



Building toward Clarity

Having begun his career decades ago as a residential pool/spa service technician on Long Island, N.Y., watershaper Steve Kenny has a profound appreciation of superior water quality – one he developed, he says, despite a near vacuum when it came to high-caliber industry education on the subject. Today, this self-taught expert applies what he's learned in building pools that combine unusual hydraulic designs with sophisticated water treatments.

By Steve Kenny



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hen my family started in the pool and spa service business some 25 years ago, it didn't take us long to recognize that there was very little available to us by way of education about water chemistry – or, for that matter, about most of the other skills involved in maintaining pools, spas and other waterfeatures.

That didn't make much sense to us, even then. After all, how could an industry devoted to the health, safety and comfort of millions of people function without addressing the need for standardized approaches to water maintenance or the technical fundamentals?

To be sure, the industry has caught up a bit in the past 25 years, and a variety of trade shows and other forums are taking steps to fill the information gaps, but what I still see most often is education at a bare-sustenance level – enough to help someone who owns a vehicle, has a few containers of chemicals and harbors a willingness to do backbreaking work deal with common challenges, treat a few symptoms and maybe cope with some fairly serious conditions. But as I see it, there's still little or no support when it comes to helping professionals truly understand the essence of water management as it applies to watershapes.

This was certainly the case when I started working with my dad and two brothers back in 1985: We knew almost nothing about the tasks we were pursuing and had a hard time finding resources to point us in the right direction. Sure, we kept our eyes and ears opened and picked up some pointers along the way. Before long, we fell neatly in line with what was then the prevailing mentality about water treatment: *Just keep adding chlorine until the water clears up.*

We were operating, we began to see, in a universe ruled by ignorance – and desperately wanted to rise above it.

Serving Quality

As disconnected as it may sound, the main thing we had going for us in our fledgling business was our family's collective history in the culinary arts. My grandparents were restaurateurs, and all of us recognized the way fine dining was in our blood and influenced the way we approached our lives and our business.

From those early days to the present, this culinary orientation has continued to serve me well and has helped me focus on the concept of delivering quality to consumers in ways that encompass the entire experience. After all, food must look, smell and taste good to generate satisfaction and must also be presented by a knowledgeable wait staff in an attractive, comfortable setting. And all of this must be done so that customer expectations are met (or exceeded) at a reasonable price.

Early on in our pool service business, that culinary value system provoked a restlessness in me that I felt had to be indulged. I knew that water quality stood at the heart of what we were now doing and that there was no point in our clients' owning pools or spas unless the water itself was inviting and delivered an experience worth the price.

My brothers left the business after two years, leaving me in charge of the field work.



It was never lost on me that, as with cooking, there was a great deal of basic chemistry involved. So, in effect, I began to relearn how to bake a cake.

As I had done in my previous career, I took it upon myself to unearth as much information about water chemistry as I possibly could (a commitment, by the way, that I maintain to this day). That effort was clouded at first, however, by the fact that back in the 1980s and well into the '90s, the industry was caught up in quick fixes and miracle cures.

Wonder clarifiers, sanitizers and treatment devices meant to solve all of our water-treatment problems besieged us on all sides. From magic magnets to special enzymes, it seemed that everyone – even a reputable company or two – was selling some shortcut or other to producing quality water. And even though the mainstream industry was virtually addicted to chlorine, pathways to being “chlorine free” dominated the agenda despite the fact nobody I ever encountered had a satisfactory explanation of how it was possible.

Through all of the marketing hype and pseudoscience, through all of the clang and clatter of confusing and misleading messages, I stuck with it and gradually, with study as well as a tremendous amount of trial and error, increased my understanding of water chemistry and its dynamics in the watershapes I'd been hired to maintain.

Moving Forward

The first concept I embraced – and one I steadfastly adhere to now – is the Langelier Saturation Index. This demonstrates in clear, scientific terms that for any treatment regimen to be effective, you must start by bringing the water into balance – meaning that pH, total alkalinity and calcium hardness (among other factors) must settle into prescribed ranges to create water that is neither excessively corrosive or scaling.

In a sense, balanced water in these terms is analogous to the foundation of a house: Without good, manageable water balance, everything else you might try will be unreliable. Or put another way I understood even better, trying to maintain water without balancing it was like trying to bake bread without understanding how leavening works.

As is true of many people who start out in pool service, I eventually found myself in my own business doing repairs and renovations and ultimately branched out into new construction. That was in 2007, when we at SRK Pool Services of Wainscott, N.Y., entered pool construction with a focus on custom residential pools and spas. (I still have a service unit, however, because I saw early on that the combination enabled me to control my clients' treatment programs.)

In building pools, I work hard to apply a variety of lessons I've learned not only by servicing pools, but also in repairing

and renovating them. As an example, I've come to believe that the basic scheme of two skimmers, two return lines and a main drain – a common hydraulic setup where I operate – was completely inadequate because of the way it virtually assured creation of massive dead spots where water didn't circulate properly.

In one instance, these problems with circulation prompted me to try a new approach – a turning point that has driven my business ever since.

It was several years ago: I heard from a client with a pool whose return lines both leaked profusely. Rather than repair or replace them, I decided to return the water through the main drain and rely on the skimmer for suction. Although that was admittedly a primitive solution I wouldn't endorse today, I was able to see that in making this one adjustment, I had succeeded in *dramatically* improving the pool's water quality and had simultaneously made it much easier to manage.

Jumping ahead to my current work, I currently design and install pools with multiple floor returns and skimmers. Depending on a variety of design specifics, a typical 40,000-gallon pool will, for example, have from six to eight floor returns down the center and up to eight skimmers – but no main drains, thereby eliminating any concerns about entrapment.

What this basic arrangement does for water circulation is amazing. We're able to turn pools over rapidly with amaz-



ingly low line velocities – often four feet per second or even lower. We use variable-speed pumps and large plumbing sizes for energy efficiency, and heating becomes more efficient as well by virtue of even distribution across the bottom of the pool and taking advantage of the fact that heat rises through the entire water column.

And by putting all of this in context with our adherence to the Langelier Saturation Index, we've set the table for what can only be described as truly superior results.

The Big Idea

As mentioned above, I came of age in this industry in an era when the notion of going “chlorine free” was the motivating force behind an entire segment of the water-treatment industry.

I recognized the range of reasons why so many consumers were interested in making this change, including the desire to get away from unpleasantly familiar chemical odors; the bleaching of bathing suits; worries about possible health effects; and the widely popular belief that chlorine is bad for the environment.

At times I found this a bit hard to take, because I'm not personally opposed to the use of chlorine and know that most problems associated with it are the result of improper use. In fact, once I mastered basic water chemistry and understood the advantages of working with balanced



water, for years I was able to maintain beautiful water using chlorine.

Achieving that mastery really made the difference for me. I understood how, depending upon the situation, to make use of the different types of chlorine; had figured out how pH characteristics can influence water balance; knew the right way to use shock treatments; and had come to see that if all of these factors were held in balance, chlorine was no longer a problem for most of my clients.

I was on a roll, confident and comfortable, until 2008 – when my understanding of both hydraulic design and water treatment were put to a major test. This is when I was asked to participate in a project spon-

There aren't huge technical differences between building pools with multiple floor returns and skimmers and building them in the conventional way, but it does involve extra piping, forming and fittings – and an enhanced need to keep everything organized.



Good organization at the pool pays dividends when everything is carried back to the equipment room, where all of the systems, manifolds and plumbing loops need to come together in understandable, workable and serviceable ways.

sored by *Hamptons Cottages & Gardens*, a Long Island publication that covers high-end residential living in our area.

The project was called “The Idea House” and was intended as a showplace for state-of-the-art design and amenities with a special focus on environmental sustainability. The goal was to see how many LEED points the project could earn through creation of a beautiful contemporary environment.

My part of the project was about building a chlorine-free pool using the latest in water-treatment technology. I enjoyed the irony, because I had never tackled that sort of approach before. So as excited as I was by the opportunity to participate in such a high-profile project, I was also intimidated, knowing that if I failed, the damage to my company’s reputation could be significant and long lasting.

Despite those early misgivings, I jumped in and decided to replace the oxidizing action of chlorine with that of ozone, one of the most powerful oxidizers known to science. To that end, I chose a commercial-grade corona discharge system by Del Ozone (San Luis Obispo, Ca.) that produced about seven grams of ozone per hour. For sterilization, I turned to a high-flow ultraviolet system made by Emperor Aquatics (Pottstown, Pa.)

We completed the system with an ORP controller (also from Del Ozone)

as well as a high-flow contact chamber and degassing system I fabricated to eliminate any concerns about contact times or off-gassing. We also split the circulation system into two sub-systems – one for the ozone, the other for the ultraviolet unit and the heating system. For additional energy efficiency, we installed LED lights and finished the pool’s interior with a dark exposed aggregate to absorb some heat from the sun.

The New Phase

With a bit of luck in scheduling, we finished the pool late in spring – a couple of months before work on the house was complete. As a result, the pool was available for near-daily use by the construction crews, and it turned out to be a great test run for overall system performance.

At times, it seemed, the watershape was basically a public bath: Every day, numerous dirty, sweaty construction workers took advantage of the opportunity to cool off and clean up – as I carefully monitored the water chemistry.

I’ve worked with pools for 25 years, and I have to say that I was literally stunned to see how the system I’d installed simply seemed to take care of itself. Without much intervention on my part at all, the water stayed clear and in perfect balance and seemed to me to be very close to self-sustaining.

The Idea House itself was a smashing

success, and the pool was on display for hundreds of tours spread over several months – giving me tremendous local notoriety and ultimately propelling my pool construction career. I immediately seized on the ozone/ultraviolet combination and began marketing the systems as “Hydrozone 3.”

Since that summer, I’ve designed and built 28 custom pools using the concept and have others in the pipeline. The configurations change, of course, depending on the design of the pool and what the client wants and is, of course, able to afford.

At a minimum now, all of my pools use multiple floor returns and skimmers. Some still include chlorine as a primary sanitizer; some others use ozone with a small chlorine residual; but most, I’m happy to say, go all the way and take full advantage of the combined ozone/ultraviolet package.

Not willing to sit still, we’ve kept tinkering with system configurations. We’re intrigued, for example, by the fact that when you run ozone-treated water directly through an ultraviolet chamber, it results in production of hydroxyl radicals – an extremely unstable form of oxygen that acts as a powerful sanitizer. This adds a third phase to our chemical treatment program and generates the cleanest, most manageable water I’ve ever encountered.

The beauty of all this is that we didn't invent any of it. All we've done is combine established circulation-system designs with existing water-treatment technologies and found a potent set of synergies – not the least of which is the saving that comes when variable-speed pumps are used. That step alone more than offsets the additional draws required to run the paired sanitizing systems.

And there's more, including no off-gassing from the surface, which means among other things that solid pool covers can be used and will enhance energy efficiency even further. In fact, those savings have prompted some clients to spend more on heating to extend the swimming season – and one has even chosen to leave the pool open year 'round as a result.

One final note on system evolution: I don't make these pools chlorine-free unless specifically asked to do so. When given the option, I choose to work with a tiny chlorine residual as a safety measure for immediate bather-to-water contact. But with the main load of oxidation and sanitation taken care of by the main systems, I'm happy to say that these pools rarely require shocking and always stay ahead of whatever burdens bather loads might have to deliver.

Consumer Demand

All of the benefits of these systems, of course, come at a cost. Given the times, I had no expectation, even with the success of The Idea House, that these projects would catch on, no matter how affluent Long Islanders might be. In fact, I spent a good part of 2008 bolstering up my service division to keep things rolling through the looming recession.

Much to my surprise and delight, however, a significant number of people we've talked with about new pools or renovations are extremely excited by the ozone/ultraviolet concept. Some just don't warm to it or understand it and others can't stretch to cover the cost, but we've been impressed by the count of people who see this approach as an investment in their lives and in the way they'll enjoy the swimming experience. It's been tremendous.

Even the willing, of course, need an



explanation of the chemistry involved and want to know that the benefits are both long-term and sustainable with respect to both operating costs and water quality. It bears mentioning that these same clients also want quality when it comes to aesthetics, and it's clear that I owe a great deal to the Genesis 3 program for elevating my awareness and abilities on that front.

It's also true that we have a big advantage in servicing most of the pools we build. Not only does this give us the ability to address any minor issues that might arise, but it's also given us the opportunity to analyze how our systems perform—observations that have helped

us tweak other installations and enabled all of my clients to benefit from what we keep learning as we move along.

We might have entered into this process encumbered by ignorance, but through the years we've systematically pushed beyond those limitations and are humbled by the progress we've made as we've passed along what's been a very long and at times bumpy road.

It's not lost on me when one of my clients tells me that the water in our pools is *delicious*. Given my culinary background, that might be the best possible compliment I could ever receive because now I know I'm serving my clients the very best "meal" possible!

Some might see all of these extra skimmer ports as visual disruptions in a pool's appearance, but we've found that by arranging them with an eye to symmetry and balance that they're not any sort of issue—especially when we succeed in blending the skimmer lids into the surrounding decks.

