

Advanced Treatment with UV/Hydrogen Peroxide in Indirect Potable Reuse/Drinking Water Applications

Adam Festger
Trojan Technologies

ABSTRACT

As the world's water supply becomes more uncertain due to drought and over-utilization, there is a growing trend toward reuse of wastewater. In Southern California, Southern Arizona, East Australia, and in other areas where water is especially scarce, a number of projects have been installed or are under way to re-use wastewater (performing indirect potable reuse [IPR]).

The presence of wastewater-derived chemical contaminants in wastewater is being overcome through the use of advanced treatment technologies. These contaminants include N-nitrosodimethylamine (NDMA), 1,4-dioxane, and a variety of pharmaceuticals and personal care products. The post-secondary treatment train that is currently being used to remove chemical contaminants is microfiltration (MF), reverse osmosis (RO), and UV-oxidation (UV in combination with hydrogen peroxide). In fact, the California Department of Health Services has taken the step of requiring the use of RO and UV-oxidation in its draft IPR (groundwater injection) regulations. In this treatment train, the MF/RO combination removes a majority of contaminants, both microbiological and chemical. However, NDMA and some pharmaceuticals pass through RO membranes. UV-oxidation therefore performs two primary functions: treatment of NDMA/other low molecular weight contaminants and microbial disinfection. In this capacity, the UV-oxidation system acts as an additional barrier to currently unmonitored or unregulated contaminants. The Groundwater Replenishment System under construction at the Orange County Water District (CA) is utilizing UV-oxidation for these purposes.

This presentation focuses on how UV works to treat contaminants, the benefits, and the relative costs of treatment. It also discusses the use of UV-oxidation in drinking water applications either in cases where the plant extracts its water effluent-dominated source waters (i.e. it contains a significant fraction of wastewater from upstream sources) or in which difficult-to-treat chemical contaminants are present (e.g. taste and odor-causing compounds such as MIB and geosmin).