FLORIDA RURAL WATER ASSOCIATION

Chemical Shortages & Possible Alternatives in Exigent Circumstances

Chemicals in Short Supply	Alternatives	Actions for Making the Switch / Retrofit
LOX (Liquid Oxygen) for Generation of Ozone	1. Use Air as feed source (21% oxygen) passing dry air over 2 high voltage electrodes or 2. Install a Liquid Oxygen Generator	1. Expensive retrofit / switch Ozone Generator, electrodes, and higher energy use 2. Costly to Purchase
Ferric Sulfate $Fe_2(SO_4)_3$ (other ferric feed sources)	Alum (aluminum sulfate)	▪ Ph adjustment before Alum required ▪ Additional tankage ▪ High demand for hydroxide & alkalinity
Gas Chlorine (Cl_2 gas)	Liquid Chlorine (NaOCl)	▪ Install separate liquid feed facilities, pumps, tubing, and storage tanks ▪ Higher feed rate ▪ NaOCl is more costly
Ozone (O_3)	Chlorine (Cl_2 gas or NaOCl)	▪ Many who went to Ozone reduced chlorine feed equipment ▪ Systems will likely fail D/DBP MCLs
Chlorine Dioxide (ClO_2) Binary Powder	Onsite ClO_2 Generation	▪ Expensive switch to retrofit to ClO_2 Generation ▪ Higher energy use / expense ▪ ClO_2 Generation is dangerous and creates a vapor that is explosive and is a fire hazard
Hydrogen Peroxide (H_2O_2)	1. Other Oxidants (Chlorine) or 2. Aeration	▪ Many who went to H_2O_2 had D/DBP MCL issues 1. Higher chlorine feed = higher DBPs 2. Aeration requires physical facilities
Sulfur Dioxide (SO_2 gas)	Carbon Adsorption, Sodium Metabisulfite, Hydrogen Peroxide	▪ Used to dechlorinate WWTP Effluent prior to surface discharge ▪ Higher costs to retrofit and different feed equipment
Sodium Bisulfite ($NaHSO_3$)	Sulfur Dioxide (SO_2 gas)	▪ Used to dechlorinate WWTP Effluent prior to surface discharge ▪ Higher costs to retrofit and different feed equipment
Carbon Dioxide (CO_2)	1. Liquid Acids 2. Sodium Bicarbonate ($NaHCO_3$)	▪ Used to increase alkalinity WTP/WWTP 1. Liquid Acids has safety issue - higher costs to retrofit and different feed equipment

		2. $NaHCO_3$ higher costs to retrofit and different feed equipment