

ChemScan®

PROCESS ANALYZERS

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ChemScan® Application Summary #164 Water Blending

Statement of the Problem

When a supply of water is obtained from one source and supplemented with additional water from another source prior to distribution, the result is a water blend. Sometimes the source of the water is ground or surface water blended with water from a side stream treatment process. (See ChemScan Application Summary #58, Well Blending, for a discussion of that application.)

Sometimes the **supply** water is treated potable water purchased from a nearby municipality or water utility. If the **supplement** water is untreated ground or surface water, addition of the supplement will alter the characteristics of the supply water, especially the hardness, pH or disinfectant residual within the final **blend**.

One particularly difficult situation is where the supply water has been chloraminated. The relationship between ammonia and chlorine is relatively unstable and can change as a result of disinfectant consumption within the supply pipes. Addition of untreated supplement water by the purchaser can also exert a disinfection demand. Addition of chlorinated supplement water or addition of a chlorine boost to the final blend must be performed with caution and with real time knowledge of the disinfection chemistry prior to addition or boost.

Objectionable taste and/or odor in the blend is frequently the result of chlorine addition at a concentration that degrades monochloramine into dichloramine or trichloramine. Addition of chlorine to the point of creating a free chlorine residual is expensive, unnecessary and sometimes ineffective as some dichloramine and trichloramine will persist in the presence of free chlorine. Dichloramine and trichloramine are the principal cause of objectionable taste and odor in water blending applications.

Process Control Strategy

The disinfection chemistry residuals in the supply water at a point just prior to supplement addition or disinfection boost must be known in order to calculate the effect that the addition or boost will produce in the blend. The chemistry of the supplement water should also be known and under control if it is variable in nature.

For chloraminated water, these measurements include free ammonia, total ammonia, monochloramine and total chlorine. Chlorine is added only to the point of combining with free ammonia to produce monochloramine, but not to the point of degrading the chloramine into dichloramine or trichloramine. If there is not sufficient free ammonia available to produce the desired concentration of monochloramine in the blend, additional free ammonia may be required to produce the desired composition and concentration. (See ChemScan Application Summary #86, Water Chloramination Process Control and #154, Peak Point Chloramination Control.)

ChemScan has multiple parameter and multiple sample line process analyzers capable of providing rapid analysis of all chloramination control parameters in the supply water and in the blend. Some ChemScan analyzers are also capable of providing analysis of the supplement water and/or other water quality parameters that may be of interest including nitrate, nitrite, hardness, iron, manganese and more.