

# The San Diego Union-Tribune.

## Oceanside expands local water supplies

By Michael Burge

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OCEANSIDE – Years before a company proposed purifying ocean water to make drinking water at a beachfront desalination plant, Oceanside embarked on a smaller project that does something similar with groundwater.

Part of the city sits atop a large underground basin beneath the San Luis Rey River. Water from wells that tapped that basin supported the farms that congregated in the valley in Oceanside's early days.

That same basin today is the source for a project that strips minerals from brackish groundwater at a rate of 2 million gallons a day – an amount that is expected to triple to 6.3 million gallons by this summer after 2 new wells come on line.

Those wells will complete a \$13 million expansion that will result in the plant supplying about 20 percent of the city's average daily demand, Barry Martin, the city's director of water utilities, said. That's enough water to provide for 35,000 of the city's 175,000 residents.

The city's motivation for building the Mission Basin Groundwater Purification Facility, which initially went into operation in 1994, is the same as the San Diego County Water Authority's reason for exploring seawater desalination as a future source: to develop reliable local water supplies.

“This plant was in response to the drought” of the late 1980s and early '90s, Mike McGrath, the plant's manager, said Tuesday during a tour of the facility.

At that time, water customers faced a possible 50 percent cutback in supplies after five dry years.

The drought prompted several projects aimed at developing local sources and reducing dependence on water imported from Northern California and the Colorado River.

The County Water Authority and the Olivenhain Municipal Water District built the region's first large dam in 50 years, for example. That project was completed in 2003.

And the water authority began to consider desalinating seawater as a possible source.

Connecticut-based Poseidon Resources Inc. has proposed building a plant that would desalt 50 million gallons of ocean water a day at the Encina Power Station on the Carlsbad coast. Poseidon hopes to begin operating such a plant by 2009-10. The proposal is undergoing environmental review.

### **Aqueduct development**

Oceanside had known for years that the ground beneath the San Luis Rey River was a treasure chest for potable water, but the development of aqueducts that carried water from outside the area had eclipsed groundwater as a supply. The drought taught Oceanside and the county a lesson: Develop local supplies or cut back in dry years.

But consumers' tastes had changed when the city began to reconsider pumping the water from the Mission Basin, as the underground stream in Oceanside is called.

“Up until 1960 this would have been drinking water,” McGrath said. “Aqueduct water – the quality and availability – made well water less desirable.”

So the city developed the Mission Basin Groundwater Purification Facility, on Heritage Street just east of the former drive-in, to pump the water from the ground and treat it.

McGrath said the water is potable even before the city runs it through a reverse osmosis process to strip it of iron and manganese, minerals that stain clothing in the laundry.

“It's an aesthetic thing, not a health hazard,” McGrath said.

The plant's first steps in the process are to add chemicals that suspend the iron and manganese in a solution and to adjust the acid level, then run the water through filters to remove suspended solids.

McGrath said the filtering is minimal, because the water has already traveled though miles of underground rock and sand, nature's own filters.

McGrath noted that groundwater filtering differs from seawater filtering, because ocean water may contain 20 times more solids.

### **Reverse osmosis**

The heart of the Oceanside process is two “trains” of reverse osmosis membranes, which have microscopic pores so tiny that nothing larger than a water molecule can pass through.

The membranes are contained in 48 tubes with seven membranes in a tube, for a total of 336 membranes. The water is driven through the membranes under pressure.

“You don't want the minerals to (stick) on the membrane's surface,” McGrath said, because that would foul them. “You want them to be flushed away as a concentrate or brine while the pure water passes through.”

The rejected water goes out to the ocean through the city's outfall.

McGrath noted that the Oceanside plant forces water through the membranes at about 120-140 pounds of pressure per square inch. He said seawater would require about five times the pressure, because it contains more minerals. That also would increase energy costs.

He noted also that Oceanside's demineralization process produces 3 gallons of pure water for every 4 gallons that enter the system. The proposed seawater desalination process would produce 1 gallon of pure water for every 2 that enter the plant.

### **Test wells planned**

McGrath said that after the water passes through the reverse osmosis membranes, the plant trickles it through a tank to remove carbon dioxide, and adds some minerals to bring it to customary levels. Then it blends the water with the rest of the city's supply.

McGrath noted that desalinating seawater has one thing over demineralizing groundwater.

“Seawater is unlimited in supply, whereas groundwater is limited to whatever the natural recharge is,” from rain and runoff, McGrath said. If the city overpumps its wells, ocean water can seep in from the west, fouling the underground stream.

In fact, McGrath said, the city plans to drill test wells near the mouth of the San Luis Rey River that would probe the water beneath the underground layer of ocean water, to see if the city can reclaim that.

The city has nine operable wells in the basin, Martin said, and is about to add two more.

The only other facility in the county that compares in size with Oceanside's demineralization plant is the Sweetwater Authority's Richard A. Reynolds Groundwater Desalination Facility in Chula Vista, which can produce 4 million gallons a day of pure water from brackish groundwater.



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Water trickles through a tank to remove carbon dioxide at the end of the purification process, then the water is pumped through pipes to the distribution system.



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Utilities manager Mike McGrath of the Mission Basin Groundwater Purification Facility in Oceanside explained that the groundwater is potable even before it is run through a reverse osmosis process to strip it of iron and manganese.