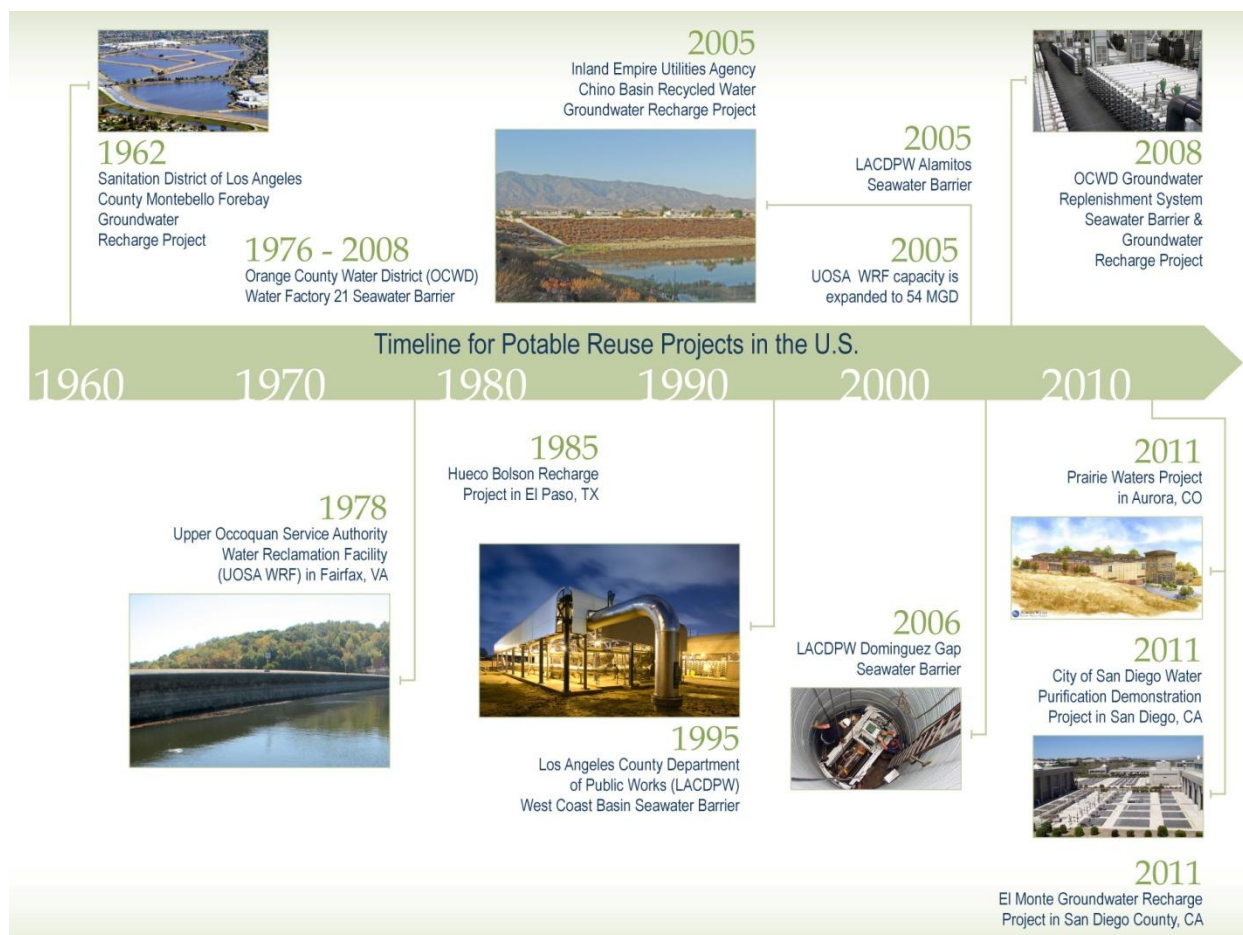
White Papers

POTABLE REUSE PROJECTS IN THE UNITED STATES

The water cycle—the continuous movement of water from ocean to air and land and back to the ocean—is as old as the earth itself. The basic underlying principle is simple: All water is recycled. There is no new water.

Throughout the developed world, wastewater has been collected and treated for return to the environment where it receives further treatment thanks to sunlight, time, and nature, prior to being used again. Today, nature cannot keep up with all the water needs of people, industry and agriculture, especially in arid regions like Southern California. As a result, human beings have accelerated this process with advanced water purification systems which, combined with natural treatment occurring in groundwater or surface water bodies, make up *potable reuse*. Advanced water purification includes additional treatment beyond tertiary for further removing constituents of concern to public health. This may include membrane filtration, reverse osmosis and advanced oxidation (WateReuse, n.d.).

This white paper presents key potable reuse projects that have been implemented in the United States beginning in the 1960s. It should be noted that almost all of these projects occur in areas with limited or no surface water reservoir storage capacity and, as such, the treated water is used to recharge groundwater aquifers. Projects that discharge into rivers or reservoirs (surface water augmentation) include the Upper Occoquan Service Authority project in Fairfax, Virginia and the Prairie Waters Project in Aurora, Colorado. A summary timeline and key fact tabulation is presented below.



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⁵ Recycled water is provided by four Inland Empire Utility Agency water reclamation facilities; Regional Plants Nos. 1, 4 and 5 and the Carbon Canyon WRF.

⁶ Recycled water is provided by the Los Angeles County Flood Control District's Terminal Island Treatment Facility.

Following are brief descriptions of key groundwater replenishment and surface water augmentation projects using advanced purified water that are currently in operation.

Los Angeles, California: Montebello Forebay Groundwater Recharge Project

The Sanitation Districts of Los Angeles County (LACSD) manage the Montebello Forebay Groundwater Recharge Project, one of the oldest ongoing natural groundwater recharge projects in the nation. LACSD has managed the project, located in southeastern Los Angeles County, since 1962.

The Montebello Project provides advanced secondary treatment (partial denitrification) and tertiary filtration/disinfection for an average of 45 MGD of water prior to spreading in basins in the Montebello Forebay area of the Los Angeles Central groundwater basin. This advanced purified water makes up about 35 percent of the total recharge to the groundwater basin, while imported water purchased from the Metropolitan Water District of Southern California and storm water runoff make up the remainder of the water used to replenish the basin, which provides water for 3.7 million people.



The Montebello Project is important because its long duration—40 years—has allowed numerous health studies that confirm the safety of groundwater replenishment projects. A heavily peer-reviewed health

effects study conducted in 1976 found no measurable health issues among the people consuming the water. In 1996 and 1999, the Rand Corporation conducted epidemiological studies on the Montebello project examining the health outcomes of about 900,000 people. The conclusion reached by the Rand researchers was that after 30 years of consumption of advanced purified recharge water there was no association between project water and any ill health effects.

Fairfax, Virginia: Upper Occoquan Service Authority, Millard H. Robbins, Jr. Water Reclamation Facility

After an intensive study conducted in 1970 of water quality problems in the Occoquan Reservoir, a major source of drinking water for Northern Virginia, the Occoquan Policy (Policy) mandated the creation of an advanced water purification facility to replace the 11 secondary treatment plants discharging to the reservoir. The Policy also mandated the creation of an independent ongoing program of water quality surveillance. The Upper Occoquan Service Authority (UOSA) was created to meet the water recycling mandate of the Policy. The Occoquan Watershed Monitoring Laboratory met the requirement for independent surveillance.



The UOSA regional advanced water purification facility includes lime clarification, carbon adsorption, filtration, and chlorine disinfection. Originally a 27 MGD facility, UOSA WRF was expanded to 54 MGD in the 1990s and discharges to a final effluent reservoir prior to release to Bull Run, a tributary of the Occoquan Reservoir, about 20 river miles upstream of the water treatment plant intake. During times of normal precipitation, the advanced purified water from the UOSA WRF makes up about five percent of the total inflows to the reservoir, with percentages much higher (up to 90%) during times of drought.

Orange County, California: Water Factory 21 and Groundwater Replenishment System

Water Factory 21

From its inception in 1976, Water Factory 21 was the most recognized and highly-regarded water purification program in the water industry worldwide. It was the first project in California to use advanced water purification technologies, including reverse osmosis, to enhance secondary effluent to drinking water standards. Advanced purified water was injected into the Orange County groundwater basin in a series of wells used as a barrier against the intrusion of seawater into the basin. For over 30 years, Water Factory 21 protected the integrity of the large groundwater basin that serves northern and central Orange County while also helping to increase the reliability of the region's water supply. Water Factory 21 had a design capacity of 15 million gallons per day (MGD).



Groundwater Replenishment System

The Groundwater Replenishment System (GWRS) has been operational in Orange County since January of 2008. The GWRS replaced Water Factory 21 and expanded using a combination of membrane filtration, reverse osmosis, and advanced oxidation to address a new generation of emerging contaminants, including pharmaceuticals. The 70 MGD project, expandable to 100 MGD, purifies water to state and federal drinking water standards prior to serving the seawater injection barrier and a spreading basin recharging the Orange County groundwater basin. The underground basin provides more than half the water used by northern and central Orange County.

El Paso, Texas: Hueco Bolson Recharge Project

In order to decrease the rate at which the fresh water reserves of the Hueco Bolson were being depleted, El Paso Water Utilities looked to artificially recharge the aquifer using advanced purified water. The Hueco Bolson aquifer provides about 40 percent of the municipal water supply needs of El Paso, Texas and the surrounding area. It also supplies 100 percent of the municipal supply for Ciudad Juarez, Mexico and Fort Bliss, Texas. The Hueco Bolson receives limited natural recharge due to the arid climate. The 10 MGD Fred Hervey Reclamation Plant and the associated Hueco Bolson Recharge Project started full operation in 1985 and treats up to 7.5 MGD to drinking water standards for groundwater injection. The reclamation plant uses a 10-step treatment process including activated carbon, lime clarification, filtration and ozone disinfection.

Scottsdale, Arizona: City of Scottsdale Water Campus

Meeting the water supply demands of a growing city led to the creation of the Water Campus in Scottsdale, Arizona. Since 1998, the Water Campus has produced 12 MGD of tertiary treated recycled water that is used for golf course irrigation during the summer months. In winter, when irrigation is reduced, 10 MGD receives advanced purification at a state-of-the-art facility where microfiltration, reverse osmosis, and disinfection purify the water to drinking water standards before recharge into the local groundwater basin.



Los Angeles County-Area, California: Seawater Barrier Projects

Seawater intrusion is a natural and typical occurrence for all coastal aquifers around the world. Due to the severe over-draft of groundwater for potable and agricultural purposes in the Central and West Coast Basins (CWCB), seawater intrusion is contaminating the groundwater with salt and poses a serious threat to the local potable water source. To address this issue, fresh water consisting of imported and recycled water is injected into a well to build up pressure such that it overcomes the pressure of the intruding seawater, thereby blocking the intrusion. The Water Replenishment District of Southern California (WRD) currently manages three seawater intrusion barriers systems within Los Angeles County, all of which are operated by injecting imported potable or advanced purified water into a series of wells to maintain a freshwater barrier to protect against seawater intrusion. It is important to note that all seawater barrier projects are, in fact, potable reuse projects as well, as the injected water does eventually migrate into the drinking water source in the aquifer.



West Coast Seawater Barrier

The West Basin Municipal Water District's Edward C. Little Water Recycling Facility (ELWRF) in El Segundo, California, has been on-line since 1995. Secondary effluent from the City of Los Angeles Hyperion Treatment Facility is treated at the ELWRF to produce five different qualities of custom-made recycled water for irrigation, commercial and industrial use and groundwater recharge. For recharge, secondary treated effluent is purified by micro-filtration, reverse osmosis, and disinfected with UV disinfection. The advanced purified water is mixed with imported water prior to injection into the groundwater basin (West Coast) via a 100-well seawater barrier. Approximately 5,000 acre-feet of advanced purified water is injected into the seawater barrier annually.

Alamitos Seawater Barrier

The Alamitos Seawater Barrier receives recycled water from the Long Beach Water Reclamation Plant (LBWRP) that provides primary, secondary and tertiary treatment for 25 million gallons of wastewater per day. The plant serves a population of approximately 250,000 people. Approximately 5 million gallons per day of recycled water is reused at over 40 reuse sites for landscape irrigation of schools, golf courses, parks, and greenbelts by the City of Long Beach and the re-pressurization of oil-bearing sediment off the coast of Long Beach. A portion of the recycled water produced from the LBWRP undergoes advanced treatment at the Leo J. Vander Lans Advanced Water Treatment Facility. The facility uses microfiltration, reverse osmosis, and ultraviolet disinfection to produce high quality water that is blended with imported water and pumped into the Alamitos Seawater Barrier to protect the groundwater basin from seawater contamination. The WRD purchases all of the water injected into the barrier, except for about 2,500 acre-feet per year that is purchased by the Orange County Water District. In total, approximately 3,000 acre-feet of advanced purified water is injected into the seawater barrier annually.

Dominguez Seawater Barrier

The Dominguez Gap Barrier currently receives approximately 1,000 acre-feet per year of advanced purified water from the Los Angeles County Flood Control District (LACFCD) Terminal Island Water Reclamation Plant/Advanced Water Treatment Facility. They also operate and maintain the barrier. The plant treats wastewater from over 130,000 people and 100 businesses in the heavily industrialized Los Angeles Harbor area, including the communities of Wilmington, San Pedro, and a portion of Harbor City. The advanced purification facility can treat up to 4.5 MGD of tertiary effluent with microfiltration followed by reverse osmosis and chlorine disinfection. The advanced purified water meets all drinking water quality standards. It is also used as valuable boiler feed water for local industries in the Harbor area and offsets millions of gallons of potable water each day.

San Bernardino County, California: Chino Basin Groundwater Recharge Project

Water recycling is a critical component of the water resources management strategy for the Chino Basin in Southern California. Inland Empire Utilities Agency (IEUA) has implemented an aggressive water recycling program to complement dwindling imported water to meet its expanding needs. IEUA produces a very high quality recycled water that can be used for a wide variety of applications, including groundwater recharge, industrial process water, and irrigation of golf courses, freeway landscaping, pasture for animals and food crops. Presently, about 15 percent of the 60 MGD of water currently generated by the agency's four water recycling plants is reused locally each day. Recycled water received tertiary filtration and UV disinfection prior to conveyance and blending with stormwater flows in spreading basins prior to percolation into the groundwater basin.

Aurora, Colorado: Prairie Waters Project

Colorado's arid environment and cycles for drought make a drought-protected water supply a priority for many Colorado cities. Out of this need, the City of Aurora, Colorado developed the Prairie Waters Project. Anticipated to begin operation in 2011, the Prairie Water Project will increase the City's water supply by 20 percent, delivering up to 10,000 acre-feet (about 3.3 billion gallons) of advanced purified water per year. The project will draw river water from the South Platte River, a receiving water of treated wastewater effluent from wastewater treatment plants located upstream. The river water will be drawn through the sand and gravel of the riverbank and pumped to a 50 MGD water purification facility that treats the water using softening, advanced ultraviolet oxidation, filtration and granulated activated carbon adsorption. The advanced purified water will then be discharged into the Aurora Reservoir, the City's raw water storage reservoir. Water from the reservoir is treated again prior to distribution into the potable water distribution system.



SIDEBAR

Planned Versus Unplanned Potable Reuse Projects

Indirect potable reuse—using water a second time as a drinking water supply—occurs on both a planned and unplanned basis. San Diego's Water Purification Demonstration Project will demonstrate the safety associated with *planned* indirect potable reuse, which means that wastewater is purified to an extremely high level. The process includes state-of-the-art technological processes, including a combination of membrane filtration, reverse osmosis, and advanced oxidation.

Unplanned indirect potable reuse takes place on nearly every river system throughout the world, including the United States. Water that moves from an upstream community to one downstream varies in water quality depending on the quality of wastewater discharged along the way. So, treated wastewater is already being provided to many communities as part of their drinking water.

In the case of the City of San Diego, imported water from the Colorado River and Northern California contains treated wastewater discharged from a total of over 345 municipal wastewater facilities. All imported water and water collected in San Diego's reservoirs from rainfall is untreated or "raw" water. Before any of that water is sent to your tap, it is treated in a water treatment plant to ensure it is safe and healthy to drink – and that it meets all drinking water standards. San Diego could not exist without these imported water sources, which contain treated wastewater.

References

WaterReuse. (n.d.). WaterReuse Association website online glossary. Accessed on June 13, 2011.

<http://www.watereuse.org/information-resources/about-water-reuse/glossary-1>

CITY OF SAN DIEGO WATER PURIFICATION DEMONSTRATION PROJECT ADVANCED WATER PURIFICATION

It is commonly known that human activities over the years have resulted in contamination of our water bodies worldwide. Whether it's runoff from agricultural farms or health and beauty products we use daily to improve the quality of our lives, contaminants find their way into water bodies as a result of human activities. Many of these water bodies are used as public water supply sources. Recently, the public has become more aware about human activities and the associated impact of contaminants from those activities on water supplies, as well as the potential impacts of exposure to contaminants on both humans and wildlife. For more than a decade, water professionals and regulators have studied various contaminants, which are sometimes called "constituents of emerging concern" (CECs), because of their consistent occurrence in source waters throughout the United States and internationally.

While the presence of CECs is of concern, many of these compounds are not being detected as a result of recent events. Instead, the elevation of the level of compounds is a result of the improvement of our ability to detect them in the environment. In fact, our ability to detect CECs has outstripped our knowledge of what kind of impact they might actually have on humans. *Detection of these compounds does not necessarily imply a risk.* For example, typical concentrations of pharmaceuticals found in water supplies are millions of times lower than one therapeutic dose of that same pharmaceutical. In fact, the highest concentration of any pharmaceutical detected in U.S. drinking waters is approximately 5,000,000 times lower than the therapeutic dose (AWWA, 2008). Nonetheless, strategies have been developed to manage potential risks to the public.

The primary objective of water and wastewater treatment is to protect human health and promote economic vitality while minimizing adverse ecological impacts from the use of the water. Improved public health protection, through effective drinking water treatment, is one of the outstanding civil engineering accomplishments of the twentieth century. At the same time, advances in wastewater treatment have greatly reduced the ecological impacts of wastewater discharges.

While wastewater treatment has been shown to be an effective barrier at reducing CECs, many agencies have embraced the advanced purification of water that will find its way back to a public water supply. Advanced water purification has been proven to positively remove CECs and provide a superior water quality that meets all drinking water standards.

What is Advanced Water Purification?

Advanced Water Purification (AWP) is a state-of-the-art process that further purifies highly treated wastewater. After the wastewater is biologically treated and filtered, the water is considered to be high quality but is not considered suitable for drinking water. AWP involves several additional treatment steps that scientists and health professionals recognize will produce a very high quality water supply. The high quality of this water is achieved by filtering the water through membranes that remove CECs, which are much larger in size than the very small pores in the membrane material. A subsequent step involves advanced oxidation, the combination of hydrogen peroxide and ultraviolet light, which provides one of the most powerful oxidants on the planet to provide an additional barrier and disinfect the purified water. Analysis of the water produced by this process indicates that advanced water purification facilities consistently produce water with significantly lower concentrations of constituents than raw (untreated) imported water supplies.

What type of treatment is provided by Advanced Water Purification in the Demonstration Project?

This advanced water purification process includes membrane filtration (microfiltration and/or ultrafiltration), reverse osmosis, ultraviolet light disinfection, and advanced oxidation. These

technologies have been utilized in the water industry for many decades, and are proven barriers that remove CECs and safeguard public health.



Microfiltration and Ultrafiltration

Microfiltration (MF) and ultrafiltration (UF) are types of filters that utilize fibers that resemble a sponge-like material when magnified. The pores, or openings in the fibers that allow the water to pass through, are 0.2 microns, which is approximately 300 times finer than one human hair. MF and UF are very effective at removing materials in the water, but not good at removing dissolved compounds or CECs. These filters are used to “polish” the water. This improves the operation of the reverse osmosis system that is very effective at removing CECs and dissolved materials.

Reverse Osmosis

Reverse osmosis is a membrane filtration method that removes compounds that are very small, such as dissolved salts, by using pressure to push water through a semi-permeable membrane, leaving other unwanted materials behind. The reverse osmosis membrane is designed to allow only water to pass through while preventing the passage of dissolved materials, such as salt. While these membranes have been used for years to desalinate seawater, they are also being used today to purify water by removing CECs from reuse supplies. The membrane essentially acts like a very fine filter that separates out any remaining minerals and pollutants, salts, viruses, bacteria, metals, pesticides and other materials, resulting in very high quality water. Many bottled water companies use reverse osmosis because of its proven purifying capability.



Ultraviolet Light Disinfection

Following reverse osmosis, water is treated by ultraviolet (UV) light as an additional barrier to CECs. The system is designed to deliver a dose of UV light significantly higher than natural UV from sunlight. This breaks the chemical bonds of the compound into their more natural elements like carbon or nitrogen. The UV system also provides disinfection of the water. Hospitals and dental offices utilize UV light to sterilize instruments.

Advanced Oxidation

The addition of hydrogen peroxide before the UV process creates an additional step called advanced oxidation, providing an additional or backup barrier to CECs. Many of the operating AWP facilities use advanced oxidation to target chemicals typically not found in reuse waters in San Diego. The other intended use of advanced oxidation is as a safety net to address any remaining trace chemicals, which are in extremely low concentrations and thus difficult to detect even with the improvements in analytical testing.

Water Quality Testing

Awareness of our impact on the environment has increased over the years, but this is particularly true in the last 10 years with the improved sensitivity in analytical testing. Decades ago, compounds could only be detected at the parts-per-million levels (one part compound to one million parts water). In the last ten years this has advanced to parts-per-billion. Now, with very sensitive equipment, we are able to detect compounds at the parts-per-trillion level, and are near the parts-per-quadrillion boundary. In fact, lab technicians have to wear special gloves, clothing and breathing filters in order avoid contaminating the samples of water they are testing. While this low level of detection is necessary for analytical purposes, it is not always necessary to determine a human health impact. Experts agree that just because a compound is detected doesn't mean there is an associated health concern.

While humans worldwide have sent many compounds into the environment, many of these compounds are of little health or environmental concern. For those compounds that are a health or environmental concern, the risk of their presence is balanced by the extremely low concentrations at which they occur. Improvements in wastewater treatment have resulted in a very effective barrier to the CECs that are introduced into the water. Advanced water purification has been proven to be an extremely effective system at providing a superior quality of water that meets all drinking water standards.

If the Demonstration Project were to result in a decision to implement a full-scale project that would augment San Vicente Reservoir with purified water from the AWP, it would have one benefit that other similar projects do not possess. All of the other projects in Southern California use the purified water to supplement groundwater supplies and then pump that groundwater directly to the consumer's taps. A full-scale reservoir augmentation project would send the purified water from the AWP to the San Vicente Reservoir where it would blend with untreated water stored there. Ultimately the blended water would be sent to one of the City's water treatment facilities where it will be further treated before being sent into our drinking water system.

SIDEBAR

What can you do to help reduce pharmaceuticals in water supplies?

Pharmaceuticals and personal care products are products used by individuals for personal health or cosmetic reasons. They comprise a diverse collection of thousands of chemical substances, including prescription and over-the-counter therapeutic drugs, fragrances, soaps, lotions, and cosmetics. These products are considered pollutants when they enter the wastewater stream through such means as bathing or flushing unused or expired medications down the toilet. Many cities have established "take back" centers or, as with the City and County of San Diego, an annual "Take Back Day", for unused medications. Additionally, the City of San Diego Environmental Services Department recommends that medications and pharmaceuticals be securely packed and disposed of in the trash: <http://www.sandiego.gov/environmental-services/ep/medical.shtml>. You can help reduce pollution in our water supplies by returning unused or expired medicine to a center or by properly disposing in a landfill rather than flushing it down your toilet.

References

American Water Works Association (AWWA). 2008. *Statement of Dr. Shane Snyder, Southern Nevada Water Authority before the Senate Subcommittee on Transportation Safety, Infrastructure Security, and Water Quality on Pharmaceuticals in the Nation's Water: Assessing Potential Risks and Actions to Address the Issue*. April 15. Accessed on May 12, 2011.
<http://www.awwa.org/files/GovtPublicAffairs/AWWA2008FlyinTestimonyPharmaceuticals.pdf>

Water Bill Insert

The latest version of the insert from March 2012 is displayed. A similar version was distributed in July 2011.

Open for Tours

Water Purification | Demonstration Project



The Advanced Water Purification Facility is part of the City's Water Purification Demonstration Project, which is examining the use of advanced water purification technology on recycled water.

Experience the water purification process:

- See how wastewater becomes purified water
- See what other places are already drinking purified water
- See the comparison among purified, drinking, and recycled water

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Water Purification | Demonstration Project



El Tratamiento Avanzado de Purificación de Agua es parte del proyecto de Demostración de Purificación de Agua, el cual está investigando las tecnologías más avanzadas para la purificación de agua reciclada.

Conosca por experiencia propia el proceso de purificación de agua:

- Vea cómo el agua de desague se convierte en agua purificada
- Vea en qué otros lugares se usa agua purificada como agua potable
- Vea la diferencia entre agua purificada, agua potable y agua reciclada

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- Mande un correo electrónico a purewatersd@sandiego.gov o llame al (619) 533-4631

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AWP Facility Brochure

Demonstration Project Components

The Advanced Water Purification Facility is one component of the Demonstration Project. Additional components include a study of San Vicente Reservoir to determine the potential of augmenting the reservoir with purified water, an economic and energy analysis, and defining regulatory requirements. In addition, an independent advisory panel of experts provides oversight and guidance. The purified water will not be added to the San Vicente Reservoir during the demonstration phase; instead it will be added to the existing recycled water distribution system. For more information about the project or to schedule a speakers bureau presentation for your organization, visit www.purewatersd.org.

Take a Look

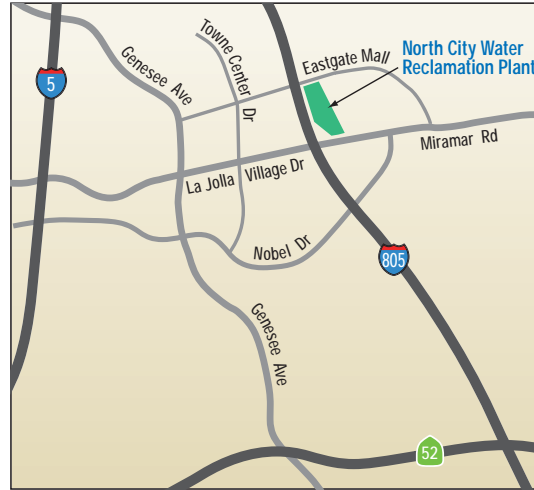
You are invited to tour the Advanced Water Purification Facility, the test facility for California's first indirect potable reuse via reservoir augmentation pilot project. During the walking tour you will see water purification technology up close and compare samples of purified water produced at the facility to tap and recycled water – the difference is clear.



Tours are held Tuesdays and Thursdays and on occasional evenings and Saturdays. To tour the facility, please register at www.purewatersd.org/tours.shtml or call (619) 533-4631.

Tasting is Believing

Orange County's Groundwater Replenishment System (GWR) is a full-scale advanced water purification facility located in Fountain Valley, California. The GWR System uses the same purification process being examined by the Demonstration Project to supply a safe and reliable water source to over 500,000 residents. As a full-scale facility, guests touring the GWR System are able to drink the purified water. To register for a tour, visit www.GWRSystem.com.



To tour the facility, please register at www.purewatersd.org/tours.shtml or call (619) 533-4631.



**City of San Diego
Public Utilities Department**

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Project Speakers Bureau Line: (619) 533-6638

Email: purewatersd@sandiego.gov

Website: www.PureWaterSD.org

Water Purification Demonstration Project

@PureWaterSD

PureWaterSD

A look at the technology behind the Water Purification | Demonstration Project



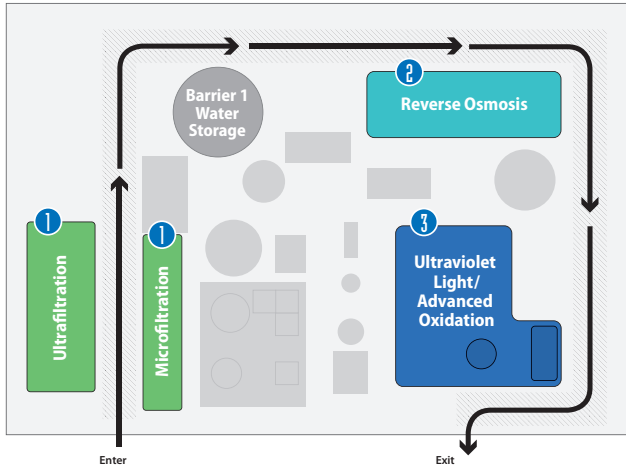
*Exploring local resources to ensure
a sustainable water supply*



THE CITY OF SAN DIEGO

Innovation for Future Water Supply

The Advanced Water Purification Facility is the focal point of the City of San Diego's Water Purification Demonstration Project (Demonstration Project). This project is vital to San Diego's future and is a critical step towards developing a local, sustainable and reliable water supply. This state-of-the-art facility, located at the North City Water Reclamation Plant, is using the most advanced technologies to purify one million gallons of recycled water per day.



The Purification Process

The City of San Diego currently uses recycled water for irrigation and industrial purposes. The Demonstration Project is a pilot study to determine the feasibility of further purifying recycled water to supplement local drinking water supplies through reservoir augmentation. The project will determine if the purified water meets water quality, safety and regulatory requirements. The purification process uses the multi-barrier approach of consecutive treatment steps, which work together to remove or destroy unwanted materials. Each barrier includes frequent and continuous water quality monitoring. Safeguards are built into the

process to ensure that an anomaly at any given treatment step would not compromise public health. Here is a look at the process:

Membrane Filtration — Barrier 1

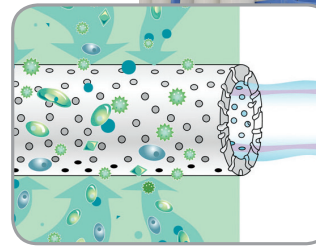
The first step in the water purification process is membrane filtration. Two types of membrane filtration systems are being tested—microfiltration and ultrafiltration—to determine which is most effective. This treatment step uses a series of membrane filtration canisters that remove contaminants in the already-treated recycled water.

Inside the membrane filtration canisters are hollow fibers that block unwanted materials like suspended solids, bacteria and protozoa from passing through. The filters are extremely efficient and are tested daily to confirm their consistent removal of contaminants. After undergoing membrane filtration, the clouded appearance of the recycled water is converted into a clear solution that contains dissolved organic material and salts.

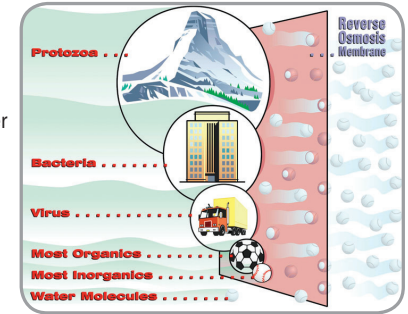


Reverse Osmosis — Barrier 2

Reverse osmosis is the second and most essential step in the purification process. Water is forced under high pressure through membranes that remove salt and microorganisms, including viruses and bacteria.



Reverse osmosis purifies the water to a level similar to distilled water quality. This process is used by the bottled water industry.



Ultraviolet Disinfection/Advanced Oxidation — Barrier 3

Step three of the purification process is advanced oxidation through the use of ultraviolet (UV) light and hydrogen peroxide. Inside the vessel shown to the right is a high intensity light, similar to extremely concentrated sunlight, that provides disinfection. Hydrogen peroxide is added and reacts with the light to form powerfully reactive molecules like those used by nature to clear pollutants from the atmosphere. These molecules provide further disinfection and destroy any remaining contaminants in the water by breaking them down into harmless compounds.



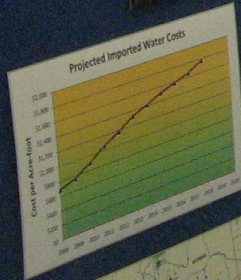
San Diego is among many innovative cities exploring water purification technology to purify wastewater for use as drinking water.

Display Board

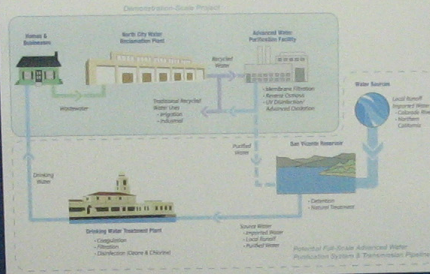
Water Purification | Demonstration Project

Water Supply Challenge

San Diego needs local, reliable and sustainable sources of water to lessen our dependence on imported water.



City of San Diego's Water Purification Demonstration Project Purification Process



Did you know...

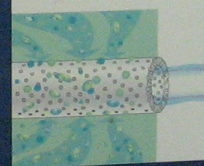
- The Water Purification Demonstration Project is examining the use of advanced water purification technology to determine the feasibility of full-scale reservoir augmentation.
- The water produced by the purification process goes through multiple steps of advanced treatment to meet all water quality, safety and regulatory requirements.
- No purified water will be added to the San Vicente Reservoir or San Diego's drinking water system during the Demonstration Project.

Benefits of the Demonstration Project

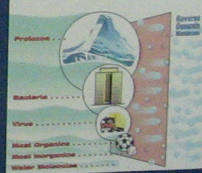
- Provide a local and sustainable supply of high-quality drinking water for San Diego
- Increase utilization of recycled water
- Decrease reliability on imported water
- Provide a supply of water that uses less energy than imported water
- Improve the quality of water in the San Vicente Reservoir
- Have a positive impact on the environment by producing less discharge into the ocean & working toward lower carbon emissions



Microfiltration: Step One



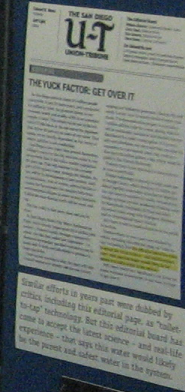
Reverse Osmosis: Step Two



Ultraviolet Light + H₂O₂: Step Three



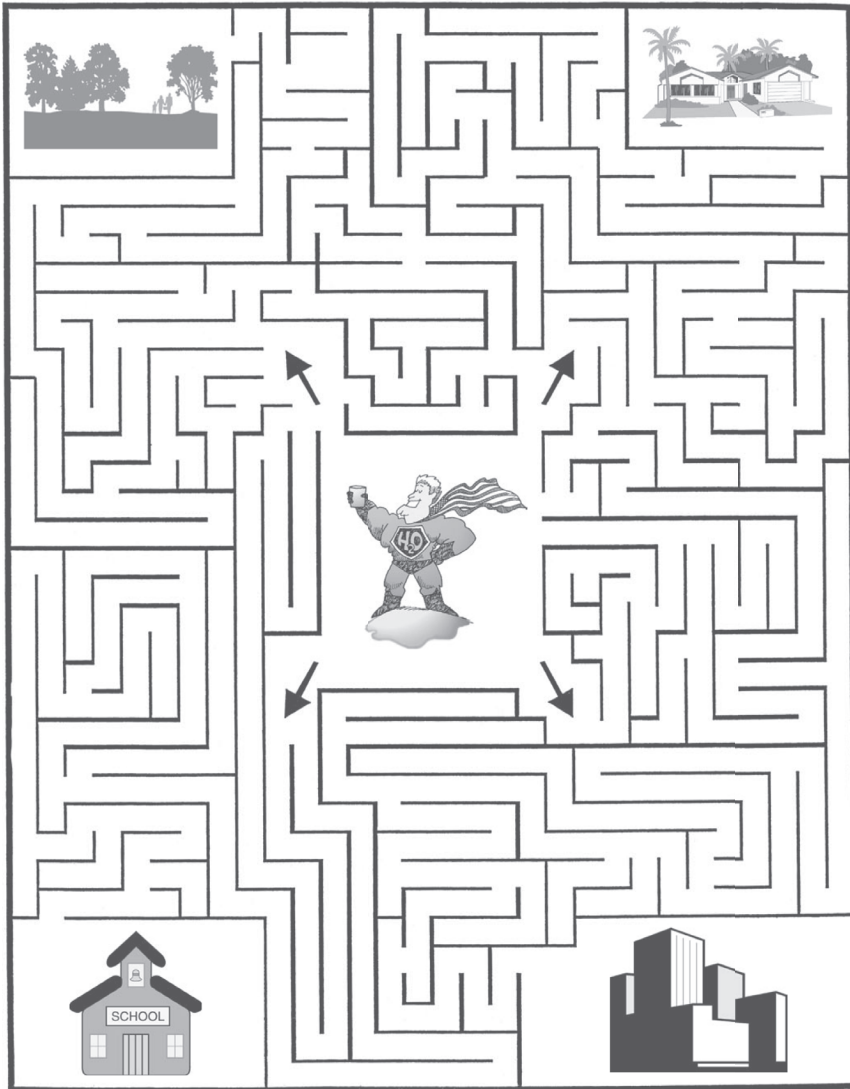
Support



Children's Activity Page

Maze

Help our water superhero find his way to the park, home, school and business.



Water Purification Demonstration Project Activity Page



Test your Demonstration Project knowledge!

Water is essential for life. We need it for cooking, cleaning, bathing, watering lawns, and drinking! In San Diego, most of our water is imported, or brought in, from Northern California and the Colorado River. Importing water costs a lot of money. Also, many other people use the water before it gets to San Diego.

The City of San Diego is looking at ways to create a local water supply. With the Water Purification Demonstration Project, the City is testing whether the water San Diegans flush down their drains can be cleaned and used for drinking again. This activity page will help you learn more about the Water Purification Demonstration Project.

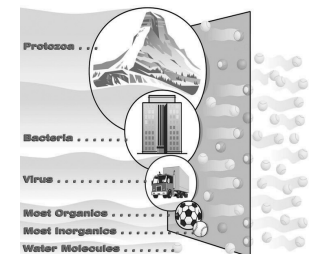
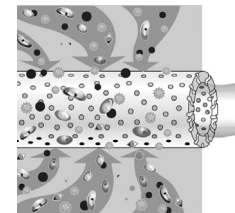
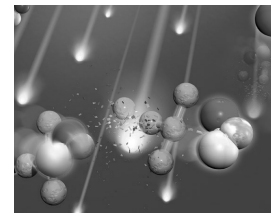
Match the Technology

Three technologies used in the Water Purification Demonstration Project are described below. Write the name of the technology underneath the matching picture.

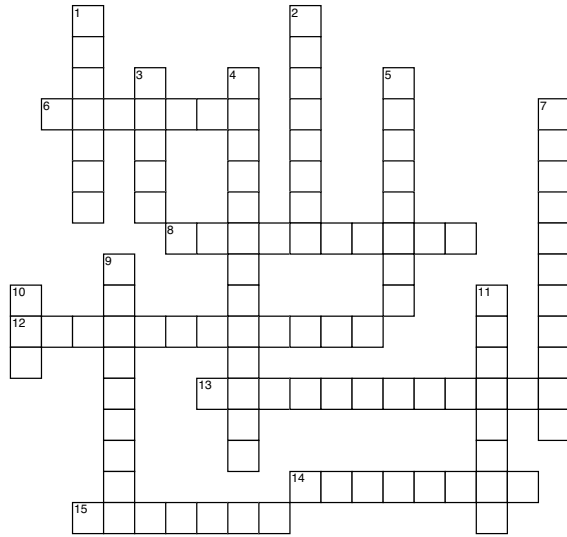
Membrane filtration: Consists of "straws" with holes in the side that suck in the water and keep out the contaminants. The Demonstration Project uses microfiltration and ultrafiltration.

Reverse osmosis: Forces water through several sheets of thin plastic membranes to filter out anything bigger than a water molecule, such as minerals and contaminants. The RO membranes are like microscopic strainers.

Ultraviolet disinfection/advanced oxidation: Intense light, like sunlight, that works with hydrogen peroxide to zap any remaining contaminants in the water.



Crossword Puzzle



www.Puzzle-Maker.com

Determine the word that best fits the clues and definitions provided. Fill the word in the crossword puzzle.

ACROSS

- 6 _____ water. Another name for "drinking water."
- 8 Untreated water collected in the sewer system from residences and businesses (e.g., from bathtubs, showers, bathroom sinks, clothes washers, toilets, kitchen sinks, and dishwashers).
- 12 A reduction in water waste. Saving water.
- 13 Removing or destroying microorganisms in water that may be harmful to humans.
- 14 _____ water. Wastewater that has undergone a high level of treatment at a reclamation facility so that it can be reused for a variety of purposes, such as irrigation and industrial use. This is the water that comes into the AWP Facility.
- 15 A period of time when rainfall is far below average.

DOWN

- 1 Reverse _____ (RO). A high-pressure membrane filtration process that forces water through several sheets of thin plastic membranes to filter out minerals and contaminants. The RO membranes are like microscopic strainers.

- 2 _____ filtration. A filtration process used to separate particles from the water. The Demonstration Project uses microfiltration and ultrafiltration.
- 3 _____ cycle. The movement of water as it evaporates from rivers, lakes or oceans, returns to the earth as precipitation, flows into rivers and evaporates again. This cycle is aided in urban areas by modern technology, which includes wastewater and drinking water treatment facilities.
- 4 Water Purification _____ Project. This test project is examining the use of water purification technology to provide safe and reliable water for San Diego's future.
- 5 _____ water. A water source that begins in one region and is transferred to another region. For example, San Diego's water comes from Northern California or the Colorado River.
- 7 A substance found in the water. Can be safe or unsafe.
- 9 A manmade lake or tank used to collect and store water.
- 10 Abbreviation for personal care products. Products that can be found in wastewater such as shampoos, fragrances, soap, and deodorant.
- 11 _____ water. The water that the AWP Facility produces. It starts as recycled water and is treated with membrane filtration, reverse osmosis and ultraviolet disinfection/advanced oxidation.

Word Search

Words related to the Water Purification Demonstration Project are hidden in the puzzle to the right. Find the Word Bank words in the puzzle. Words may go right, left, up, down, and diagonal.

WORD BANK:

- ADVANCED
- DEMONSTRATION
- DISINFECTION
- MEMBRANE
- MICROFILTRATION
- PURE
- RECYCLED
- REVERSE OSMOSIS
- ULTRAVIOLET
- WATER

C R G B M S M E Y Y J F T B M
 N I E C K L L F A Y B E K I T
 O O C C V Q M V H N L G C L W
 I U I R Y T I F H O R R L O W
 T M T T U C C H I F O A B A X
 C D C L A A L V Y F C M T F T
 E D Z M J R A E I C U E F X L
 F E R U P R T L D A R M Z M K
 N H A C T O T S D R Q B U I W
 I E K L C R K T N U R R Q U Y
 S W U M A B C R Y O O A M V A
 I S Z T Q X E N M C M N S T I
 D S I S O M S O E S R E V E R
 F O A D V A N C E D V J D Y K
 N G D S E Y I P F C I K Q S I

Water Quiz

Below are statements about water. Some are true. Some are false. Circle T if a statement is true and F if a statement is false.

1. The water coming out of your faucet contains molecules that the dinosaurs drank.
2. Most of San Diego's water supply comes from local rainfall.
3. San Diego is at the end of the pipeline when importing water from the Colorado River and Northern California.
4. The City of San Diego's "purple pipes" carry recycled water to use on lawns and for industries.
5. Recycled water from the purple pipes is safe to drink.
6. The Water Purification Demonstration Project is testing whether San Diego can purify recycled water and add the purified water to a local reservoir.
7. A reservoir is a manmade lake or tank used for storing water.
8. The Demonstration Project is using membrane filtration, reverse osmosis and ultraviolet disinfection to purify recycled water.
9. San Diego is the first in the nation to use water purification technology.
10. If you drink tap water at Disneyland, you are most likely drinking purified water.

True/False

- T F
 T F
 T F
 T F
 T F
 T F
 T F
 T F
 T F
 T F

Solutions



Word Search:

+ + + + + + + + + + T + M
 N + + + + + + + + + E + I +
 O O + + + + + + + L + C + +
 I + I + R + + + + O + R M + +
 T + + T + E + + I + O + E + +
 C + + + A + C V + F + + M + +
 E + + + + R A Y I + W + B + +
 F + + + + R T L C A + + R + +
 N + + + T + T S T L + + A + +
 I + + L + R + E N + E + N + +
 S + U + A + R + + O + D E + +
 I + + T + + + + + M + + + +
 D S I S O M S O E S R E V E R
 + O + + A D V A N C E D D + +
 N + + + + + E R U P + + + +

(Over, Down, Direction)
 ADVANCED (5, 14, E)
 DEMONSTRATION (13, 14, NW)
 DISINFECTION (1, 13, N)
 MEMBRANE (13, 4, S)
 MICROFILTRATION (15, 1, SW)
 PURE (10, 15, W)
 RECYCLED (5, 4, SE)
 REVERSE OSMOSIS (15, 13, W)
 ULTRAVIOLET (3, 11, NE)
 WATER (11, 7, SW)

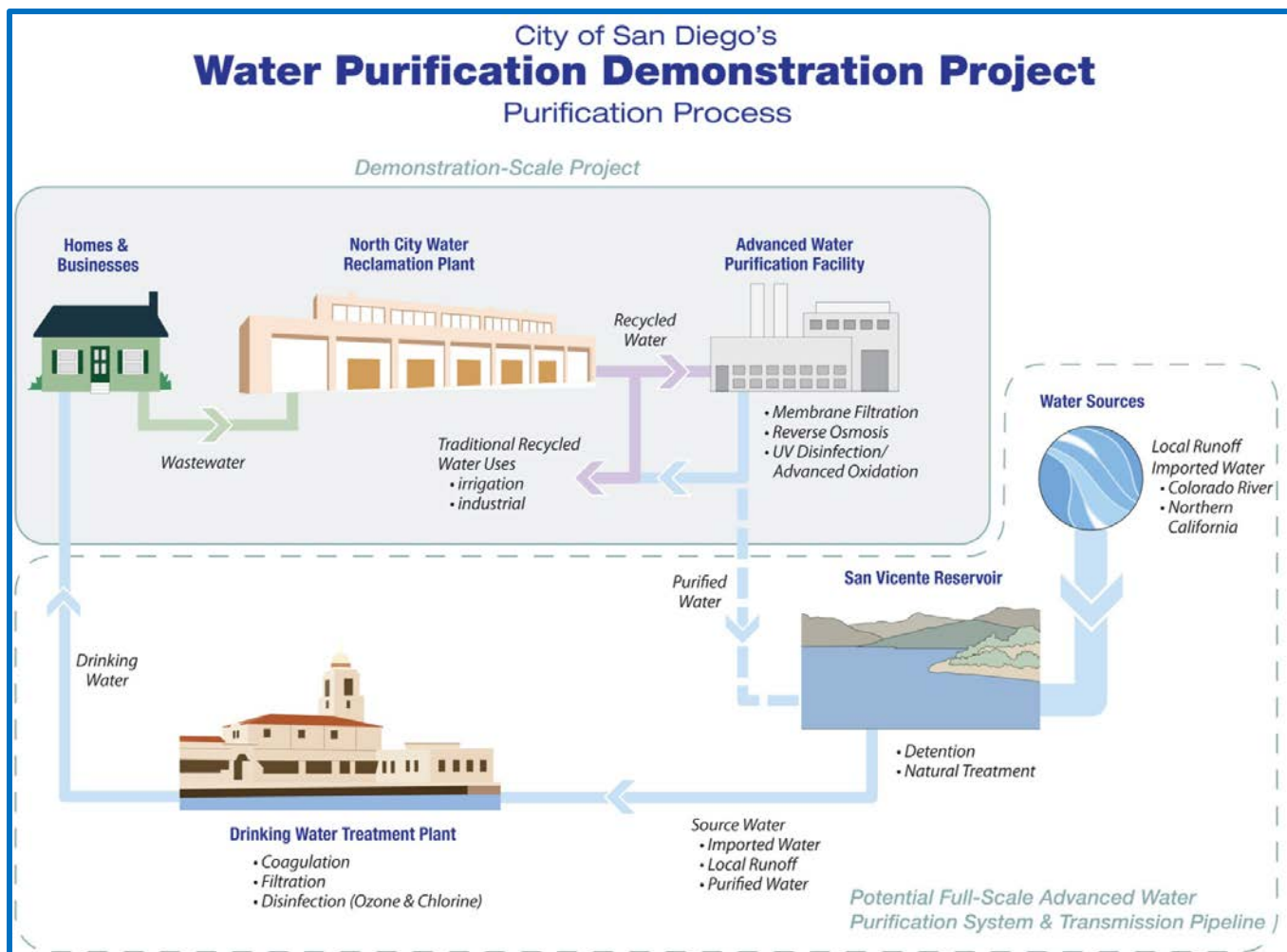
Water Quiz:

1. T, 2. F, 80% is imported, 3. T, 4. T, 5. F, recycled water needs further treatment to be safe for drinking, 6. T, 7. T, 8. T, 9. F, other communities have used this technology for years, 10. T

Water Purification | Demonstration Project

Necesitamos agua potable para beber, conicna, bañarnos, limpiar y regar. En San Diego, la mayoría de el abua proviene del norte de California y del rio Colorado. Como cuesta mucho dinero comprar esta agua, San Diego necesita su propia agua.

La ciudad de San Diego esta buscando mas agua y hacienda pruebas al agua que los san dieguinos mandan al drenaje par aver si se puede limpiar y usarse para usos domesticos. Esta pagina de actividades te ayudara a entender como funciona esto.





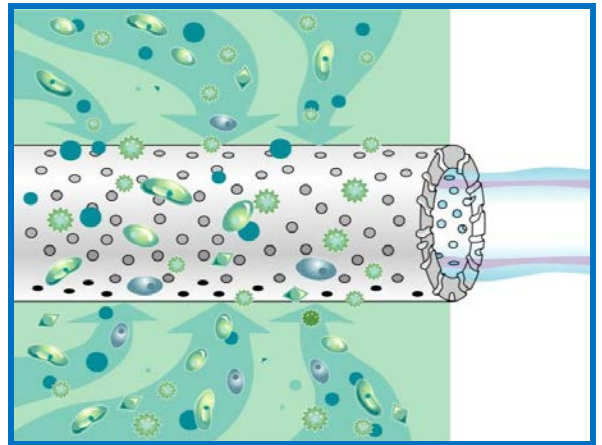
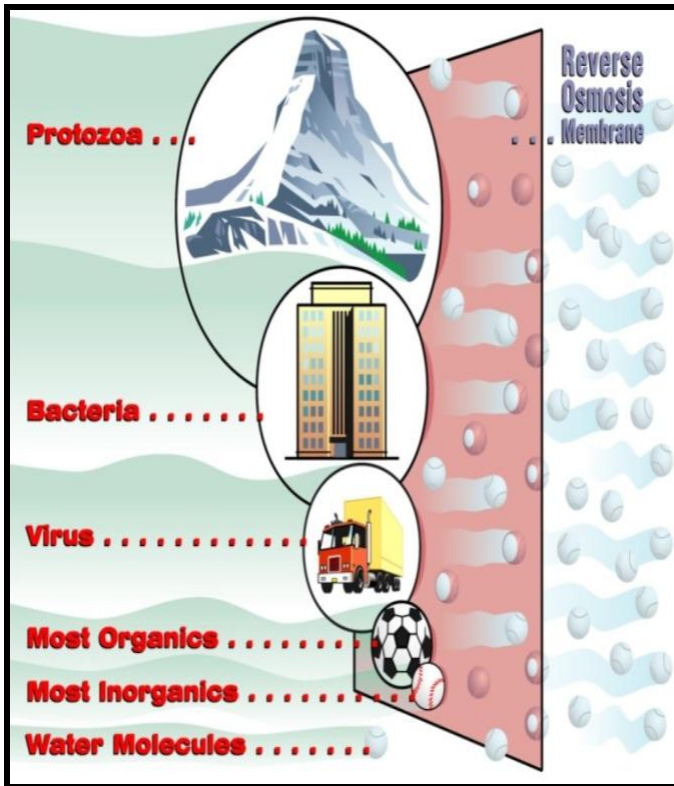
Iguala la Tecnología

Descrito abajo son 3 tipos de tecnología usadas en el proyecto de Demostración de Agua Purificada. Escribe el nombre de la tecnología al lado de la foto.

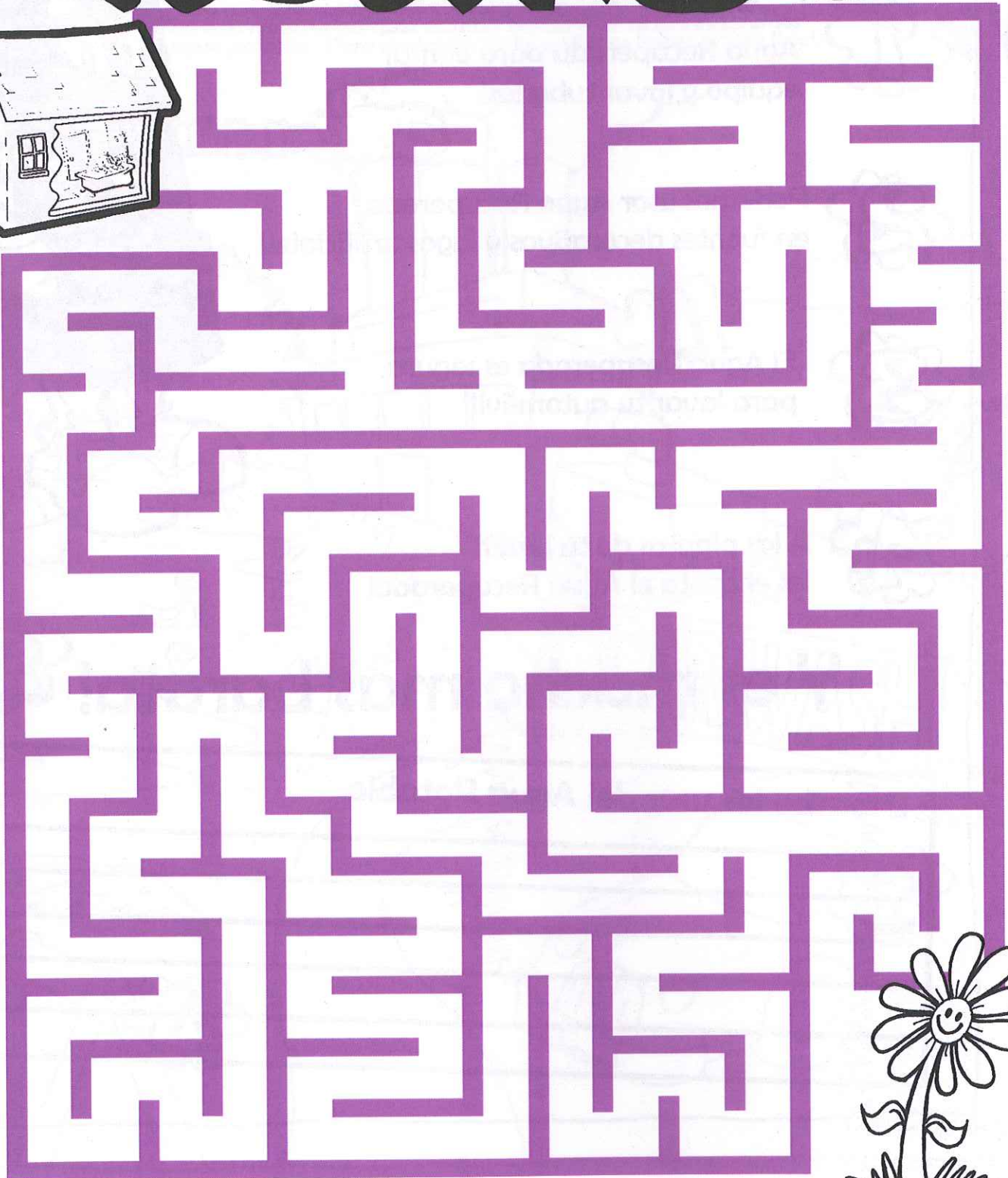
Filtración de membrana- popotes con agujeros en los lados que chupan el agua dejando fuera contaminantes.

Osmosis Reversa- fuerza agua a través de capas delgadas de membranas de plástico para filtrar cualquier cosa más grande que una molécula de agua, como minerales y contaminantes. La osmosis inversa funciona como coladores microscópicos.

Desinfección ultravioleta/ oxidación avanzada- luz intensa, como la luz natural, que trabaja con agua oxigenada para eliminar cualquier contaminante restante en el agua.



EL LABERINTO MORADO



PALABRAS RECUPERADAS



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R | E | S | E | R | V | A | X | R | W | R | A |
| E | Z | S | X | E | W | Q | X | Z | Q | W | G |
| C | X | I | H | C | K | F | P | X | K | Z | U |
| L | L | U | V | I | A | E | I | Z | X | W | A |
| A | Q | Z | I | C | X | R | P | Z | W | X | N |
| M | X | Q | R | L | W | T | A | N | Q | U | E |
| A | Y | X | R | A | Q | I | S | Q | J | W | G |
| D | X | Q | I | R | Q | L | K | H | X | Q | R |
| A | T | X | G | Q | X | I | X | Z | L | Q | A |
| Q | X | Q | A | Y | Q | Z | X | W | X | W | X |
| X | K | T | R | A | T | A | D | A | X | Z | K |
| X | Q | W | X | Q | X | R | X | Y | Z | Q | R |

RESERVA
LLUVIA
TANQUE
TRATADA
RECLAMADA
IRRIGAR
RECICLAR
FERTILIZAR
AGUA NEGRA
PIPAS

Iremos en la búsqueda de las Palabras Recuperadas
Encuentra las palabras de la derecha en la sopa de letras
y encierralas en un círculo.
Pueden estar en forma horizontal ó vertical.

Videos

Demonstration Project videos can be found on the project's website. The videos and links are as follows:

- Virtual AWP Facility tour video
http://granicus.sandiego.gov/ASX.php?publish_id=1257&sn=granicus.sandiego.gov
- Water purification process animation video
http://granicus.sandiego.gov/ASX.php?publish_id=1207&sn=granicus.sandiego.gov
- The Science Behind the Water Purification Process (testimonial video)
http://granicus.sandiego.gov/MediaPlayer.php?publish_id=1413
- The Benefits of the Water Purification Process (testimonial video)
http://granicus.sandiego.gov/MediaPlayer.php?publish_id=1412
- Overcoming The Yuck Factor (testimonial video)
http://granicus.sandiego.gov/MediaPlayer.php?publish_id=1417
- Support for the Demonstration Project (testimonial video)
http://granicus.sandiego.gov/MediaPlayer.php?publish_id=1416