

# Ozone's Role in Pool & Spa Water Sanitation

(By Barry Nelson, BSA in Microbiology & President of UltraPure Water Quality Inc. (UWQ) – August 2008)

The role of Ozone is to oxidize non-living bather wastes. Oxidation is the breaking up or burning out organics and the altering of ammonia compounds in the swimming pool or spa water. These compounds are introduced by swimmers/bathers and the environment. Organics (oils, sun tan lotions, creams, cosmetics, antiperspirants, body oils, etc.) are carbon based compounds and ammonia or amines are nitrogen based compounds originating from perspiration or urine. Historically oxidation of wastes, called break-point chlorination, super chlorination or shocking, is performed by chlorine or a non-chlorine shock. This requires large amounts of chlorine or persulfate to reach a 'break-point' and remove contaminants. In the case of chlorine, the level is often raised to 20-30 Parts per Million (PPM). Chlorine is a good oxidizer; however, at 'pool running levels' up to 5.0 PPM, it will combine with organics and amines to form obnoxious compounds. It does not remove or alter them, but rather joins with them to form chlorinated organics and chloramines. The best use of chlorine is as a disinfectant and safety residual to kill and keep microorganisms in check. A free available chlorine residual of 1.0 PPM, will stop the growth of most strains of algae and kill other microorganisms.

Ozone, at pool and spa direct-dosage levels, readily oxidizes organics and amines in pool and spa water to remove or alter them. They are then unavailable to combine with chlorine. Ozone accomplishes this important work because it is a much stronger and faster acting oxidizer than chlorine. In this process, Ozone does not form combines; reverts to Oxygen, leaving no residue in the water; and, 'carries up to 70% of the 'sanitation-workload' in pool water and up to 95% of the workload in spa water. Ozone, at levels introduced into pool or spa water, does not disinfectant, i.e. Ozone does not kill bacteria, algae and other microorganisms. Effective, ongoing **sanitation** of pool and spa water is accomplished through the **oxidation** of organics and amines; the **disinfection** or killing of microorganisms; and the assurance of a backup safety **residual** of the disinfectant. Ozone providing the **oxidation** and Chlorine, with perhaps a mineral product or algaecide, doing the **disinfection** and supplying a backup, safety **residual** makes the best use of each product's strengths. To date, this is the best 'water treatment package' available, yielding the most modern, 'greenest', environmentally friendliest, cost effective and near-automatic **sanitation** of pool and spa water.

The interchanging of sanitation, disinfection, oxidation and residual terminologies is an industry malaise. The misuse of these terminologies can be misleading and in some cases leads to false claims. Ozone, no matter if it is from a Corona Discharge (CD) or an Ultra Violet (UV) Ozone generator, when directly injected into the water, is not a disinfectant and does not kill 99.99% of known pool and spa microorganisms. Ozone in sufficient concentrations and enough exposure time will kill microorganisms; however these requirements are not met in residential pools and spas. In addition to being false, the disinfection claims cause the real value of Ozone in pool and spa water to be missed. Ozone, in fact carries the majority of the sanitation workload (up to 70% in pools and 95% in spas) as it oxidizes organics and ammonia based wastes introduced by bathers/swimmers. Ozone prevents the formation of scum line forming; filter clogging chlorinated organics and eye, skin irritating; hair and swimsuit discoloring chloramines. Upon completion of these significant oxidation tasks, Ozone reverts to Oxygen, leaving no dissolved solids behind and virtually eliminating the need to shock the pool or spa water. Ozone is doing its job, as a continuously applied non-Chlorine shock, when the difference between free and total Chlorine (combined Chlorine) is kept below 0.5 PPM.