

PLANTPROFILE

NAME:

Ak-Chin Indian Community surface water treatment plant

LOCATION:

Ak-Chin Indian Community, Pinal County, Ariz.

PLANT SIZE:

2.25 mgd

INFRASTRUCTURE:

Four raw water pump station (10-hp submersible pumps); two self-cleaning 500- μ strainers; flash mix pump station; two Stage 2 train flocculation basins; 0.4- μ membrane filters; clean-in-place/neutralization system for chemical cleaning of membranes; a blower room with two 50-hp blowers for membrane air scouring; four 20,000-lb granular activated carbon contactors; 750,000-gal finished water storage tank; finished water pump station with three 60-hp vertical turbine pumps and two 25-hp vertical turbine pumps for water distribution; used water lift station



An aerial view of the Ak-Chin Indian Community surface water treatment plant, taken from an ultra-light aircraft by Dave Weesner, superintendent for PCL Constructors

By Mary Beth Nevulis

Long View

Indian community invests in award-winning treatment plant

The Ak-Chin Indian Community's surface water treatment plant is located in Arizona's Santa Cruz Valley about 50 miles south of Phoenix. The plant, which was commissioned in 2012 and provides drinking water to approximately 1,000 Ak-Chin community members as well as Harrah's Ak-Chin Casino, recently was honored with the 2013 Water Project of the Year Award from the Arizona Water Assn.

Before the surface water treatment plant was built, the community examined its infrastructure and found that it lacked redundancy as well as the means to deal with increasingly tight regulations.

"At that point, we were depending on groundwater from wells," said Jayne Long, capital projects manager for the Ak-Chin Indian Community. "We hadn't had any issues with our drinking water, but the trends had us concerned that we were eventually going to need to implement nitrate or arsenic removal, which is an expensive process."

Long said that the community council and capital projects team sat down and weighed options as well as issues like water rights and access to Central Arizona Project (CAP) water.

"The community decided that the future of the domestic water here was in filtering the surface water and getting away from reliance on groundwater," Long said. "That's the direction we went and we never looked back."

Construction & Challenges

Construction on the plant, designed by Carollo Engineers with PCL Construction as contractor, began in mid-2011, with distribution beginning on Oct. 18, 2012. One challenge during construction was that the community also was building a 180,000-sq-ft "multi-tainment" center—which includes 12 movie theaters, 24 bowling lanes, restaurants, nightclubs and an arcade—at the same time it was building the plant.

"We had a tight schedule on the plant construction, because in order for the multi-tainment center to get its certificate of compliance and open its doors, we had to get the new surface water plant up and operating," Long said.

In addition to a tight deadline, the community knew that the plant had to work as soon as the local drinking water wells were taken offline.

"It was all or nothing," Long said. "We needed the water quality to be high enough that we could go right to distribution of it."

Blending the plant's produced water with groundwater was out of the question; the groundwater contained bromide ion, and the chlorination process can cause a chemical reaction that changes the bromide ion to bromate ion, according to Ray Pulver, water and wastewater operations manager.

"The National Primary Drinking Water Regulations has limits on bromate ion in drinking water, thus blending was not a viable option," Pulver said.

Another challenge involved the chemical

metering pump system. The plant was originally designed to use a 12.5% sodium hypochlorite—or bleach—solution, used to disinfect drinking water. During times of low flow in the winter, however, the 12.5% solution caused the pumps to run slowly and at a low stroke setting, and the bleach solution was not delivered reliably.

"We now use 5.25% sodium hypochlorite," Pulver said. "The lower concentrated bleach solution increased the speed and stroke settings of the metering pumps, making them more reliable."

A current challenge is gas binding issues with the metering pumps. Bleach is a chemical that will react with itself and create gas, which builds up in the pipes, according to Pulver.

"The designers put in gas relief valves, but this still has been a challenge," Pulver said. "If gas is introduced into the metering pump, the pump loses its prime and will not pump again until the gas is released and the pump is primed with liquid again. We have added extra piping to help correct the problem and it has helped, but the pumps still are getting bound up with gas. We are looking into solutions that will resolve this issue."

Looking Forward

The current capacity of the Ak-Chin Indian Community's surface water treatment plant is 2.25 mgd, but it might not always be that size.

"The basins were sized so that, with minimal construction, the plant can be expanded to 3.18 mgd—so, 20 to 30 years in the future, it still will be producing adequate water supply for the community," Long said.

The plant also takes advantage of its surface water allotment of Colorado River water, supplied via the Maricopa-Stanfield canal system and the CAP canal to ensure that the community's water supply will not be jeopardized.

"We built a dedicated 18-in. pipe that's about two miles long, where we intersected our CAP pipeline coming in from farm operations," Long said. "So we have a direct route for the water to come to the plant, but in the event that something catastrophic happens and that canal or pipeline needed to be shut down, we also have the ability to feed the plant by taking the water [from farm operations], making the plant fully redundant."

The plant incorporated sustainable technology and a small footprint, as well as investing in membranes that, when they reach the end of their useful life at the surface water plant, can be installed in the community's water reclamation facility for a few more years of use.

"The plant has utilized the latest technology, knowing that the community is looking for this plant to work for generations to come," Long said. **WWD**

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