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New CDC Data on CYA Levels in Pools

By Alvaro G. Mendoza

Municipal pools started taking direct control of pool chemistry back in the early 1980s. At that time, most were using either gas chlorine or simple erosion feeders with trichlor tablets. Few owners and operators were concerned about cryptosporidium (Crypto) outbreaks, and there was very little research and very few published guidelines for Crypto.

Now, fast forward to 2016, where, in the municipal pool industry, both of these chemical treatment technologies have become virtually extinct. However, Crypto, linked to major disease outbreaks and even patron fatalities, has wreaked havoc in multiple U.S. cities. The Centers for Disease Control and Prevention (CDC) published a fecal accident guideline in May 2001, and new 2015 data finally clears up a 30-year-old debate on proper treatment strategies. It concludes that high stabilizer levels (with manual cyanuric acid (CYA) introduction or with trichlor tablets) may delay Crypto inactivation and thus be very harmful to patrons.

With this data, we now have all the tools, and must do the following, to formulate a cohesive game plan for safer swimming:

- Understand CYA and the new 2015 research on CYA's impact on Crypto (<http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00962>).
- Be aware of improved CYA testing strategies.
- Use a proper treatment strategy with correct stabilizer levels.
- Follow CDC protocol for fecal accidents.
- Educate staff and be prepared to take action.

CYA Review

Stabilizer or CYA is a pool chemical that is available either as a stand-alone powdered or granular special-

ty chemical, or as a byproduct of chlorine tablets or shock treatments. Once in the water, it protects the chlorine molecule from destruction by sunlight. Its concentration is expressed in parts per million (PPM) and can be tested and verified using a variety of chemical test kits.

All chlorine types have a chemical byproduct, with some more beneficial than others. Trichlor, in granular or tablet form, contains 55 percent CYA. When added to pool water, the chlorine is consumed almost immediately, but the CYA accumulates and is only removed via water leaks, splash out, backwashing or proactively dumping water. In a typical 50,000 gallon pool, CYA would build up at a rate of 7.33 PPM per day. CYA can also be hand-fed (and overdosed) using powdered or granular stabilizer, and only 8.5 lbs. will raise the CYA level in the same pool by more than 20 PPM. Why is this important? CYA in higher concentrations overprotects the chlorine molecule from UV rays and germs alike, simultaneously delaying inactivation of the Crypto pathogen that could harm your patrons.

What Is the Optimum CYA Level?

While many Department of Health (DOH) codes specify a maximum stabilizer level of 100 PPM, best-practice maximum levels on a national basis are thought to be closer to 30-50 PPM. In the early 1980s, a national group of early Oxidation Reduction Potential

(ORP) pioneers used early research to promote a 20-30 PPM maximum range for commercial pools, with an 8-10 PPM target for highly used municipal pools and waterparks. Using these CYA ranges, a facility could maintain 750-775 ORP levels with only 2 PPM of chlorine — both representing a high level of performance with minimized operational costs.

Now, in consideration of an acceptably quick Crypto kill, new 2015 CDC data points out that the optimum level of CYA is around 8 PPM to see the following benefits:

- Retain 84 percent of CYA's UV protection of the chlorine molecule
- Achieve high ORP levels using moderate chlorine residual
- Remediate a fecal release in only 6.2 hours using a 40-PPM shock

The CDC data also contains the following additional facts:

- As little as 16 PPM of stabilizer can almost triple the time needed to deactivate Crypto (3-log CT values) in 20 PPM of chlorine.
- At 50 PPM stabilizer, the time needed to deactivate Crypto is 4.6 times longer than without CYA.
- At 100 PPM CYA (found in tens of thousands of Florida pools), Crypto inactivation was not possible in under 72 hours. So, if someone poops in your pool, are you really ready to subject your patrons to this risk for 72 hours?
- At 100 PPM the killing rate of chlorine is so diminished that Crypto oocysts had more of a chance of dying from "old age" than from the effects of the stabilized chlorine.

Using Proper CDC Protocol for Fecal Accidents

At the forefront of any article on


CYA, fecal accidents and/or bather safety is a discussion on using the proper CDC guidelines (<http://tinyurl.com/728o5ft>) once a fecal accident occurs. As difficult as they may appear, they are infinitely more acceptable than the standards that some local health departments were concocting before CDC guidelines were adopted in the early 2000s. You may need to close your pool for several hours to a full day to properly inactivate Crypto.

There are a couple of ways, through education and a better strategy, to help bulletproof your facility:

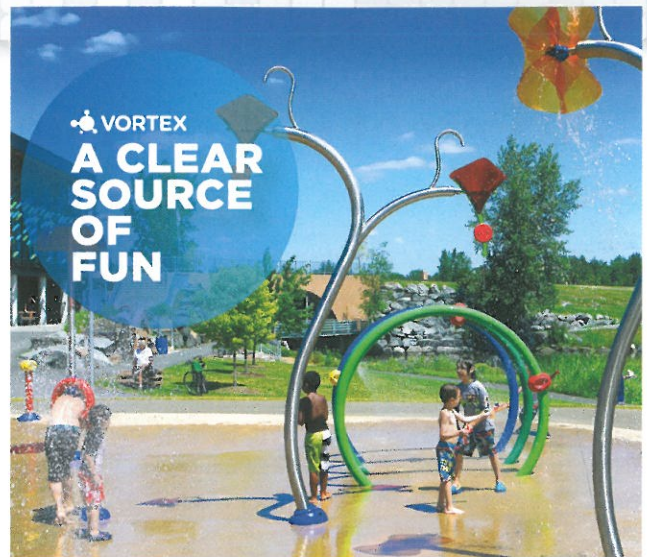
- Get educated about your water chemistry and find out what CYA levels are being used in your pools.
- Establish new guidelines for CYA in your pool to maintain 8-16 PPM maximum; close the pool for suitable amounts of time each time a fecal accident occurs.
- Maintain an emergency fecal treatment kit on-site. This should consist of fast-acting shock in sufficient quantities to increase the chlorine to 60 PPM, along with enough dechlorination chemicals to restore to normal operations.
- Use a better photometric test kit to help measure CYA in your pool, and maintain good records.
- Operate your pool above DOH code standards for best results, especially in terms of maintenance, preparation and checks and balances.
- Make sure your operators are certified to operate pools. NRPA's AFO certification program (www.nrpa.org/afo) can help to properly empower your staff.
- Maintain great records or subscribe to a remote monitoring, record-keeping and alert notification program. They are recognized as a valuable loss-prevention tool and help make your facility more bulletproof.

Conclusion

Compared to a specially promoted professional guideline of 20-30 PPM of CYA, the new CDC data pinpointing an 8-16 PPM target is not earth-shattering. But, compared to the rampant number of pool service "professionals" holding 80-100 PPM CYA on every pool they operate, the correction for the owner is significant and should be made immediately.

While proper testing is important, asking your pool subcontractors or in-house staff the right questions is paramount. Given that Crypto can result from an unnoticed fecal release, can you really afford to expose your patrons for 72 hours? 

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