# ozone across the country

*An ozone industry update*

By Paul Overbeck

*The International Ozone Association (IOA) is an educational association supporting the safe and effective use of ozone and related oxygen species in water, wastewater and industrial processes. The IOA provides its members with current information on the ozone industry through* Ozone News *and global research through its peer-reviewed* Ozone Science and Engineering *journal. Both journals are published bimonthly. The following is an "advance copy" on what's happening is the ozone industry.*

## History of Large Potable Water Systems

Ozone continues to show growth in the municipal water and wastewater arena based on its multiple benefits. The 2007 year-end issue of *Ozone News* spotlighted a paper by Kerwin Rakness, a principal with Process Applications, Inc., and a Fort Collins, Colo., consultant on ozone system process optimization, titled, "Twenty Years of Advances in Ozone Operation and Performance at Drinking Water Treatment Plants."

Rakness details how "ozone has been used successfully to achieve disinfection performance and reduce trihalomethanes (THM) and haloacetic acids (HAA5) concentrations. In addition, many plants have experienced positive secondary benefits, such as the elimination of customer complaints by the treatment of off-taste and odor-causing compounds and improvements in filtered water turbidity by micro-coagulation effects of ozonation.

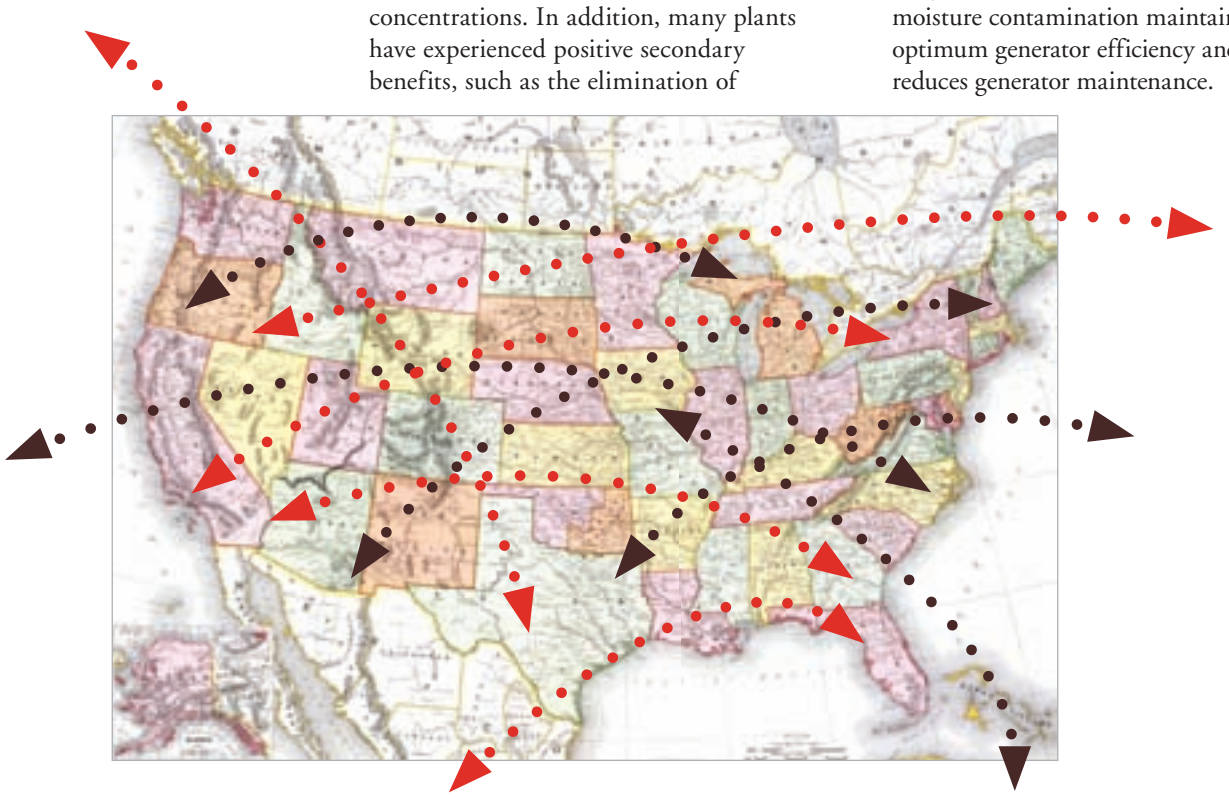
"As a result, plant personnel are generally happy with their ozone systems. Ozone systems have operated well, and many plants are considered to have optimized process operation and control. Multiple factors contribute to optimized performance."

Three factors are highlighted in the paper:

- Ozone generator moisture minimization, whether through an air-fed or oxygen-fed ozone system. Minimizing moisture contamination maintains optimum generator efficiency and reduces generator maintenance.
- Improvements in ozone generator design that allow cost-effective operation at high ozone concentration with liquid oxygen as the feed gas. This milestone development for the U.S. might be attributed to the successful performance of first-of-its-kind installations in 1987 at the Los Angeles Aqueduct Filtration Plant and in 1993 at the Randall Bold Water Treatment Plant (Contra Costa Water District).
- Improvements in ozone monitoring, control and automation that have enabled optimized disinfection performance to proceed with minimal operator attention.

Several factors led to this success. Three key elements include:

- Installation of robust online ozone residual sampling systems and dedicated operating staff that is diligent and informed concerning residual meter calibration.
- Installation of high-quality, pressure-reducing valves, high-performance gas-flow control valves and valve actuators, and accurate flow measuring instrumentation for the key gas-flow control locations.
- Development and programming of specialized control logic for different types of ozone installations.



## Small Water Systems

Technological improvements have allowed ozone to become more competitive in both smaller municipal systems and in commercial and industrial applications. State regulators who were previously not considering ozone are now looking to allow community water systems to employ this advanced technology.

The city of Charleston, Ill., recently announced: "Management at the new 4.5-mgd surface water treatment plant reports it has established future opportunity for disinfection credits, while ending a 25-year taste and odor problem by installing a special ozone generation and treatment system. The state of Illinois does not currently recognize ozone as a disinfectant."

"We had eventual petitioning for disinfection credits in mind when we built this plant," said Bill Bosler, Charleston's

water treatment superintendent, "but our official objective for the ozone system in the new plant was to solve our long-running taste and odor problem. Meanwhile, the state required a one-year pilot ozone system study at the old plant while the new plant was under construction.

"The results have been phenomenal. We have not received one single taste or odor complaint since the ozone system was installed in January 2006. Previously, we would have an average of 18 to 30 complaints per month from July to October, and then another two or three each month the rest of the year.

"To accommodate the possibility of a future petition for disinfection credits, the ozone system vendor, Mitsubishi Electric Power Products, set up the filters as bioactive in such a way as to control operational byproducts. There's a dual backwash in the design to accomplish that.

"The 4.5-mgd plant serves a residential community of about 21,000, including about 10,000 university students who move in all at once every August, typically arriving from the well water-supplied northern part of the state," Bosler said.

"Our 350-acre reservoir has an average depth of only 8 ft, and major summertime algae blooms releasing Geosmin and methyliso-borneol resulted in taste and odor degradation. To fix the problem over the years with the old plant, we tried powdered activated carbon, potassium permanganate and chlorine dioxide, but nothing would do the job 100% of the time. We put ozone treatment out to bid as part of the new plant and finally got the reliable solution we needed."

## Municipal Wastewater

Membrane biofiltration and post-ozone treatment will combine to return treated effluent to Lake Mead for reuse in the drought-sensitive desert southwest. GE Water & Process Technologies has been selected to supply its advanced ZeeWeed membranes for a 30-mgd (average daily flow) tertiary ultrafiltration upgrade of the 110-mgd Clark County Water Reclamation Facility in Nevada.

The facility, which treats wastewater for approximately 960,000 people in the Las Vegas Valley, will use the ZeeWeed membranes, in combination with a new ozone treatment system, to help protect water quality in Lake Mead and the downstream portion of the Colorado River, the primary water sources for Las Vegas and for millions of people in southern California and Arizona. The ozone system is provided by Degremont Technologies' Ozonia division.

Advanced treatment technologies such as ZeeWeed membranes and ozonation are integral parts of Clark County's proactive approach to achieving increasingly stringent effluent discharge requirements. The synergistic process will significantly reduce total suspended solids, total phosphorus and pathogenic bacteria in treated effluent. Through the use of ozonation, treated effluent will also contain fewer endocrine disrupting compounds and pharmaceuticals and personal care products. The project enables Clark County to demonstrate, evaluate and optimize the performance and operation of membrane and ozonation technologies for potential full-scale developments in the future.

The ability of ozone to reduce endocrine-disrupting and similar compounds was demonstrated during pilot testing in June 2005. In many cases, target compounds were reduced to below 1 ng/L or below the detection limit. *wqp*

**Paul Overbeck is executive director of the International Ozone Association. Overbeck can be reached by e-mail at pauloverbeck@io3a.org.**

**LearnMore! For more information related to this article, visit the web at www.wqpmag.com/lm.cfm/wq020807**

**For more information on this subject, write in 1017 on the reader service card.**