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> "We also see tremendous demand [for ozone technology] in smaller communities that have the same treatment challenges as larger plants, just less plant water flow."
> **ERICH DELANG**

Open cabinet shows QuadBlock technology.

Smaller Is Beautiful

A MODULAR OZONE GENERATION TECHNOLOGY PROVIDES AFFORDABLE WAYS FOR WATER UTILITIES TO DEAL WITH TODAY'S AND TOMORROW'S TREATMENT CHALLENGES

By Ted J. Rulseh

Ozone treatment is a proven technology for disinfection and for removal of odor, taste, and color in drinking water systems. Keys to ozone system performance include reliability, flexibility and operating cost.

Demand for ozone technology is growing, notably among smaller water utilities, and it has the potential to expand even more with rising attention to a class of compounds known as contaminants of emerging concern, or CECs.

In this market environment, Aqua-Aerobic Systems has introduced modular ozone generating systems under the Aqua ElectrOzone M-Series name. The company acts as the exclusive distributor in the U.S. municipal market for these and other treatment systems manufactured by Pinnacle Ozone Solutions.

The system is designed for safe operation and cost-effective treatment. The technology is well-suited for potable water and wastewater treatment, water reuse, and industrial applications. It provides modular expandability and operating costs 40 to 60 percent lower than for legacy ozone systems, according to Erich DeLang, product manager with Aqua-Aerobic Systems. He talked about the technology in an interview with *Treatment Plant Operator.*

tpo: What drove the introduction of this technology to the municipal market?

DeLang: Our company has supplied some of the largest ozone drinking water treatment installations in the world. But we also see tremendous demand in smaller communities that have the same treatment challenges as larger plants, just less plant water flow. With the ElectrOzone M-Series, we are targeting installations requiring less than 500 pounds of ozone per day.

tpo: How does modularity fit into the demand picture?

DeLang: Many smaller communities start out treating a certain stream of water but then experience population growth and want to add capacity without having to completely uninstall the system that's in place and install a different one.

tpo: What does the modularity actually mean in relation to this series?

DeLang: It is a very compact technology. The power supply unit and the ozone generator are combined in one cabinet. The system consists of QuadBlock units that can be individually pulled, replaced and added onto without changing the overall architecture of the generator. It's also very simple. There are only six main connections to make when installing the generator: controls in and out, cooling water in and out, oxygen in, and ozone out. There's also a small amount of compressed air to drive some pneumatic valves. Startup on these systems usually takes less than two weeks versus many months on some bigger ozone generator projects.

tpo: How would you describe the ozone treatment process using this technology?

DeLang: This is a coronal discharge technology, as distinct from ozone generation by UV light. Most ozone systems of appreciable capacity are coronal discharge, and that has some significant advantages. At the same time, there are key differences between our technology and others. The system uses QuadBlock units, each including four oxone generation chambers with two dielectrics in each chamber. Each QuadBlock is run by an individual microprocessor. Therefore, if you lose one QuadBlock, the system automatically increases the pulse density of the power to the other QuadBlocks to make up the difference. One dielectric drops off, and the others kick up to fill the gap. You don't even see a blip in production capacity.

tpo: Does this configuration have any other benefits?

DeLang: The microprocessors are also programmed individually. So if you call the factory and say you have a dead QuadBlock, they can look at their database, take the software program for the dielectric that's coming out of your generator, program a new QuadBlock specifically for your installation, and ship it in a couple of days. You just pull out the old QuadBlock, put the new one in, make the connections and turn it on. It will pick up right where you left off.

tpo: What accounts for the energy savings potential of these units?

DeLang: High-frequency operation in excess of 20 kHz allows the QuadBlocks to operate at high power density levels. The combination of higher operating frequency and power densities accounts for the energy savings.

tpo: What control strategies can be used with this treatment technology?

DeLang: The system can be set up to feed ozone in three ways. One is simply constant production of so many pounds per day. Another is to use the plant water flow in conjunction with ozone output instrumentation to provide a constant dose to the system. A third is to connect an external ORP, dissolved ozone, or color sensor to the ozone system and maintain a desired level based on a user-defined setpoint.

> "We believe many of the CECs will come under regulation, and oxidation is an excellent method for dealing with them."
> **ERICH DELANG**

tpo: What kinds of problems do you envision utilities solving with this technology?

DeLang: We're seeing taste and odor applications from hydrogen sulfide in groundwater to algae blooms and lake turnover effects in reservoirs with odor compounds like geosmin and 2-MIB, which are much harder to oxidize. Another benefit of ozone is that it is much less likely to form serious disinfection byproducts. So for example, if ozone is used for primary disinfection before chlorine or chloramines as secondary distribution disinfection, the ozone will have oxidized much of the TOC that would otherwise combine with the chlorine downstream to form trihalomethanes or haloacetic acids.

tpo: How might ozone play a role in dealing with CECs?

DeLang: We believe many of the CECs will come under regulation, and oxidation is an excellent method for dealing with them. As these contaminants move from the CEC list into secondary or primary drinking water standards, we see small, modular ozone systems as a serious way for smaller communities to address that issue. tpo