

## MOVING TOWARDS 100% RECYCLED WATER AT THE SEAWATER INTRUSION BARRIER WELLS, CENTRAL BASIN AND WEST COAST BASIN

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As part of its Water Independence Now (WIN) program, the Water Replenishment District of Southern California (WRD) is launching a series of projects to completely eliminate the dependence on imported water for groundwater replenishment. Case in point is the multi-agency partnership underway to move towards 100% recycled water at the seawater intrusion barriers, as further described below.

### What Is a Seawater Intrusion Barrier?

When groundwater is extracted at a rate that greatly exceeds natural replenishment, this will cause an overdraft and lowering of the groundwater elevations. If such extraction occurs in coastal areas over an extended period of time, it will result in seawater intrusion of inland aquifers. As a solution, barrier wells may be constructed to inject freshwater into the aquifers to build up the hydraulic pressure to protect the fresh water aquifers (Figure 1).

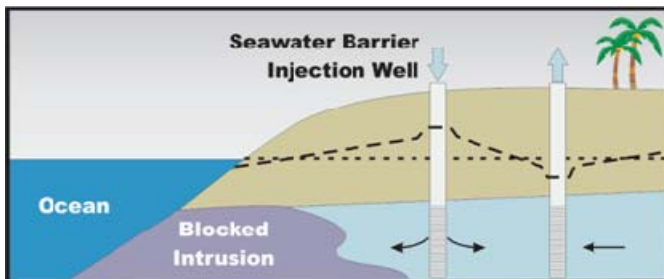


Figure 1—Blocked Seawater Intrusion and Barrier Wells

### What Are the Seawater Intrusion Barriers in the Central Basin and West Coast Basin (CBWCB)?

A severe groundwater overdraft occurred in the CBWCB in the early half of the 20<sup>th</sup> century, causing groundwater elevations to be depressed by over 100 feet below sea level, resulting in an estimated 600,000 acre-feet (AF) of seawater intrusion and contamination of the CBWCB aquifers by the late 1950s.<sup>1</sup> To combat this problem, the Los Angeles County Flood Control District (LACFD) constructed the West Coast Basin Barrier Project, the Dominguez Gap Barrier Project, and the Alamitos Gap Barrier Project, which have been successfully protecting

the fresh water aquifers in the CBWCB for nearly 60 years. The locations of these projects are shown in **Figure 2**. Currently, both imported potable water and



Figure 2—Location of Seawater Barrier Projects

recycled municipal wastewater that has undergone advanced treatment are injected at the Barriers. **Figure 3** illustrates the advanced treatment processes provided at the Leo J. Vander Lans Advanced Water Treatment Facility, consisting of: microfiltration, reverse osmosis, and advanced oxidation process (hydrogen peroxide addition to be completed in 2014). The recycled water from the facility is injected at the Alamitos Gap Barrier.



Figure 3—Treatment Processes at the Expanded Leo J. Vander Lans Advanced Water Treatment Facility

**Table 1** presents some construction details for the Barrier Projects. The LACFD owns, operates, and maintains the Barrier Projects. WRD purchases all of the water injected into the Barriers, except for about 1,500 acre-feet per year (AFY) purchased by the Orange County Water District for a portion of the Alamitos Gap Barrier. The recycled water for the Alamitos Gap Barrier

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Barrier Project	West Coast	Dominguez Gap	Alamitos Gap
Date Started	1953	1971	1966
Overall Length (miles)	9	6	2.2
Number of Injection Wells	153	94	43
Number of Observation Wells	300	257	220
2012 Injection Amounts (AF)	11,851	4,335	5,201

Table 1—Barrier Details

is treated by WRD, for the West Coast Barrier by the West Basin Municipal Water District (WBMWD), and for the Dominguez Gap Barrier by the City of Los Angeles. Imported potable water is provided by WBMWD and the City of Long Beach.

Currently, advanced treated recycled water is blended with potable water either before or after injection at the Barriers. The West Coast Barrier is permitted for a stepwise increase, allowed initially to operate at 75% recycled water (remaining 25% consists of potable water), then when shown to be successful, allowed to transition to 100% recycled water, which may happen in the second half of 2013. Plans are underway for both the Alamitos Gap Barrier and the Dominguez Gap Barrier to become 100% recycled water projects by 2014 and 2017, respectively.

### Why Transition to 100% Recycled Water?

Water reuse projects are essential to the water resources management of the region. Without widespread development of additional water resources, the California Department of Water Resources predicted that by the year 2020, Californians will be short 7 million acre-feet of water per year during a drought and 2.9 million acre-feet in an average year.<sup>2</sup> In an effort to increase reliability of local water supply, the State Water Resources Control Board (SWRCB) adopted goals for increasing the use of recycled water over 2002 levels by at least 1 million AFY by 2020 and by at least 2 million AFY by 2030.<sup>3</sup> In keeping with these statewide goals, WRD and its partners are transitioning to replenish the

three Barriers using only recycled water to eliminate the dependence on imported water.

### Is Recycled Water Safe?

Yes. The advanced treated recycled water used at the three Barriers is safe for public health and the environment. It is rigorously regulated and extensively monitored and often exhibits better water quality than other water sources. The California Department of Public Health (CDPH) has set strict standards for recycled water use in Title 22 of the California Code of Regulations. Groundwater replenishment projects using recycled water are jointly permitted by CDPH and the Regional Water Quality Control Boards (RWQCB) and must comply with the CDPH's Draft Groundwater Replenishment Reuse Regulations, the SWRCB's Recycled Water Policy, and the RWQCB's Basin Plans. Collectively, these regulations specify the level of treatment, compliance with public health criteria and water quality objectives, monitoring, and notification requirements. The advanced treated recycled water used at the three barrier projects have consistently complied with all regulatory requirements and are safe for public health and the environment.

### Are the Seawater Barriers Working?

Yes. Groundwater monitoring data compiled for all three Barriers indicate that the injection wells have been successfully used to battle seawater intrusion in the CBWCB aquifers since the early 1950s, and no adverse impacts from recycled water use have been observed. To a great extent, precious groundwater resources have been spared from additional salt contamination because of the Barriers.

The public may access the monitoring data for the advanced treated recycled water used for injection and the groundwater associated with the Barriers via Geotracker, a public database maintained by the SWRCB, at: <http://geotracker.waterboards.ca.gov/>. Additionally, water quality data for monitoring wells in the CBWCB are available via WRD's web-based GIS database at: <http://gis.wrd.org/wrdmap/login.asp>.

#### Reference Information Used for this Technical Bulletin:

1. California Department of Water Resources, Bulletin No. 104, 1962. Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix B – Safe Yield Determinations.
2. California Department of Water Resources, Bulletin 160-98, 1998. Update to the California Water Plan.
3. State Water Resources Control Board. Recycled Water Policy, 2009 (Amended 2013).



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