

New Facility Pretreatment

Forced Draft Aerators and Solids CONTACT CLARIFIERS™



CASE STUDY

Location: Johnson County, Kansas
Owner: Water District #1 of Johnson County
Engineer: Black & Veatch
Contractor: Grimm Construction

Expanding Service

Water District No. 1 (WaterOne) serves more than 400,000 residents in the growing community of Johnson County, Kansas. Johnson County is one of the nation's fastest growing areas, and in order to meet current and future demands for purified drinking water, WaterOne required expansion.

The existing location of the treatment facility did not have the space to house new equipment. Therefore, to accommodate for new equipment, WaterOne chose a new site at a neighboring location. WaterOne contracted with Black & Veatch to design the new Wolcott Water Treatment Plant.

Equipment Selection

The new Wolcott Plant treats water drawn from the Missouri River, so engineers required equipment which would treat for hardness, turbidity, iron and manganese. Engineers desired equipment that would produce high-quality water with low chemical dosage at a low cost. WesTech was chosen to help meet these objectives by providing two Forced Draft Aerators and two Solids CONTACT CLARIFIERS™.

The first step of treatment at WaterOne's Wolcott Water Treatment Plant is WesTech's Forced Draft Aerators. After chemical dosing, raw water is pumped into the Forced Draft Aerators where iron and manganese are oxidized, creating floc and reducing CO. With few moving parts and minimal maintenance, Forced Draft Aerators efficiently remove iron and manganese at a much lower operating cost than other systems. Following the aerators, water is pumped to the clarifiers for softening and sedimentation.

WesTech Solids CONTACT CLARIFIERS are enhanced flocculation devices with internal solids recirculation, gentle flocculation, and gravity sedimentation in a single unit, making them an ideal choice for softening and clarification.

Compared to the conventional clarifier, the Solids CONTACT CLARIFIER provides high volume recirculation and low floc

shear, while using less horsepower. In the same clarifier basin, softening and clarification occur simultaneously, improving efficiency and reducing overall footprint.

Because alkalinity is maintained in the clarifiers, WaterOne is able to settle a large amount of suspended solids, better preparing water for filtration. Following the clarifiers, membranes using microfiltration technology further treat water before it is sent on for distribution.

WesTech Solids CONTACT CLARIFIERS greatly improve the lifespan and cleaning frequency of membrane filtration. Enhanced clarification also reduces chemicals needed to maintain the membrane filtration system.

Water Quality

Parameters	EPA Standards	Goal	Effluent
Total Alkalinity (as CaCO ₃)	300 ppm	<80 ppm	Avg: 62 ppm Range: 45-77 ppm
pH	8.5 pH	>9.0 pH	Avg: 9.5 pH Range: 9.2-9.8 pH
Total Hardness (as CaCO ₃)	400 ppm	200 ppm	Avg: 123 ppm Range: 73-152 ppm

Solids CONTACT CLARIFIERS™

Quantity	2
Sizes	167 ft dia 130 ft dia
Design Flow Rate	30 MGD each
Total Detention Time	283 min 172 min
Motor HP	40 HP each

Forced Draft Aerators

Quantity	2
Footprint	144 ft ²
Design Flow	5250 gpm
Loading Rate	24.11 gpm/ft ²
Media	6" PVC slats
Blower Rate	20,900 cfm
Air/Water Ratio	4.0 cfm/gpm



With the help of WesTech Solids CONTACT CLARIFIERS™, operators at WaterOne consistently achieve set goals for total water hardness, pH and alkalinity.

Exceeding Expectations

Operators are very pleased with the performance of WesTech's Forced Draft Aerators and Solids CONTACT CLARIFIERS. They acknowledge that, with the help of

WesTech's equipment, they consistently achieve set goals for total water hardness, pH and alkalinity.

Because of the environmentally friendly and technologically advanced equipment at

the Wolcott Plant, WaterOne received the 2011 Engineering Excellence Award, in the water resources category, from the American Council of Engineering Companies (ACEC) of Kansas.

