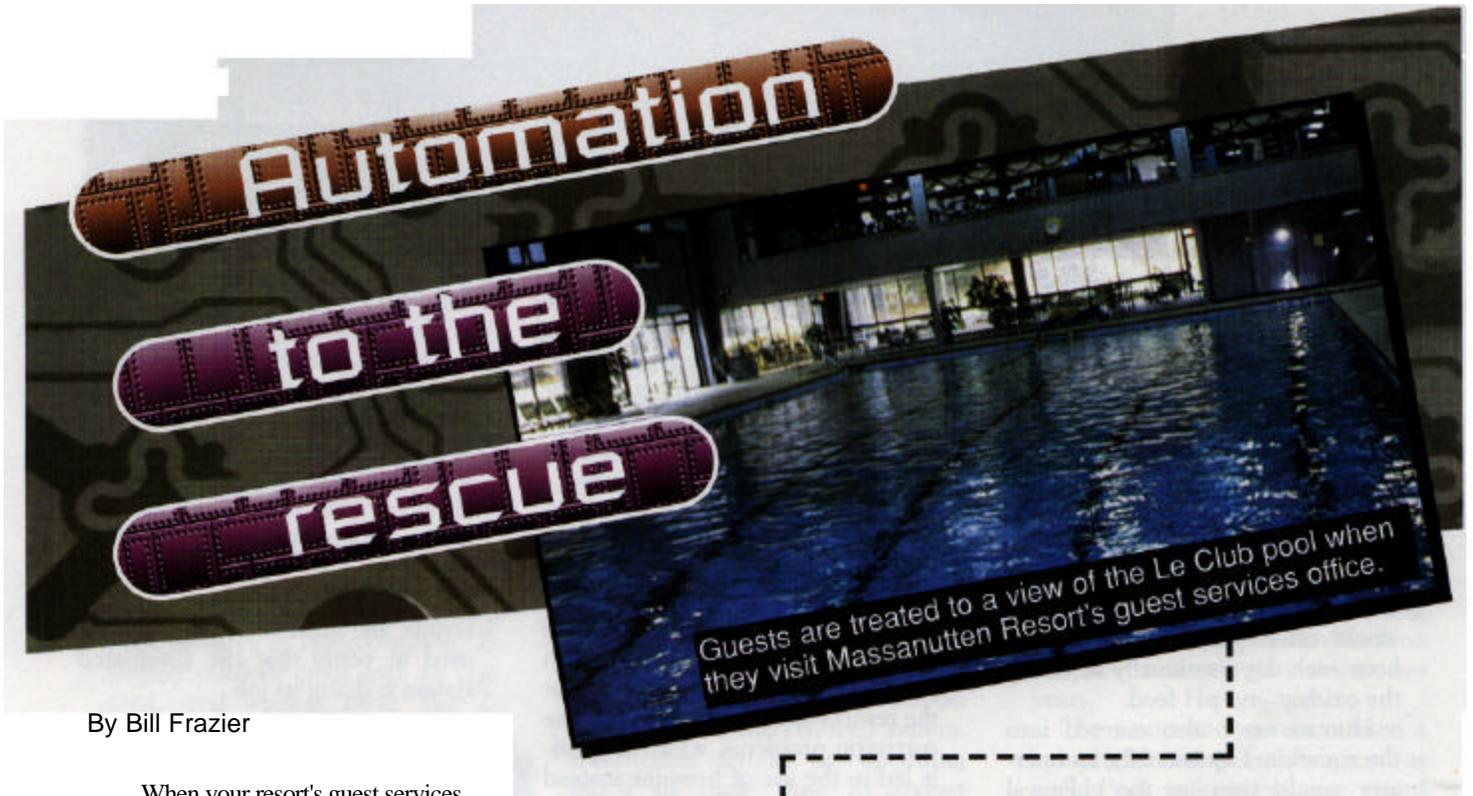


aquatics

THE SOURCE FOR FACILITY MANAGEMENT, PRODUCTS AND SERVICES

Reprinted with permission
AQUATICS INTERNATIONAL
May/June 1998



By Bill Frazier

When your resort's guest services office looks out over your pool facility, the water had better sparkle. Clean clear water and an inviting pool atmosphere can make a lasting impression.

The 175,000-gallon indoor pool at the Massanutten Resort in McGaheysville, Va., often serves as the centerpiece in efforts to attract guests and homebuyers. So it was understandable that resort officials became concerned when, in 1995, they noticed increasing cloudiness in the pool water - a problem that appeared to worsen as bather loads increased. Meanwhile, pool staff was struggling to maintain desired sanitizer residuals and pH levels.

The inability to maintain clear water was of even greater concern in light of the resort's plans to make substantial additions to its aquatics facilities, including construction of a second indoor pool and two outdoor pools.

So the mountain resort in Virginia's Shenandoah Valley converted to an automated water-chem-

When pool-water woes threatened to derail plans to expand the aquatics facilities at Massanutten Resort, an automated water-chemistry system help put the expansion back on track.

istry control system that not only resulted in crystal-clear water but substantially reduced the resort's chemical and labor costs.

With new-found assurance that pool water-chemistry problems were a thing of the past, the resort moved forward with its expansion plans and now features three separate aquatics centers, all operating on automated chemistry-control systems.

Cloudy water rears its ugly head The Massanutten Resort is truly a year-round destination, with tennis and golf in the spring, summer and fall, and downhill skiing, snowboarding and snow tubing in the winter. The aquatics center includes the indoor pool as well as a 3,000 gallon indoor wading pool, 2,200 gallon spa and two portable outdoor spas. Not just a vacation spot, the resort includes more than 700 homes and 800 condominiums for permanent or time-share residents.

Long before construction was scheduled to begin on the new aquatics centers, pool operators were having difficulty maintaining proper water-chemistry control at the Le Club pool. Wide swings in bather loads - usage ranged from 100 bathers a day in the winter to as many as 1,500 during the summer months - often resulted in cloudy, unappealing water.

The pool was originally equipped with an ozone-and-chlorine-feed sys-

tem. Due to intervals of chlorine underfeed, however, the facility was plagued by irritating odors. Two years after opening, a bromine feeder was installed to lessen the noticeable chloramine odors and to reduce some corrosion problems two small UV-type ozonators pro-

vide ozone injection.

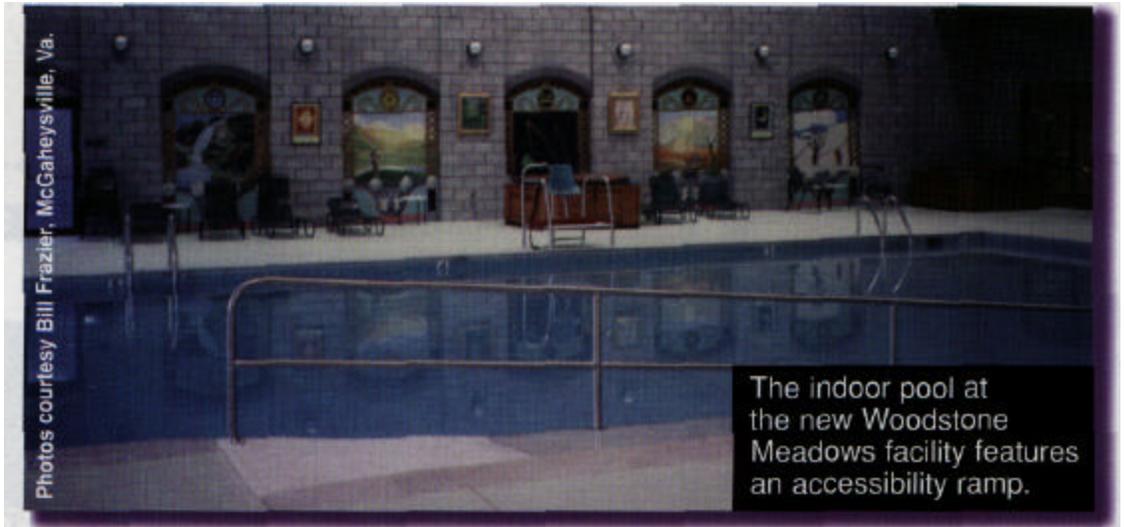
While this system was well equipped to handle disinfection requirements during periods of low to moderate usage, water quality suffered when usage was high. In the morning, operators had to estimate the expected loads for the day and adjust the feed accordingly. As the number of swimmers changed throughout the day, operators would often spend more than an hour each day continually adjusting the oxidant and pH feed.

Human error also entered into the equation. Occasionally, an operator would turn up the chemical feed in the evening and forget to turn it off at closing time, resulting in extremely high residual levels the next morning as well as unnecessarily high chemical costs. Maintaining the correct pH manually also was a problem. To lower the pH, technicians fed muriatic acid straight into the pools, with the same imprecise results as with the oxidant feed.

Automation to the rescue

The pool-water problems reached a peak during the 1995 Christmas season when the facility faced exceptionally high bather loads and accompanying cloudy water. The resort's recreation staff and pool operators realized that something had to be done to combat both the cloudy water and the high chemical costs.

After careful consideration of several different systems, officials decided in April 1996 to install an **automated, high resolution redox (HRR) controller** (HRR is a refined



version of oxidation reduction potential). In addition to measuring pH, the controller directly measures the sanitizer's qualitative work value regardless of pH, temperature or organic load. The system includes corona-discharge (CD) ozonators, a chlorinator and the HRR controller to modulate chlorine replenishment.

With the installation of automated water-chemistry control, the aquatics staff replaced bromine treatment with chlorination, which proved to be a better oxidizer for the resort's sizable bather loads. The corrosion problems, which originally led to the use of bromine instead of chlorine, were caused primarily by poor chemical control. The automated HRR system solved the problem by accurately modulating chlorine dosages based on actual demand.

The system works by injecting ozone generated by CD ozonators at a constant low level into the pool's return line, downstream of the filter and heater. The state of Virginia, however, requires ozone feed to be augmented with another oxidant, such as chlorine or bromine, because ozone leaves no residual in the water. Therefore, a separate line with a booster pump pulls water for chlorination after filtration and reinjects it upstream of the ozonator.

The system is set up so that the controller monitors pH and chlorine levels in the sidestream water and compares them with the controller setpoints established by pool operators. When disinfection levels fall below the setpoint, additional chlorine is automatically fed. The chlorinator feeds calcium hypochlorite

briquettes, which are 68 percent available chlorine.

The automated controller keeps the chlorine residual at a chosen value within the 1- to 3ppm range required by the state health department, maintaining safe conditions at all times without excessive chlorine usage. To comply with state regulations, standard wet tests are still taken every two hours, and the results are posted. These tests are used to verify that the automated system is doing its job.

As an additional precaution, the controller is equipped with alarm modes that alert operators if chemical values fall out of specified ranges. This has occurred on occasion when the system has run out of chemicals or the electricity went out. In each case, red alarm lights on the controller are activated. With the manual system, pool operators didn't know if the pools were out of compliance until they ran a test; now they know almost instantaneously.

Pool operators check the controller calibrations weekly to verify that the ORP readings and colorimetric test results fall within the same range. They also test the controller response time weekly during peak bather loads to ensure there are no overtreatment or undertreatment intervals. The staff reports no problems with the system after more than two years of operation.

Expanding with confidence

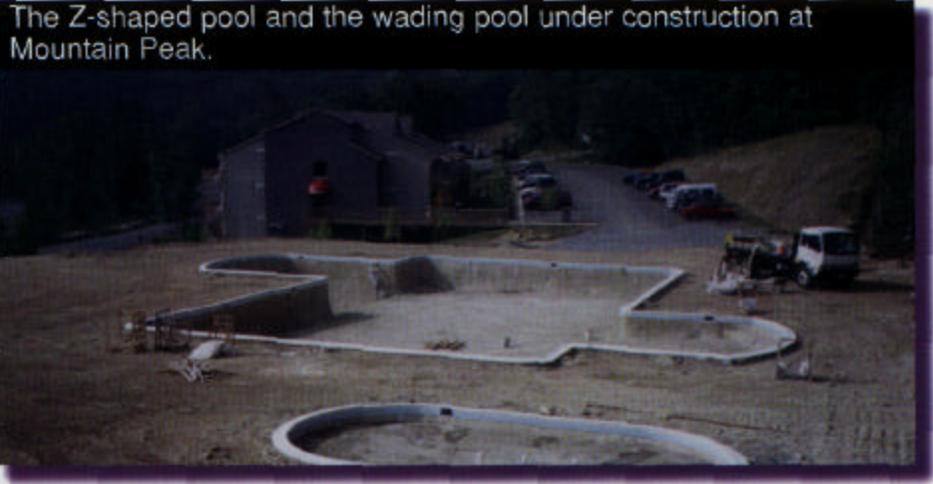
In 1996, resort officials decided to expand Massanutten's aquatics facilities. The decision was based on the desire to increase aquatic programming and ease the load on the

Le Club pool. The plan called for two new facilities, with officials determining that hotel and condominium expansions would easily support the new facilities.

If not for the success of the new automated water-chemistry system in maintaining the existing pool, officials may have thought twice about constructing two new aquatics facilities.

In April 1998, the resort completed construction of the Woodstone Meadows Aquatics Center at the base of Massanutten Mountain. This facility features a 45,000-gallon indoor pool designed for general aquatics use and a 120,000-gallon, free-form outdoor pool with a zerodepth entry, children's play fountain, water-jet therapeutic area and two-tier fountain. Programming in the indoor pool initially included water aerobics, beginning scuba lessons and swim lessons, with additional programs scheduled for the summer months.

The other new facility is the Mountain Peak Aquatics Center, completed in May 1998. Mountain



and hot tubs are equipped with smaller, but similar, systems.

Because there is some distance between the three aquatics facilities, the automated system's remote monitoring feature was important for Massanutten Resort. The Mountain Peak facility is 3/4 mile up the mountain from the Le Club facility, close to the hotels and timeshare units. The Woodstone Meadows facility is approximately 2 1/2 miles down the mountain from the main facility, where more homes and condos are projected.

If the three facilities were still on a wet-test and manual-feed system, technicians would be spending much of their time in transit between the facilities. With the automated system's Windows-based software and modem access, operators can monitor and adjust chlorine and pH levels at all the pools through the department's desktop computer. In fact, pool conditions can even be checked from the aquatics director's home computer during off hours.

Additional system features include an alarm that immediately notifies pool operators of any unusual chemical feed patterns allowing a rapid and appropriate response to emergencies - and automatic, continuous recording of all pool water data. The data can be retrieved at any time and presented in a graphic or tabular form.

Efficiency equals savings

Nothing puts a smile on an administrator's face quite like saving money. By eliminating chemical overfeed, the resort realized a 15percent reduction in chemical expenses, which pleased resort offi-

cial even more than the newfound clarity of the water.

Among the chemicals used more economically are chlorine, muriatic acid, clarifiers and algacide. During the busy summer season, the frequency of superchlorination treatments dropped from once a week with the manual system to once a month with the automated system.

This reduction in chemical usage amounts to several thousands of dollars saved in the first year alone, resulting in an estimated payback on the new controller in about two years.

The automated system created a substantial savings in labor costs as well. Pool technicians now spend approximately 15 minutes per day taking wet tests and posting the results, compared with an average of two hours per day with the manual system.

Perhaps the best evidence of the system's effectiveness is crystal clear water in every pool and spa. Though the majority of the pools' users are guests, some club members live at the resort year round. Several of these residents have commented that not only does the pool water look better, it feels better. This is the best testament to the system's success.

Bill Frazier is the aquatics director at Massanutten Resort in McGaheysville, Va.

For more information regarding the Stranrol water chemistry controllers discussed in this article, please contact USFilter, Bradley, IL at 800-882-6466 or visit their website at <http://www.stranco.com>



shaped pool consists of a shallow, 18inch entry on one leg of the Z, a 25meter pool in the middle portion and a 10-foot-deep diving well on the other leg. The 8- to 18-inch-deep wading pool also features a children's play fountain.

The new pools are equipped with the same automated system as the Le Club pool, each with its own controller. The new wading pool at Mountain Peak and Le Club's spa



Stranco Products
PO. Box 389
Bradley, IL 60915
U.S.A.
800/882/6446 or 815/932-8154 tel.
815/939-9845 fax
<http://www.stranco.com>
e-mail: Stranco@usfilter.com