



## **Water Recycling, 6 Stories of Saving Water and Money.**

Some of the following stories and more information can be found at Beachapedia.org in the article [http://www.beachapedia.org/Wastewater\\_Recycling](http://www.beachapedia.org/Wastewater_Recycling)

### **# 1 Orange County, CA -**

Orange County was looking to put a second ocean outfall pipe into the ocean around 1998 at a cost of hundreds of millions of dollars. Given the cost of building such a pipe, the county looked into alternatives and found one. The decision to recycle the water was made in 2001 and contracts were awarded in 2004. The water recycling plant cost \$481 million to build and went operational in 2008 when it started turning secondarily treated sewage to clean potable water much cleaner than drinking water standards. The effluent is subjected to:

- micro filtration
- reverse osmosis
- advanced oxidation with hydrogen peroxide,
- ultra violet light.

The finished product is purer than anything that comes from a faucet or any bottled water (pretty much distilled water quality, so clean they have to add minerals to the water so it does not leach minerals from the aging pipes). This pure water is then pumped 16 miles up into the watershed to be filtered through the ground where it joins a large underground aquifer. The drinking water removed from the aquifer is of course subject to all the tests and treatments given to water before it is added to the drinking water supply.

This “indirect potable re-use” project, called the “[Groundwater Replenishment System](#)” has been so successful at replenishing needed freshwater, and fending off seawater intrusion and contamination of the aquifers, the County is now expanding the treatment facility from 70 million gallons per dayMGD to 100 mgdMGD. [Video here.](#)

### **# 2 San Diego, CA - Point Loma -**

The Point Loma Sewage Treatment Plant has a 301(h) waiver from the federal government to allow advanced primarily treated sewage to flow into the ocean via



an ocean outfall pipe. The City continues to get these 5-year waivers as they have for decades. Recently, several environmental groups including Surfrider Foundation threatened to sue them for continuing to pursue the waivers instead of simply upgrading their treatment.

But the environmental groups took a real look at what their lawsuit would bring. If they succeeded, it would make the City spend \$1 to 2 Billion to upgrade their treatment to full secondary and they would still be sending up to 240 million gallons a day into the ocean (about 180 mgd on average). This water would be cleaner, but not completely clean. Furthermore the idea of importing water to San Diego from hundreds of miles away to use it once, treat it partially and then continue to discharge it into the ocean did not appeal to the environmental groups.

They agreed not to sue if the City would study ways to implement large scale water recycling. The City completed a study in 2012 showing the best cost/benefit alternative is to divert 100 mgd before it reaches the coastal treatment plant and treat it to drinkable standards. If implemented the he City would still spend the \$1 to 2 Billion as before, but now they will have a useable, sellable product and local supply of water. Eighty-three mgd of potable water will be produced with additional non-potable water used elsewhere.

The Point Loma plant itself is located in a small cove on the coast -- so massive expansion is not feasible. Diverting the water before it reaches the Pt. Loma plant will be accomplished by tapping into a major trunk of the sewage system, and treating the sewage to potable standards near a place where the water is needed. This means less sewage going to plant, thereby increasing the plant's capacity to do more treatment, without massive physical expansion.

It is also an example of "de-centralizing" wastewater treatment and beneficial re-use of the water through advanced treatment. The concept of de-centralization can be more broadly applied through a network of small wastewater recycling facilities, or "package treatment plants", designed to treat the water to either irrigation standards or potable standards for near-by large demands for the treated water – eliminating the need to pump the purified water from the central treatment plant back to where it is used. This "de-centralization" planning can increase the return on investment by reducing the construction and operational costs of the system by elimination of piping infrastructure and pumping costs for the recycled wastewater.



It also allows treatment to specific uses (eg. potable standards, irrigation standards, industrial use standards, etc).

### **# 3 Los Angeles, CA -**

The West Basin Municipal Water District pumps secondary treatment water from the Hyperion Treatment Plant to a near-by recycling facility and subjects it to 5 different suites of treatments based on the end user's needs. They are tertiary, nitrified, softened RO, pure RO, and ultra-pure RO. (RO means reverse osmosis). The end uses range from agricultural, to refineries, low-pressure boilers, high-pressure boilers, and some of this water is pumped back in to coastal aquifers as groundwater protection against saltwater intrusion. The solid waste products from creating all of this "designer water" is used as landfill cover.

This is an example of how wastewater can be purified to meet the specific needs of the end-user. The cost savings and greater return on investment are gained through tailoring the treatment process for the purification standards of the user. The West Basin recycled wastewater facility is a single plant that requires extensive pipelines and pumping costs to deliver the "designer water" to specific end users. While there are arguably greater economic returns from a de-centralized system, this facility is a good example of reducing the operation costs by customizing the level of treatment to a level appropriate for the end use.

Also, it is important to note that the Hyperion Treatment facility is a good example of a wastewater treatment facility that has upgraded the process to include "co-generation" of electricity to operate the plant by capturing gases otherwise emitted to the air.

### **# 4 Morro Bay, CA -**

Morro Bay is a small coastal community in San Luis Obispo County -- half way between Los Angeles and San Francisco. The wastewater treatment facility was often incapable of complete secondary treatment due to population growth and larger volumes of in-flow than contemplated in the original design. And, the 50 mgd facility was aging and in need of major upgrading.



After years of complaints by citizens and regulatory agencies, the City decided to demolish the existing plant, upgrade the capacity and rebuild on-site – including the capacity to recycle a small portion of the discharged water.. The plant was originally built in coastal dunes on the beach for gravity feed reasons.

Climate change and sea level rise studies showed that the facility would likely be “an island” well within the projected life of the plant. Surfrider Foundation activists convinced the City to relocate the plant away from the ocean in what is referred to as “managed retreat” in climate change adaptation planning. This revised plan, recently endorsed by the City as well as State regulatory agencies, also includes relocating the plant adjacent to a small farming area on the outskirts of town, and dramatically increasing the recycling capacity in order to use the purified water for agricultural irrigation. The City is currently gathering detailed design and construction estimates from engineering firms – so the cost and return on investment estimates are not yet available.

Nonetheless, this is an example of a planning process that went beyond the immediate needs of upgrading the treatment plant to modern standards, and incorporated not only beneficial re-use of wastewater, but also included climate change adaptation as an important part of the goals.

#### **# 5 Cape Coral, FL –**

This community of 160,000 people now recycles 100% of its water in some years. A few years ago the city launched a half-billion dollars worth of water and sewer treatment plant expansions to treat wastewater and pump it back through the city’s irrigation system. This protects their waterways and assures the city has a reliable water source all year.

#### **# 6 Fairfax County, VA –**

Since 1978, the [Upper Occoquan Sewage Authority](#) has been, filtering, purifying, and discharging recycled water into a stream above Occoquan Reservoir, a potable water supply source for Fairfax County, Virginia. Two upgrades have increased the current capacity to 54 mgd. After 30 years of highly successful operations, UOSA reclaimed water is an increasingly important component of the drinking water supply strategy for the Washington metropolitan area.