



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

APPLICATION PROFILE

APPLICATION
SURFACE WATER CLARIFICATION

INDUSTRY
POWER & ENERGY, OIL & GAS, MINING, PULP & PAPER, FOOD & BEVERAGE

AQUA-AEROBIC SOLUTION
Aqua-Aerobic® PILE CLOTH MEDIA FILTRATION

PILE CLOTH MEDIA FILTRATION FOR CLEAN UTILITIES

The Challenge

Cooling towers and boilers consume the most fresh water in the industry, with industrial process waters carrying the balance. Power plants and refineries use more water volume for the cooling process than any other area of the facility. Mining and food and beverage industries consume higher volumes for their processes. Clean water may come from a range of sources, including clarified surface waters, groundwater or properly treated wastewater (reuse) sources.

Of the total water volume withdrawn in the United States in 2015, 322 billion gallons per day (Bgal/d), the U.S. Geological Survey estimates 41.3% or 133 Bgal/d total were supplied for thermoelectric power generation. Agricultural irrigation and livestock use accounts for 37.2% or 120 billion gallons per day of water consumption. Of the remainder, excluding aqua culture (7.6 Bgal/d), 18.8 billion gallons per day were withdrawn for general industrial use, including 4 Bgal/d for mining.

Facing regional water scarcity, government entities and their industrial consumers are challenged to reduce impact on surface and groundwater supply. This can conflict with industrial growth and corresponding power demand, creating a clear need for more efficient, compact and low-maintenance surface water, filtration systems.



A riverfront petrochemical processing facility - Louisiana

The Solution

Industrial consumers can rely on Aqua-Aerobic Systems' pile cloth media filtration to increase water supply when an increase in fresh water volume is required and to meet the growing demand of clarified (typically non-potable) waters. Cloth media filters are a simple and economical choice to aging infrastructure consisting of traditional, large volume clarification and sand or multi-media filtration of surface waters. OptiFiber® pile cloth media produces consistent effluent water quality, for a wide range of supply water characteristics and precipitation chemistries.

The Proven Result

A public utility in Mississippi supplies non-potable water to several industrial facilities. Water from the Pascagoula River is pumped and treated using primary clarifiers with chemical addition. Their traditional sand filters were failing and needed to be either rebuilt or replaced. Aqua-Aerobic Systems conducted a pilot test using its pile cloth media filtration producing average effluent turbidity from 0.8 - 1.4 NTU (Nephelometric Turbidity Units), with clear wells turbidities from 0.2 - 1.1 NTU.

The first, Aqua MegaDisk® cloth media filter was commissioned at this site in early 2016, with only one-half of the cloth media installed, treating up to 6,500 gpm. In mid-2017, the additional cloth media was added, increasing filter capacity to 12,000 gpm. A second, equivalent unit is being commissioned, and will eliminate the need for sand filters, achieving a combined, maximum flow rate of 26,000 gpm, or 37 MGD.

A petrochemical expansion demanded an increase in the daily flow of clarified surface water up to 3,500 gpm, at an effluent turbidity below 1 NTU. Typical treated water received from the regional water authority contains 6 mg/L TSS. The project constraints were aging sand filters and time. Rehabilitation of the old filters did not assure the long-term reliability needed to meet 24-7 production demand of this facility. The final AquaDisk® cloth media filter design filters 4.3 MGD average and 7.2 MGD peak flow, and was delivered on schedule. While the project specified post-clarification filters, the solids removal capability of the AquaDisk system could have been used to replace the primary clarifiers, in a reduced footprint with less polymer usage.

A pulp and paper facility needed to recycle 3 million gallons per day (MGD) of cooling water. The current system uses traditional sand filters to clarify cooling tower, river water from a maximum turbidity of 10 NTU below 2 NTU, and average Total Suspended Solids (TSS) from 10 mg/L to below 3 mg/L. The dual, AquaDisk system will double treatment capacity, operating in parallel to existing sand filters, with a smaller footprint and lower backwash volume. The design has redundancy to treat up to 75% peak flow in one of the two filters.



Internal view of a 6-disk AquaDisk® Cloth Media Filter

Aqua-Aerobic pile cloth media filters are available in a number of configurations for concrete basins or steel package units, to treat flow rates from 20 gpm to 24 MGD. These filters are equipped with OptiFiber® cloth filtration media in nominal particle size ratings of ten, five or two microns. The appropriate cloth is selected based on the water quality, treatment objectives [TSS, turbidity and Silt Density Index (SDI)], and polymer chemistry, when required to enhance solids removal.

In contrast to traditional sand and multimedia filters, Aqua-Aerobic pile cloth media filters offer a compact footprint and 1– 3% backwash rates, typically. These systems provide a low cost of ownership due to minimal maintenance and few moving parts. OptiFiber cloth media is durable, and will last seven to ten years in typical applications.

The recommended design will meet the hydraulic conditions, loadings, and available footprint. Retrofit options can be evaluated utilizing existing basins and tanks. The most suitable configuration and pile cloth media will be optimized for the process characteristics and the application, with final designs that integrate preferred components, controls and materials of construction.