Walters environmental consulting, inc.

Treatment Reactions Webinar Description

Treatment is fundamentally a series of chemical reactions—but in real-world systems those reactions rarely behave the way they do in textbooks. Competing ions, changing pH, temperature shifts, hydraulic conditions, and complex mixtures of inorganic and organic compounds all influence whether a reaction succeeds, slows down, or fails entirely. Understanding these interactions is essential for consistent compliance and reliable plant performance.

This course takes a practical, operator-focused approach to treatment chemistry by breaking down the key reactions that drive water and wastewater treatment processes. Rather than treating chemistry as abstract theory, the class focuses on how reactions actually behave in operating systems and what can go wrong when conditions are less than ideal.

Participants will explore stoichiometry and reaction rates as they apply directly to treatment performance, including how catalysts, inhibitors, and system conditions influence outcomes. Special attention is given to pH-dependent reactions involving metals, oxyanions, organometallics, and organic compounds, along with how these reactions affect coagulation and flocculation performance.

The course also examines oxidation-reduction chemistry using common treatment oxidants such as oxygen, hypochlorite, permanganate, hydrogen peroxide, and ozone. Participants will learn how these reactions impact metals removal, pathogen control, organics destruction, and overall system stability. Additional topics include precipitation reactions, adsorption processes involving activated carbon, and emerging interactions with nanomaterials.

By the end of the session, participants will be able to better predict how treatment reactions will behave under changing plant conditions, identify common interferences, and select more effective treatment strategies based on actual system chemistry rather than theoretical assumptions.