

ARSENIC IN DRINKING WATER COMPLIANCE SUCCESS STORIES

Coldwater Canyon Water Company, AZ: Testing Emerging Technologies to Reduce Treatment Costs

Case Study Contact Information

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Coldwater Canyon Water Company, AZ found that being willing to pilot test a full-scale turn-key treatment system for arsenic removal provided significant cost savings.

Lessons Learned

For many small water systems, especially those in rural areas, system location and lack of proximity to other water systems can limit arsenic mitigation options. Interconnecting to and purchasing water from another system or finding a new source may be prohibitively expensive or infeasible. While installing treatment may be an expensive alternative, Coldwater Canyon achieved significant savings by agreeing to serve as a test case for an emerging treatment technology, meeting both the system's and treatment firm's needs.

Alternatives Considered

In mid-2005, the Company's owner began considering options for meeting the new arsenic standard. Due to the presence of elevated arsenic levels throughout the valley in which the system is located, drilling a new source or interconnecting with the only nearby water system was not an option (Black Canyon City's other water company has also had to install treatment to comply with the new arsenic standard).

At the beginning of the search for an affordable and effective treatment option, the system owner was referred to Aquacell Water, Inc., which manufactures and helps install turn-key water treatment systems. Aquacell engineers proposed installing their treatment unit, at a reduced cost. The price reduction made the treatment unit approximately \$100,000 less expensive than comparable treatment systems on the market and enabled Aquacell and Dow to conduct a full-scale pilot test of the treatment unit.

Background and System Description

The Coldwater Canyon Water Company is one of two water systems serving Black Canyon City, in central Arizona. The Company serves approximately 1,200 customers, including two small businesses and two manufactured housing communities. Annually, the system sells approximately 75 million gallons of water (ranging from 3 to 8 million gallons per month).

The system’s water supply is comprised of twelve wells located in three separate well fields (though all draw from the same aquifer). Arsenic levels have historically been 11 ppb at one of the well fields and as high as 17 ppb at the other two. The system has not provided any form of treatment at its wells and there are no other co-occurring contaminants of concern in the source water.

Selected Compliance Strategy

Aquacell’s treatment unit uses Dow Chemical Company’s ADSORBISIA™ GTO™ granular titanium oxide media. This treatment system was selected in part due to its effectiveness in removing both As(III) and As(V) without pretreatment and under all pH conditions. The media does not have to be regenerated, reducing chemical storage costs and regenerant stream disposal costs. The treatment unit is also easy to operate.

One treatment unit was installed at each well field. Approximately 30% of the water delivered to customers from each well field is passed through a pressure tank housing the ADSORBISIA™ GTO™ media while the remainder bypasses the treatment units and is blended with the treated water. The treatment unit can process up to 150 gallons per minute (GPM). An overview of water quality, production, and treatment data is provided in the table below.

Well Field	Arsenic (ppb)	pH	Annual Production (million gallons)	Maximum Flow (gpm)	Treated Flow (gpm)	Tank Size	System Footprint	Empty Bed Contact Time (min)	Amount of media (ft ³)
Squaw Valley	11	7.7	78.8	150	45	4' x 6'	8' x 6'	4.08	25
Emerald	17	7.9	78.8	150	90	4' x 6'	8' x 6'	4.08	40
Indian Hills	17	7.9	26.3	50	30	2.5' x 6'	8' x 6'	4.08	10

(Source: Data Provided by Aquacell Water, Inc.)

Sampling conducted in August and September 2006 showed that post-treatment arsenic levels at all three well fields were consistently less than 2 ppb.

While initial estimates suggested that the media would have to be backwashed every 60 days and replaced once every 3 years, the system has not yet had to backwash the media and anticipates that the media may last up to 5 years. The media will not be considered hazardous waste and can be disposed of with household waste; backwash water can also be easily disposed of, as arsenic concentrations are anticipated to be very low.

Funding Process

The average monthly bill for customers is now approximately \$15 per month. It is anticipated that a 50% rate increase on the average monthly bill will be needed to cover the costs of treatment installation. The system has not sought financial assistance from the state or other entities. The system is preparing to present their rate increase proposal to the Arizona Corporation Commission, which is responsible for the final decisions.

The system owner anticipates that there may be resistance to the rate increase, though the chosen treatment was significantly less expensive than other options that the system investigated.