

# What Are The Important Factors for Disinfection of Contaminated Water?

## A. MECHANISMS OF BACTERIAL HIDEOUT

Bacteria are known exist in clumps,<sup>1</sup> to be embedded within particulates,<sup>2</sup> to be embedded within biofilm fragments,<sup>3</sup> or reside within oil droplets.<sup>4</sup> Therefore, unless a chemical disinfectant can penetrate bacterial clumps, particulates, biofilm, or hydrocarbon, some bacteria can survive disinfection. In order for a disinfectant to penetrate these things, the disinfectant must be uncharged, relatively non-polar, and an effective bactericide. ClO<sub>2</sub> is the only disinfectant that fits these parameters.

## B. THE IMPORTANCE OF CONTACT TIME

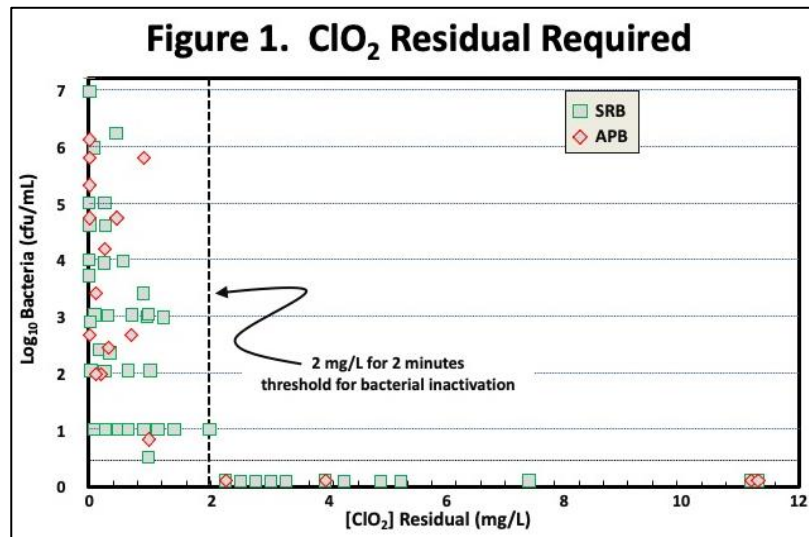
Essentially, unless ClO<sub>2</sub> can penetrate the various places where bacteria are known to "hide," then bacteria cannot be adequately inactivated. This raises the question as to what limits the ability of ClO<sub>2</sub> to penetrate these things? The key parameter is contact time.

So, what concentration would be considered necessary and how much time is required for the ClO<sub>2</sub> to penetrate bacterial clumps, particulates, biofilm fragments, or oil droplets?

## C. WHAT CONCENTRATION IS REQUIRED AND WHAT CONTACT TIME?

Several groups have identified this residual to be around 2 ppm, and the contact time must be 2 - 3 minutes,<sup>5</sup> although only 2 of the reports provided data.<sup>6</sup>

In a fairly large number of field applications, data has been collected to determine this residual and contact time. Figure 1 shows the data collected thus far, showing the impact on bacterial serial dilution bottles for both APB and SRB with 2 ppm ClO<sub>2</sub> and contact time.



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