

# Breaking the Chloramine Bubble

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Chloramines in indoor pool environments have become an issue recently due to concerns about their effects on the health of swimmers, coaches and pool workers. Virtually all the efforts to date (water chemistry, medium-pressure UV and shocking) have focused on controlling chloramine concentrations in pool water to reduce airborne chloramines. While these strategies can do a good job of reducing the chloramines during normal, stable pool operations, they do nothing to prevent the acute chloramine episodes produced by heavy pool usage associated with swim team training. Heavy swimmer loads and training produce large amounts of chloramines when free chlorine reacts with sweat and body fluids; these chloramines are then vaporized by vigorous activity in the water. If chloramines are produced and vaporized quickly enough, they become trapped in the dead air zone between the pool water surface and the deck. Once in this dead zone, water chemistry and UV treatment of the recirculated water can do nothing to eliminate this "**chloramine bubble**", located directly in the breathing zone of the swimmers.

I have been around swimming pools for over 25 years, starting when the oldest of my three girls



began summer league swimming at age 6. As these involvements have a tendency to do, I progressed through simple parental involvement to "volunteer engineer" (my day job is in aerospace design engineering) for our subdivision pool, to volunteer engineer for the aquatics program of the Greenville County (SC) Recreation District. In this capacity I have been involved in various pool projects over the last 16 years. Seven years ago, my wife and I took on the boy's and girl's head swim coaching positions at the local high school and have been intimately involved in high school swimming on both the local and state level ever since. So I have spent a few hours around indoor pools and am acutely aware of the air quality problems they present.

Recently the Greenville County Recreation District asked me to participate as a volunteer in the planning of the new GCRD Aquatic Center. In this capacity in April 2009, I attended the first Aquatic Professional Engineering Conference sponsored by USA Swimming in Colorado Springs. It was during this conference that I first heard the term "chloramine bubble" and learned of the many, but futile, efforts to eliminate it, even in the finest and most elaborate facilities.

Following this conference, I spent many hours researching the mechanisms of chloramine formation and the physical and chemical characteristics of inorganic chloramines. This research led to a "eureka" moment in which I realized that there was a simple way to directly eliminate the most irritating airborne chloramines. At about the same time, the GCRD Aquatic Center project began to crank up and I was asked to serve on the committee to select the Architect/Engineering team. Six teams were interviewed. I asked each team to give their solution to the chloramine bubble problem. After their interview, each team was also given the basic idea that came out of my eureka moment and challenged to develop a system utilizing the idea. Only one team responded to that challenge - the **Paddock** team. Not only did they respond, but they responded quickly, even before the final team selection was made. They have taken the original idea and created a system (**Evacuator™**) that provides an innovative, simple solution (the best kind) to a thorny problem.

I am excited about Paddock's commitment to this technology, and the fact that they have already taken it several steps further to not only dramatically improve air quality for swimmers, coaches, officials and spectators, but also to substantially reduce up-front and operating costs for dehumidification, while increasing building and equipment longevity.

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