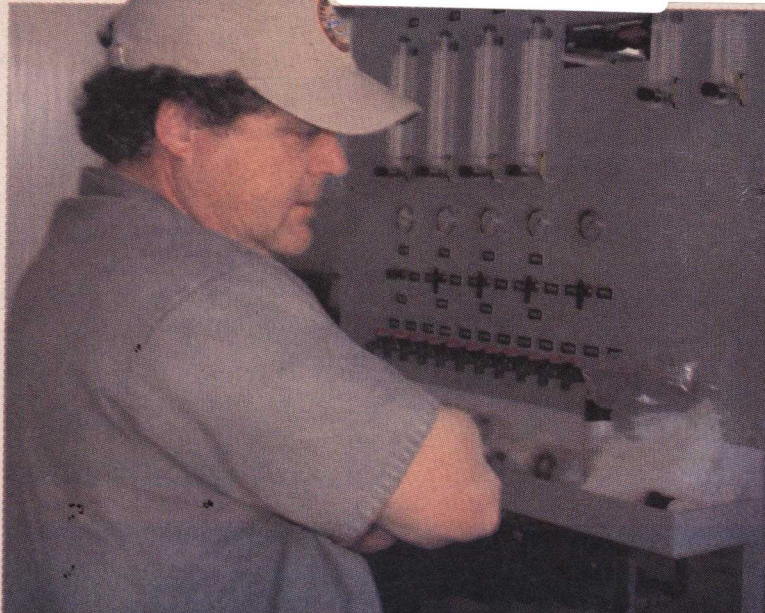


Desalination

MCP 1-21-09



Testing the Water

Desalination Studies Continue

by Linda Fridy

Local water agencies have been anxiously watching the weather, hoping for more winter storms to ease drought fears, yet they have another reason to hope for inclement weather. The pilot desalination plant jointly run by the Santa Cruz and Soquel

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Winter Storms Just One Element Needed to Study Desalination

Pilot Plant Results Encouraging, but Water Agency Officials Still Have Much to Learn

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Creek water districts needs the large waves and turbulence to expand its assessments.

Located on Santa Cruz city's west side within Long Marine Lab, the \$4 million test site opened in March 2008 with a dual purpose. State regulators require a pilot test period to assure that water meets quality standards. In addition, there are several options within the reverse osmosis process that the agencies want to test for quality and cost before settling on a design for a full capacity plant — or even committing to any kind of desal plant.

A final decision is still a long way off, said Laura Brown, manager of the Soquel Creek Water District.

Another question the public has been asking will get an answer starting in February: How does desalinated water taste?

Although the treated water is intended only for testing purposes and is not going into the water system, in February the water agencies plan to give members of the public a chance to taste test desalinated water at their offices.

The agencies are still researching the information needed to answer broader questions of whether to build a full capacity facility and how it should be designed.

"We're still optimistic about it, but there are many, many unknowns we have to answer," said Brown. "We're still a very long way from having a project."

Soquel Creek and Santa Cruz are both committed to having a facility that is environmentally friendly, both to the ocean as it takes and replaces the water it treats and in regard to energy consumption. Energy use is a major factor in evaluating treatment systems and the carbon footprint could make or break the decision whether to go forward, said representatives from both agencies.

While desalination specialists have been working on the pilot plant, finan-

cial analysts have been preparing a financial study, Brown said, one that will help her agency evaluate the impact on customer rates depending on the capital costs.

getting desalinated water in the winter months," she said.

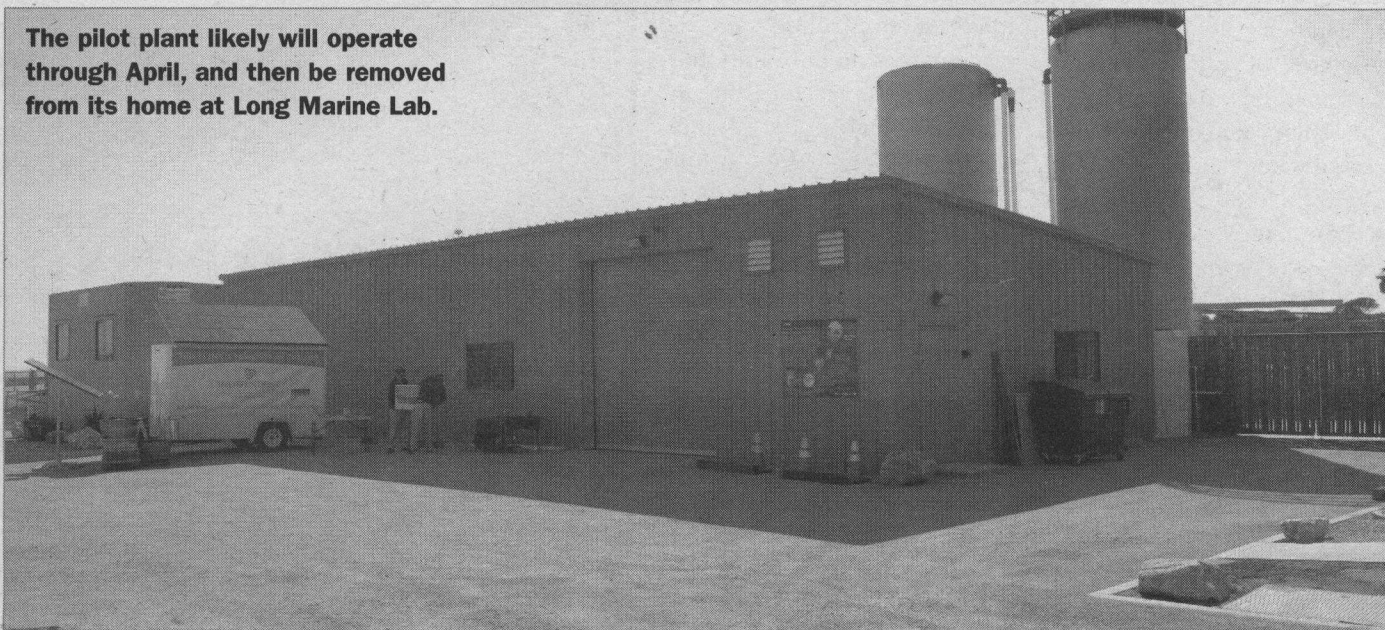
Her district would "rest" designated wells at the times it is pumping desalinated water, which it is hoped would

Pilot Progress

The pilot plant is testing four pre-treatment filtering methods under a variety of conditions.

Water quality tests for the first six

The pilot plant likely will operate through April, and then be removed from its home at Long Marine Lab.



Working Together

The two water companies have also been discussing what the partnership would look like, an area of concern and some confusion in the community.

Current discussions call for construction of a plant that could produce 2.5 million gallons of treated water a day. The costs and operating responsibility would vary depending on water demand and weather, Brown said.

The fact that the systems draw water from different sources makes sharing easier. Santa Cruz relies on surface water sources, diverting winter rainfall runoff and holding it for use during dry months.

Soquel Creek pumps its water from underground aquifers, which have seen their levels drop because water is not being naturally replaced at the same rate it is being pumped.

That means that while Santa Cruz will have the greatest need during times of low surface water supplies, Soquel Creek can reduce its draw from underground supplies at any time and benefit from the lower demand on its wells, Brown explained.

"We'll accomplish our objectives

allow underground water levels to recover naturally.

Because Soquel Creek is a smaller district, it does not require as much supplemental water as Santa Cruz, and Brown said it would likely draw only about half of the plant's capacity, or 1.25 million gallons a day, during its operations.

One concern that Brown has heard voiced is that Soquel Creek Water District will get no water during drought years. That is not the arrangement the agencies are discussing, she said. Even during dry periods, Soquel Creek would have access to water.

"We would be guaranteed 1.25 million gallons a day for six months every year," she said, under current negotiations.

The cooperative effort has other benefits beyond cost sharing.

"One great advantage of coming together is that state and federal grants want to see regional projects," she said.

The agencies have already received \$2 million in grants toward the pilot plant and another \$611,000 for an intake study.

months met standards using all four methods during the calm of summer and fall, but the state will only grant a permit for conditions that have been tested. That is why the agencies are hoping for a broad range of weather over the test period, explained Heidi Luckenbach, desalination program coordinator for the Santa Cruz Water District.

The pilot process has not had the chance to run during a red tide algae bloom, one of the scenarios they had hoped to encounter, and officials have turned to researchers at UC Santa Cruz to help simulate the situation, said Melanie Schumacher, who coordinates the desalination program for Soquel Creek Water District.

She estimates that the pilot plant will run through April of this year before the agencies move on to the next phase of research and planning.

Red tides aside, officials are very happy with the information they're getting from the pilot plant, Schumacher said.

The plant removes salt from the ocean water by the reverse osmosis

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process. In that method, other particles in the water must first be removed before the water is filtered through a membrane that eliminates most of the salt.

The local agencies are looking not only at how effective each approach is at clearing the water but also at the related costs of each type, Schumacher explained.

"There has not been a determination of which pretreatment method is most favorable. They all produced great pretreated water," she said.

The method she described as the most eco-friendly because it requires neither chemicals nor large amounts of energy is called slow sand filtration. It works much like it sounds, with ocean water seeping through sand to clear it.

It does have its downside, however.

"It requires a lot of land to provide slow sand percolation," Schumacher explained, which can be both costly and difficult to find at the coast.

**Less Space
But More Energy**

The other three methods require less space but more energy and often chemicals to break down particles. These are granular media filters, pressurized ultrafiltration (UF) filters and submerged UF filters.

Winter storms stir up the water, increasing the amount of organic materials and other particles in it, which is why the agency needs the opportunity to test pretreatment options under those conditions.

"We're also doing a watershed sanitary survey," said Luckenbach, which she explained helps evaluate the impact of runoff on what's in the seawater.

"Sometimes during major storms at the mouth of the San Lorenzo River you can see a big plume moving along the coast, and we haven't had that."

If the pilot plant doesn't get to test those conditions and a full capacity plant is built, it will have to halt distribution of water during those situations and provide the water to regulators for testing before earning certification, she said. Fortunately, it would be heavy rains that would trigger regulation checks, when the desalinated water was not an essential element in the water supply, she added.

One decision that has been made, Schumacher said, is the type of membrane that will be used. Having that in place eliminates one variable while testing the other processes.

Testing the Water

A frequent request of the public has been the chance to try the water from the plant, and Schumacher said coolers of desalinated water will be available for taste testing in the first week of February.

Each agency will have a cooler, and water will be available as well at the monthly tours of the pilot plant, held on the second Wednesday of the month.

"I'm looking forward to it. I haven't had a chance to taste it myself," she said.

Of course, while the plant produces fresh water, it also creates a high-salinity mix as a byproduct that must be safely returned to the environment. For a full-size plant that brine or concentrate, as it is known, will be combined with treated water from the city's wastewater treatment plant before returning it to the ocean.

For the pilot program, once the water is separated and tested, it is mixed back to its original salinity and run through the marine lab's pool.

"We're basically taking it apart and putting it back together," said Luckenbach.

What's Next?

Another big question about desalination is how to collect the ocean water to be treated. The intake study

looks at two options: open ocean and subsurface.

The open ocean version isn't as devastating as people may picture, said Luckenbach.

"People think it's like a big, sucking straw," she said, but the water moves at a very slow velocity and a screen further prevents any marine life from entering the pipe.

The other option is, as it sounds, located under the ocean floor, a process she

described as similar to a well.


Monetary and environmental costs will likely determine the better option, since both appear to be feasible, Luckenbach said.

These studies, along with the results from the pilot plant and financial reports, will be used by the two agencies to decide whether or not and how to proceed. If they decide to go forward with a full plant, an environmental


impact report would be conducted and the design would be subject to the California Environmental Quality Act.

Any timeline is an estimate at this point, representatives agreed, but current projections call for report reviews this year.

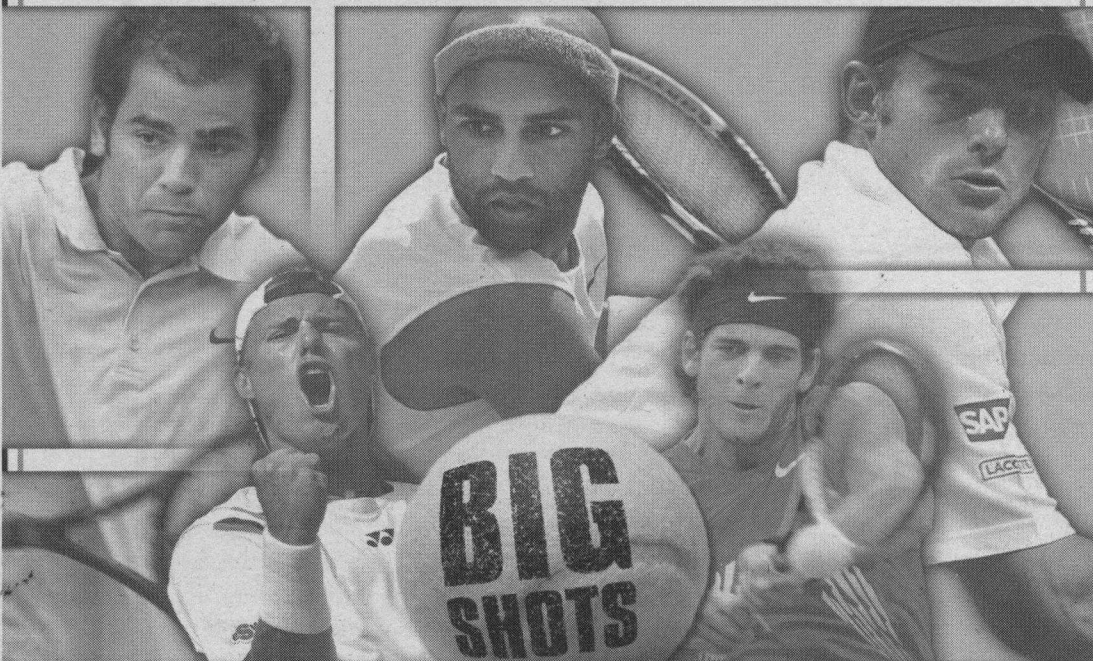
If the agencies decide to move forward with a plant, design would begin in 2010 and construction in 2012, for a 2015 completion. ■



SAP OPEN



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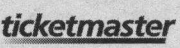


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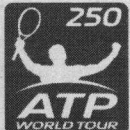
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