Shocking Alternatives

Ridding an indoor pool of pesky chloramines requires a different approach than those used outdoors. Here are some strategies.

By Dr. Alison Osinski

Alison Osinski, Ph.D., is principal owner of Aquatic Consulting Services of San Diego. She can be contacted at *alisonh2o@aol.com.*

Most indoor-pool operators and service technicians have a difficult time ridding their pools of chloramines. Chloramine buildup is not as much of a problem at outdoor pools because sunlight helps destroy chloramines, and wind often blows away objectionable odors.

Reaching breakpoint chlorination, sometimes known as "shocking," usually will eliminate chloramines (combined chlorine) and other contaminants that create an increased chlorine demand. Chloramines can cause eye and mucous membrane irritation and give off that unpleasant "chlorine odor" often associated with poorly ventilated indoor pools. When airborne, chloramines even can result in corrosion of metal fixtures and components in indoor pools.

Problems generally arise when pools have enormously high bather loads, resulting in heavy organic loading and high levels of ammoniated impurities in the water. It's not surprising, then, to find that an 18,000-gallon swim school pool maintained at 94 degrees with a daily bather load of 300 preschool-aged children will have an ongoing chloramine problem.

If a chloramine residual persists despite following proper breakpoint-chlorination techniques, service technicians or operators can try one or more of the following suggestions:

- **Increase exposure time/chlorine concentration.**

You might succeed in reaching breakpoint by superchlorinating for longer periods with higher levels of chlorine.

- **Dilute regularly.**

Drain and replace approximately 8 gallons of fresh water per user per day, as recommended in the German *DIN Standard 19,643*. The European Community has adopted the DIN standard and FINA requires water standards compatible with the DIN standard.

- **Draw water from the pool surface.**

Chloramines concentrate near the surface of the water. During breakpoint chlorination, turn off the valve that draws water from the main drains and direct all the water through the perimeter-overflow system. By circulating only through the gutters, you'll speed up the process by removing the water where chloramines concentrate.

- **Increase air flow over the water surface.**

When oxidation occurs, chemicals release into the natato-

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Chloramines can give off odors and cause eye irritation in poorly vented indoor pools.

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POOL & SPA NEWS®
VOLUME 40, NUMBER 21 www.poolspanews.com NOVEMBER 1, 2001

rium air. You can reduce the chloramine concentration in the air by increasing the percentage of outside air brought into the natatorium.

Do whatever you can to get more air moving over the pool. Open the windows and doors and turn on exhaust fans or portable fans to move large volumes of air across the pool's surface.

• Install GAC filters.

Install secondary granulated activated carbon (GAC) filters and remove ammonia through filtration. You can use GAC filters to treat a side stream of water continually drawn off the main effluent line or to treat chloramine-bearing source water before its addition to the pool.

• Use nonchlorine oxidizers.

Use potassium peroxymonosulfate (aka monopersulfate) instead of chlorine to remove chloramines and other organic contaminants from the water. Unlike chlorine, which must reach a breakpoint, any amount of potassium peroxymonosulfate added to water will oxidize some material.

• Eliminate chlorine to eliminate the chloramines, then reintroduce it.

Add hydrogen peroxide or sodium thiosulfate to the pool to drop the chlorine level to zero. This eliminates the free-chlorine residual by converting chlorine back to chlorine salt. By eliminating chlorine from the water, you'll also eliminate chloramines. When reintroducing chlorine, it will combine again with the ammonia and form chloramines, but it will do so gradually and in a less objectionable form.

• Try zeolites.

Zeolites with at least 80 percent clinoptilolite can be used as filter media in place of #20 silica sand in sand filters. Zeolites can remove ammonia as well as particles down to 5 microns in size, equivalent to the filtering capabilities of a DE filter. Adding a layer of sodium chloride (table salt) to the filter bed — add approximately 10 percent of the filter volume — results in an ionic reaction that causes the absorption and removal of ammonia as the water passes through the filter. Removal of the ammonia will reduce chloramine formation.

• Consider corona discharge ozone systems.

Organic contaminants are slightly reactive with ozone. After partial oxidation, however, filters can remove fine, solid contaminants via microflocculation. Unfortunately, ozone also destroys high free-chlorine residuals in the process of destroying chloramines, so operators must constantly replace the chlorine lost in the process.

• Ultraviolet light can help.

Whether it comes from natural sunlight or from a sanitation system, ultraviolet light can destroy chloramines and aerosolized chlorine compounds. If a natatorium or indoor pool has no source of natural sunlight, UV light sanitation systems can provide supplemental sanitation and destroy chloramines.