

By Andy Lash

# ClO<sub>2</sub> Keeps a WWTP on Track

*If the city of Martinsville, Va., sounds familiar, you may remember it from the recent NASCAR racing event that drew thousands of fans and media to the town of 15,000 and its 60-year-old speedway. Just down the road from that venue, the Martinsville Wastewater Treatment Plant (WWTP) found itself facing two challenging situations.*

New options for processing sludge and eliminating odor at municipal treatment plants

With the surge in popularity of NASCAR racing, the speedway figured to remain a major tourist destination for the foreseeable future—at least if odor emanating from the plant could be controlled. Secondly, with the closure of the city's municipal landfill, sludge haul-out expenses were rising exponentially for the use of private facilities, including increases in tipping fees, new state taxes and ordinary inflation costs such as fuel.

About one year ago, plant supervisors agreed it was a good time to examine the entire method of treating wastewater and water for Martinsville. There was a lot of experience in house, and the city had developed a

variety of comprehensive treatment schemes for both residential and industrial applications over the years. The reality, however, was that things had changed over the past couple of decades.

While most of the effluent is now residential, Martinsville at one time had much more industrial wastewater coming through its three treatment plants—two of which now serve as pumping stations to the main plant. The area was formerly a textile center for the region, but Martinsville has experienced a declining population with the exodus of those plants. Whereas the city once stayed plenty busy treating for color in dyes, industrial oils and the like, today it is plenty busy figuring out ways to economize.

### Cost Analysis

Typical for plants of its type, the Martinsville WWTP treats total suspended solids, biochemical oxygen demand and *E. coli* using extended aeration. Ferric chloride and lime are used for sludge processing and discharging for further treatment, and the city has a 9,000-gal mixing tank for this stage of the operation.

Originally, Martinsville used aerobic digestion with belt presses—a workable combination but surely not the most efficient one under the circumstances. The city was spending \$180,000 annually on aerobically digesting the sludge. The process was fairly easy to operate but did not take wide swings in loading and could cause odor problems when mechanical problems occurred. The cost of electricity also had risen significantly since the original evaluation was done. The basic math was based on electricity and demand to run two 200-hp blowers 24/7.

Tipping fees went from about \$35 per ton to about \$42 per ton during the evaluation period. The city's actual cost went from \$320,000 per annum to \$420,000 per annum. If Martinsville could double the solids from what its belt presses were achieving, the plate press would come close to cutting sludge disposal in half, with the exception of an additional cost for the lime bulking.

The city estimates that the electrical cost will experience almost complete reduction and that the disposal cost will be halved, resulting in savings of \$340,000 per annum. Officials will have to subtract



The installation included two 125-cu-ft filter presses with 1,200-mm plates.

Operating Cost Benefits with Hy-Pack Filter Press				
	% Filtered Solids	Tipping Fees	Sludge Disposal	Electricity
Before	~17%	\$35/ton	\$320,000	\$180,000
After	~33%	\$42/ton	\$160,000	N/A

the cost of lime plus the cost of landfilling the lime, which will be approximately \$80,000 per annum. These numbers are based on the original costs, not the new, higher costs for disposal and electricity. Actual savings could exceed the original estimate.

#### Solutions & Benefits

Realizing the scope of its needs, Martinsville wanted to work with a manufacturer that designed and built its own equipment and could follow up with a service program to keep systems optimized. Beckart Environmental, Kenosha, Wis.—maker of the Hy-Pack line of filter presses and Aqua3000 chlorine dioxide (ClO<sub>2</sub>) generators—turned out to be that company.

The Hy-Pack press has a recessed plate design. With the city's need to process about 4.5 million gal per day, Beckart helped determine a proper capacity of 125 cu ft for each of two, which are equipped with 1,200-mm polypropylene plates. While the presses have automatic plate shifters, Martinsville built a catwalk to accommodate cake dumpers below and to create access for routine maintenance such as cleaning and replacement of the filter cloths. Because so much of the haul-out expense is determined by weight, the relatively high solids content of the residual dry filter cake as compared to sludge processed with belt presses has helped the city realize a savings estimated at \$200,000 per year.

Though its main consideration was the cost savings to be achieved by approximately doubling the solids in the filter cake, Martinsville has since found other benefits as well. The cake dewateres well, dries quickly and requires fewer dumps due to its high density. Additionally, the filtrate water that is recirculated back to the secondary system is considerably cleaner than that of a belt press, so subsequent treatment chemical costs are lower and the city can be confident of fewer system upsets and fairly assured of a less challenging recirculation schematic in general.

During the course of various discussions on the plant's water and wastewater treatment needs, the



The chlorine dioxide generator is located at the head of the plant. At left is a corner of the influent trough that is dosed with the compound.

city learned that Beckart had recently begun marketing a patented ClO<sub>2</sub> system that would work well for its odor problem. The solution was simpler and less expensive than alternative options such as pulling air through hooded systems. For one thing, those systems have a higher capital cost—probably five times or more that of Martinsville's selection—and higher operational expenses. Also, in hindsight, the city realizes that it is constantly looking into those tanks; it is generally simpler to not have to frequently raise and lower any apparatus sitting on top.

But again, efficiency was the deciding factor.

By eliminating the contaminant at the source, any other equipment, process and handling issues are taken out of the equation.

Martinsville located its ClO<sub>2</sub> system adjacent to a trough at the head of the plant, where the compound is automatically and continuously fed in small amounts to help disinfect the wastewater. The Aqua3000 also has a reservoir that allows use of small quantities for particular applications. Every time the city fills a tank for sludge processing, plant staff adds about a liter of ClO<sub>2</sub> to the mixing tank.

One of the unique features of the Aqua3000 ClO<sub>2</sub> generator is the single-stage design of the system. There are no mixing or complicated formulas involved, and consequently the system provides minimal handling and safety issues. While it is still a fairly new technology (it has only been patented within the past couple of years), it has been working well for Martinsville.

The city was able to rent its ClO<sub>2</sub> system before deciding to buy one permanently. This case is just one example of how more enterprising manufacturers are coming up with ways to make it easy to try new technologies in an age where WWTs have to keep a close eye on system effectiveness and costs.

**Andy Lash is plant manager at the wastewater treatment plant for the city of Martinsville, Va. Lash can be reached at andylash57@yahoo.com.**

**For more information, write in 1104 on this issue's Reader Service Card.**

#### WEBresources>>>

Related search terms from [www.waterinfolink.com](http://www.waterinfolink.com): chlorine dioxide, sludge, odor control

For more information related to this article, visit [www.wwdmag.com/lm.cfm/wd080904](http://www.wwdmag.com/lm.cfm/wd080904)

**TENCATE**  
**Geotube®**

## The Smart Dewatering Choice

### From the Global Innovation Leader

TenCate™ pioneered dewatering technology more than 40 years ago. That spirit of innovation continues today with Geotube® Circumferential Seaming and the Geoport® filling port system. As the industry expert in dewatering testing and stacking techniques, Geotube® dewatering technology is the proven, cost effective dewatering choice for environmental, pulp and paper,

municipal, industrial, mining, and power applications. Our vertically integrated approach insures consistent global manufacturing, fabric, quality, knowledge, support, and resources. No matter the volume or space requirements, Geotube® dewatering technology is the smart solution for organizations worldwide.

### The Low Cost, High Volume Dewatering Solution

[www.geotube.com](http://www.geotube.com)  
888.795.0808 • 706.693.1897

Geotube® is a registered trademark of TenCate™ Geosynthetics North America.

Protective & Outdoor Fabrics  
Aerospace Composites  
Armour Composites

Geosynthetics  
Industrial Fabrics  
Synthetic Grass

write in 643

**TENCATE™**  
materials that make a difference