TROJAN UV

CASE STUDIES

Environmental Contaminant Treatment

Trojan UV Solutions: Indirect Potable Reuse

UV-Oxidation – Raw Water Production Facility (RWPF) **BIG SPRING,** Texas

PROJECT BACKGROUND

In an effort to reduce reliance on dwindling surface and groundwater supplies in Texas, the Colorado River Municipal Water District (CRMWD) constructed a new Raw Water Production Facility (RWPF) in Big Spring. Big Spring is a 27,000-member community located in West Texas approximately 300 miles west of Dallas. This RWPF treats secondary wastewater to a standard that allows it to be re-introduced directly into the raw water supply for the water treatment plants of Big Spring, Odessa, and other communities in the region.

Treatment at the RWPF utilizes a multiple-barrier approach consisting of microfiltration and reverse osmosis (RO), followed by UV-oxidation for the further removal of organic contaminants and final disinfection. The result is advanced-treated, "synthesized" raw water capable of being combined with the "natural" surface raw water from the E.V. Spence Reservoir or other system supplies. The combined raw water supply from the production facility and reservoirs is then delivered to the drinking water treatment plant of Big Spring as well as those of the neighboring communities of Stanton, Midland and Odessa for further treatment and distribution.

CHOOSING TO REMAKE AND RESUPPLY RAW WATER FOR REUSE AS PURIFIED DRINKING WATER

CRMWD, in a 2004 study, recognized that meeting future water needs and ensuring reliable supply in times of significant water shortage required consideration of additional sources of drinking water. Reusing treated wastewater for potable drinking water was considered to be an important new source because it was a cost-effective and sustainable way to augment and preserve the existing water supply.

However, several alternatives were also considered, including:

Obtaining Additional Drinking Water from Groundwater Wells and Existing Reservoirs

The aquifer has little recharge potential, and therefore does not offer the long-term sustainability that reuse offers. Additional reservoirs are distant, and the water is subject to high purchase costs in addition to the transportation cost. The wide geographic extent of drought conditions has also resulted in other lakes in the region suffering decreasing levels.

CASE STUDIES

Reusing Treated Wastewater for Non-potable uses such as Irrigation and Recreational Use

Previous studies concluded that non-potable water reuse would effectively offset the use of drinking water for these tasks. However, the small size and widely-distributed nature of the non-potable demands located in Big Spring and the surrounding municipalities meant that proceeding with this option would require the creation of extensive distribution networks to deliver treated water. Further, demand for non-potable reuse water for irrigation and recreation fluctuated seasonally and did not provide a dependable "year-round" solution. As a result, this option was not considered to be economically feasible and was also eliminated.

New Raw Water Production Facility

Treatment of secondary-treated wastewater to standards that allow it to be re-introduced into the raw water supply involves three independent treatment technologies: microfiltration, RO and UV-oxidation. The final treatment step, UV-oxidation, provides a highly cost-effective additional barrier to contaminants that, due to low molecular weight, can pass through microfiltration and RO membranes. An example is N-nitrosodimethylamine (NDMA), a probable carcinogen which is effectively destroyed through direct exposure to UV light. The final treatment provided by UV-oxidation enhances the reliability of the potable reuse treatment process.

This three-step treatment train is identical to that used by other successful potable water reuse facilities, including the Orange County Water District (OCWD) in California, to treat wastewater for re-supply into local groundwater aquifers. The success of OCWD has resulted in the replication of this "gold standard" treatment process at numerous other potable reuse projects around the world.

THE TROJANUV SOLUTION

Trojan delivered UV-oxidation equipment for CRMWD's Raw Water Production Facility at Big Spring. Two (2) TrojanUVPhox™ systems, along with hydrogen peroxide (H_2O_2) dosing equipment, treat contaminants such as NDMA, pharmaceuticals and endocrine-disrupting disrupting compounds that are not removed through upstream membrane treatment. At the same time this system provides disinfection of microorganisms including *E.coli*, *Cryptosporidium* and *Giardia*.

FULL SCALE SYSTEM DESIGN PARAMETERS

- DESIGN FLOW CAPACITY: 1.8 MGD
- DESIGN LOG REDUCTION OF NDMA: 1.2 Log
- DESIGN LOG REDUCTION OF 1,4-DIOXANE: 0.5 Log
- OXIDANT: hydrogen peroxide
- DISINFECTION METHOD: UV light

CUSTOMER TESTIMONIAL

"The Trojan system offered a cost-effective additional layer of protection against a number of water quality concerns, with removal/inactivation mechanisms distinct from the membrane separation processes upstream."

David W. Sloan, P.E., BCEE
Associate & Senior Water / Wastewater Engineer

TROJAN UV
WATER CONFIDENCE™

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