

FIELD STUDY • SURFACE-WATER TREATMENT

ROS Improves an Ozone Surface-Water Treatment Plant

At a 10 MGD Northern California plant using ozone ahead of its filters, a 90-day trial of JC 9450 as a pre-oxidant cut TOC, THMs, HAA5s, bromate, and taste/odor complaints.

Jenfitch (Walnut Creek, CA) developed a new oxidant that lowers TOC, reduces THMs and HAA5s, eliminates taste and odor (T&O), controls harmful algal blooms (HABs), improves coagulation and flocculation, eliminates biofilm in distribution systems, and boosts the effectiveness of the primary disinfectant.

JC 9450 uses mineral oxychloride technology ($M_xO_yCl_t$) and is NSF Standard 60 approved up to 84 mg/L. It generates a high initial concentration of hydroxyl radical ions — extremely reactive species that turn any molecule in their path into a free radical, propagating a chain reaction. At low concentration, it disinfects and eliminates organic and inorganic pathogens without creating disinfection by-products.

The advantage over ozone comes down to oxidation potential and by-product control. Hydroxyl radical ions and mineral oxychloride both reach 2.6–2.8 E° — above ozone (2.04–2.07) — while producing no bromate or HAA5 by-products and leaving a measurable ORP residual for control.

In a 90-day study at a 10 MGD facility using ozone ahead of its filters, JC 9450 was dosed at 8–10 mg/L as a pre-oxidant, with the results shown at right and on the following page.

OXIDIZING POTENTIAL (E°)	
REAGENT	E°
Hydroxyl Radical Ion (OH•)	2.6–2.8
Mineral Oxychloride	2.6–2.8
Ozone (O ₃)	2.04–2.07
Permanganate (MnO ₄ ⁻)	1.67
Hypochlorous Acid (HOCl)	1.49
Chlorine Gas (Cl ₂)	1.36
Chlorine Dioxide (ClO ₂)	0.95

— 90-day results — 8–10 mg/L JC 9450 as pre-oxidant

PARAMETER	BEFORE	AFTER JC 9450	IMPROVEMENT
Raw water turbidity (NTU)	2.3	2.1	—
Settled water turbidity (NTU)	0.70	0.21	+70.0%
Raw water NOM	0.158	0.115	—
Filtered water NOM	0.044	0.017	+61.4%
Raw water TOC	4.6	3.7	—
Filtered water TOC	2.2	1.1	+50.0%
Filtered water bromate (µg/L)	8.4	1.7	+79.8%
Filtered water TTHMs (µg/L)	20.0	8.7	+56.5%
Filtered water HAA5s (µg/L)	6.0	0	100%
Taste & odor complaints (Aug)	15+	0	100%

Raw-water bromide held at 300 µg/L across the study. NOM measured as UV-absorbance.

BOTTOM LINE

As an ozone pre-oxidant, JC 9450 halved filtered-water TOC, cut bromate ~80%, eliminated HAA5s and taste-and-odor complaints, and left a measurable ORP residual for control.

NSF Std 60 (to 84 mg/L)

No Disinfection By-products

Measurable ORP Residual

For the full study and more information, contact Jenfitch, Inc. at (925) 289-3559 or www.jenfitch.com.