Monterey Peninsula Water Supply Project
Progress Report
July 31, 2014

CALIFORNIA AMERICAN WATER

Promising Results for Slant Wells

Data gathered from boreholes drilled at potential well sites for the Monterey Peninsula Water Supply Project looks encouraging for the project's planned use of slant wells. California American Water has proposed subsurface intakes, also called slant wells, that will be drilled close to the coastline at a diagonal angle and collect sufficient ocean water to produce nearly 10 million gallons of potable water a day to supply to the Monterey Peninsula.

Subsurface intakes have become the preferred technology for desalination plants among state regulators and environmental groups because unlike an open pipeline to the ocean, they do not trap and harm marine life. While the technology has been used in Europe and tested in the United States, it is still considered a relatively novel approach. In the area of the Salinas Valley Groundwater Basin, where California American Water's Water Supply Project is proposed, questions about the wells include: how much water can they produce; what quality of water will they produce; and what, if any, impact will they have on the underlying inland aquifer?

The company and key stakeholders in the affected area of the Salinas Valley Groundwater Basin brought together a team of hydrogeological experts to research and help provide answers to these questions. The group studied the results of 13 boreholes that were drilled at several locations along the coast from Marina to the Moss Landing area.

Boreholes are narrow shafts drilled into the ground that can be used to gather soil and water samples. In this case, data from the boreholes is being looked at to see if subsurface slant wells can physically be drilled and to see what portion of the water underground is ocean water or groundwater. Agricultural interests in the Salinas Valley have supported the investigations in an effort to determine if the project will impact the groundwater supply on which they rely for irrigation.

"We are very encouraged by these findings and look forward to proceeding with the groundwater modeling work and our test well permit application," said California American Water vice president of engineering Rich Svindland.

While the tech memo does not conclusively answer that question, it shows promising results for the feasibility of slant wells, both in terms of geologic conditions and water quality. Data from the borehole study is being used to create groundwater models to further inform key environmental studies on the project. These studies are scheduled to be released in draft form later this summer. California American Water is also seeking approval for a test slant well at the sand plant site in Marina that will also provide further data for the project.

Six boreholes were drilled at the sand plant in Marina, the project's preferred location, and seven other boreholes were drilled at sites north of Marina, up to Moss Landing. The site near Salinas River State Beach at Potrero Road was seen as the most favorable alternative to the sand plant site in Marina. The other Moss Landing locations showed mixed results and were determined to be far less favorable.

"We are very encouraged by these findings and look forward to proceeding with the groundwater modeling work and our test well permit application," said California American Water vice president of engineering Rich Svindland. "I want to thank the Salinas Valley growers for their cooperation in this program. In addition to the invaluable scientific data produced by the study, this process has also revealed a regional community that is concerned, willing and determined to solve the Peninsula's water crisis."

The borehole tech memo is available for public review on the Downloads page of the project website, www.watersupplyproject.org.

Value Engineering Group Releases Recommendations

In June, the Monterey Peninsula Regional Water Authority, a joint powers authority made up of all six Mayors on the Monterey Peninsula, awarded a contract to Value Management Strategies, Inc. (VMS) to review preliminary design plans for the Monterey Peninsula Water Supply Project and identify potential changes to the project that could help save money.

After an exhaustive review of the project proposal, which included extensive discussions with the project's lead engineering staff and leadership, VMS outlined more than 30 alternatives to various technical aspects of the project that may enhance cost effectiveness of the plant's operations. In all, the value engineering alternatives added to more than $10 million in savings realized through increased efficiency.

One key alternative was a proposed modification to increase the overall recovery percentage of useable water from the desalination process, which is presently planned at around 42 percent. The proposal would increase that recovery percentage to approximately 47 percent, thereby increasing the plant's efficiency.

While it may not be possible to implement all of the recommendations, Rich Svindland, California American Water's lead engineer on the project, worked closely with the value engineering team and welcomed their review.

"I look forward to working with the team to see how many of these we can implement, and how much we can reduce costs to customers," said Svindland.

"We had already looked at many of the alternatives cited in their preliminary report," Svindland said. "But they were not included in the 30 percent design due to increased risk, feasibility or other operational limitations. That being said, we feel there are a lot of interesting points to consider in this report and will work very hard to implement any cost-savings alternatives should they prove feasible."

On July 10, VMS presented its findings to the MPRWA and is expected to have a finalized report at the end of the month.

Water Supply Project Makes Cut for Final Prop 50 Funding Consideration

California American Water remains hopeful after it was announced that the company's $1-million grant application for slant test-well funding had made the short list for consideration by the grant's administrator, the Department of Water Resources. Passed by voters in 2002, the Water Security, Clean Drinking Water and Coastal Beach Protection Act, sets aside investment monies for projects that help reduce reliance on state's impacted water resources. If awarded, the cost of the test well could be cut significantly, greatly benefitting ratepayers.

"This funding would help reduce costs to our customers," said California American Water President Robert MacLean. "We have been tracking this opportunity for some time. I can't imagine anyone has a better fit. If we are awarded this grant, it would fulfill the State's objective and provide a direct benefit to the Monterey Peninsula community."

Construction of the test well is estimated at $4 million. California American Water plans to begin construction of the test well in November of this year. The larger project is expected to be complete in late 2018.

Slant Test Well Application Moves Forward

On August 26, California American Water will go before the City of Marina to seek approval for its proposed test slant well.

The slant well is proposed to be installed at the sand mine site in North Marina. The well head will be buried about 10 feet underground in a vault accessible from the surface, and the well casing will extend approximately 800 feet at a 20-degree angle aimed beneath the ocean floor. The well screening, where water is drawn in, is positioned around the casing, so that ocean water is filtered through the sand into the well.

The full-scale project will consist of up to nine additional slant wells that would be installed at the same site. It is estimated the permanent wells will need to be replaced every 20 years to keep up with normal wear and tear. This schedule will also allow wells to be repositioned in response to coastal erosion.

Data from the test well will be used to further develop the Monterey Peninsula Water Supply project design. The well will provide up to 24 months of data collection, which will begin in early 2015.

About the Project

The Monterey Peninsula is facing a severe water supply problem. That's because the State Water Resources Control Board (SWRCB) has ordered California American Water to significantly reduce its pumping of water from the Carmel River. This order coupled with pumping restrictions in other parts of the county means that nearly 70% of the Monterey Peninsula community's water supply must be replaced.

Since 2004, the company has pursued a multi-source solution to the Peninsula's water needs, which includes desalination.

In 2010, the California Public Utilities Commission (CPUC), which regulates private utilities, approved a joint project with local Monterey County public agencies, termed the Regional Project, to solve the area's water shortage. However, California American Water withdrew from that project in January 2012 because it faced serious legal and financial challenges that prevented it from advancing.

After examining 11 potential alternatives to the Regional Project in October 2011, California American Water filed an application for the Monterey Peninsula Water Supply Project.

The current project is comprised of three elements:

- ✓ **Desalination**
- ✓ **Aquifer Storage and Recovery (ASR)**
- ✓ **Groundwater Replenishment (GWR)**

This multi-faceted approach brings numerous advantages over a single-source solution. For one, it will enable California American Water to build a smaller desalination plant, which will be less expensive and produce a smaller environmental footprint than a larger plant. Secondly, this strategy will build in redundancy that enables the water system to continue to provide water should one component become temporarily unavailable.

Desalination

The Monterey Peninsula Water Supply Project will consist of sub-surface slant intake wells, the desalination plant, and related facilities including source water pipelines, product water pipelines and brine disposal facilities. Depending on the availability of water from the GWR project, the desalination plant will be sized at either 10,750 acre-feet per year (afy) or 7,200 afy.

California American Water has secured a 46-acre parcel of land located off of Charles Benson Road in Marina as the site for the proposed desalination plant. California American Water is also working to secure permanent easements for locations to host its slant intake wells.

California American Water will be using a series of slant wells located west of the sand dunes in North Marina to draw ocean water. The slant wells will be up to 1,000 feet long. The final layout and configuration will be based on the results of additional groundwater modeling that will be completed.

In addition to the plant and its intake wells, various other pipeline, storage and pump facilities will need to be constructed to ultimately deliver water to customers.

Aquifer Storage and Recovery

California American Water will expand its current ASR project – a partnership with the Monterey Peninsula Water Management District – which captures excess winter flows from the Carmel River for storage in the Seaside Aquifer and withdrawal during the dry summer months. Winter flows are considered excess only when they exceed what is needed to protect the river's threatened population of steelhead.


South-Central California Coast Steelhead Trout

For the Monterey Peninsula Water Supply Project, the company plans to construct two additional ASR wells that will increase capacity of the program and allow the desalination plant to be smaller than would be needed without the wells.

Pure Water Monterey: A Groundwater Replenishment Project

The proposed Pure Water Monterey project recycles wastewater through an advanced treatment process. The resulting highly purified drinking water will be injected into the Seaside groundwater basin. A new advanced wastewater treatment plant will be constructed for the project in addition to a number of supporting facilities. The project is expected to be online by the end of 2016.

Source water for this project will be put through an additional three-step treatment and purification process of microfiltration, reverse osmosis and oxidation with ultraviolet light and hydrogen peroxide — all commonly used in numerous industries and food manufacturing.

The first step in the treatment process is microfiltration, in which treated wastewater is pushed through a filter with highly fine pores. The second step is reverse osmosis, which pushes water through semi-permeable membranes under high pressure.

Reverse osmosis is commonly used to remove salts from seawater for human consumption. The third stage of the proposed advanced water treatment facility is an insurance step to remove any molecules that may have slipped through. This is done by oxidizing the water with hydrogen peroxide in the presence of ultraviolet light. Together, these break apart any chemical bonds that may be present. This three-step process ensures complete water disinfection and purity.

The resulting purified water would be pH-adjusted and piped to the aquifer recharge area in Seaside where it is planned to be either injected into the groundwater or deeper into the aquifer itself.

Budget: Major Portions of the Project

Subsurface Intake System and Supply Return Facilities: $51M (3% spent to date)

Desalination Plant: $95M (3% spent to date)

Pipeline Facilities: $131M (3% spent to date)

Pre-Construction Cost*: $8M (100% spent to date)

***Note:** pre-construction costs are included in the $277M project total. Further breakdown of the above components will occur after the CPUC issues a Certificate of Public Convenience and Necessity permit for the MPWSP.*

** These figures include financing and some contingency costs and therefore differ from the capital costs listed in the settlement.*

Timeline

The Desalination Project is expected to be completed in 2018. Below is a timeline chart depicting the major components of the project and their expected delivery dates.