

Remediating Contaminated Water Supplies at the West Valley Water District

By Matthew H. Litchfield, PE

The West Valley Water District (WVWD) provides drinking water to approximately 82,000 customers in several communities in San Bernardino and Riverside Counties, located east of Los Angeles in Southern California. WVWD operates six water treatment plants, including the 14-million-gallon-a-day Oliver P. Roemer Water Filtration Facility, which treats water from Lytle Creek as well as imported State Water Project water, to provide clean drinking water to its customers. Groundwater from five local basins accounts for nearly 50 percent of the district's water supply.

WVWD has been dealing with perchlorate and nitrate contamination since 1998 when WVWD and the city of Rialto were forced to shut down several wells due to perchlorate detection. A water supply enhancement program has since been implemented to systematically remediate contaminated supplies to enhance the district's overall supply portfolio.

Adopting The Latest In Treatment Technology

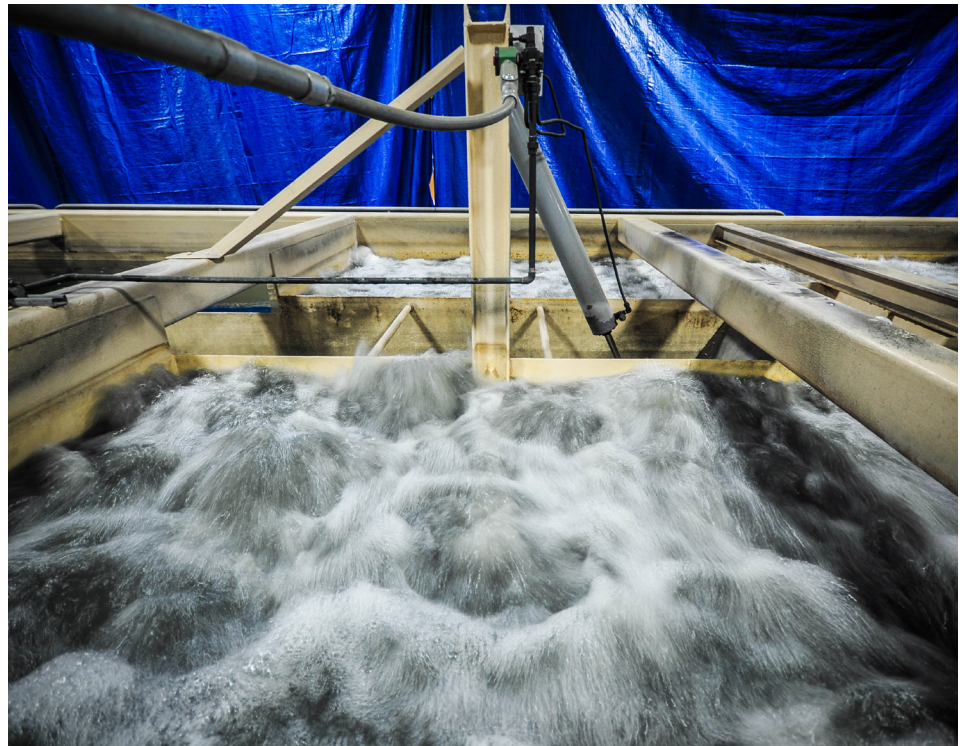
WVWD's perchlorate issue is in the Rialto-Colton groundwater basin. The two major sources of contamination are prior agricultural, industrial, and military pollutants and the 160-acre

Rockets, Fireworks, and Flares Superfund site, formerly known as the B.F. Goodrich site. Those sources generated extremely high concentrations of perchlorate in the area's groundwater. Typical treatment methods, such as ion exchange, were economically infeasible due to the frequency of changing out resin and the associated costs of that type of treatment. Given the high costs, WVWD explored other treatment technologies.

In 2011, WVWD and Envirogen Technologies, Inc., initiated a pilot project that would be the only plant in the United States that used fluidized bed reactor (FBR) technology to treat perchlorate and directly discharge into a potable water system. The FBR project was fully permitted in 2016 and produces an additional 2.9 million gallons per day from a previously contaminated source.

It was not your standard public works contract, which made it challenging for WVWD to get funding partners for the project. WVWD, in conjunction with the city of Rialto, pursued various grants and funding sources from the mid-2000s through 2014 to construct the project. Funding partners for the construction of the project include the U.S. Department of Defense, the State Water Resources Control Board, the Santa Ana Regional





LEFT: Raw water storage tank in West Valley Water District's fluidized bed reactor (FBR).

ABOVE: Inside the Oliver P. Roemer water filtration facility.

TOP: Filtration flush is a critical step in the FBR treatment process.

Water Quality Control Board, and the Santa Ana Watershed Project Authority. More recently, WVWD announced an agreement with the United Technologies Corporation, which is a “potentially responsible party” under the Superfund program, to fully fund the operation of the FBR project.

In September 2016, WVWD began delivering water directly into the distribution system. Although it is functioning as designed, as with all new technologies, there have been a few lessons learned in the first year of operation. In partnership with Envirogen, WVWD has been able to continue to deliver potable water through this project.

Lessons Learned

For other water districts considering perchlorate treatment, standard technologies such as ion exchange do not typically pan out economically for levels of 200–300 parts per billion. For those circumstances, alternative technologies can help agencies address the contamination in a more cost-effective way. For agencies considering this approach, WVWD invites tours of the project to assist with reviewing the potential application of FBR technology in other systems.

Water agencies often are leery of implementing new technologies that have not yet been tested or permitted with the state. In this case, WVWD has completed the hard work of pioneering tests of new technologies to improve treatment efficiency in the water industry to enable others to benefit from this technology.

Adding to the Portfolio

WVWD’s long-term plan for enhancing its water supply portfolio is to develop wells outside the Rialto-Colton basin and bring the Chino basin and the North Riverside basin, both of

About MIH Water Treatment

MIH Water Treatment, Inc. provides biological treatment technology to water purveyors across the nation. Its patented Hall Reactor System cost-effectively removes nitrates, selenium, perchlorate and hexavalent chromium from impacted groundwater sources while producing no contaminated waste.

1999: Hall Reactor Treatment System patented

2000: First system installed at Shedd Aquarium in Illinois for nitrate cleanup


2007: Successful pilot performed for the Environmental Protection Agency Superfund Innovate Technology Evaluation Program in Kansas

2014: Conditional Acceptance acquired from California State Water Resources Control Board Division of Drinking Water

which are contaminated by nitrates, back online. Additional treatment expansion at the Roemer Filtration Facility and additional supplies at the Bunkerhill Groundwater Basin are also currently being pursued.

For example, in the Chino basin, WVWD has partnered with MIH Water Treatment, Inc., on pilot studies to address the basin’s nitrate contamination. Currently, WVWD has the right to extract approximately 900 acre-feet of water a year from the basin that it is not able to take advantage of due to extremely high nitrates—typically two times the maximum contamination level, or about 90 parts per million (ppm).

Due to the high concentration of nitrates in the basin, ion exchange treatment is not economically feasible. To use this existing water supply, WVWD worked with MIH to test its patented biological remediation system to pump, treat, and discharge the nitrate-laden groundwater into a drain. Following the pilot studies, WVWD and the state conducted rigorous tests that showed that MIH’s system successfully reduced nitrate concentrations from 90 ppm down to 2 ppm, well below the industry maximum contamination level standard.

For WVWD, technologies like MIH’s Hall Reactor system could allow for better use of a stranded resource, increasing the local water supply and enhancing WVWD’s service reliability. 



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