



AQUA-AEROBIC SYSTEMS, INC.  
A Metawater Company

# APPLICATION PROFILE

APPLICATION  
INDUSTRIAL WASTEWATER EFFLUENT

INDUSTRY  
OIL & GAS

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

## PILE CLOTH MEDIA FILTRATION EFFECTIVELY REMOVES COD AND TSS FROM OIL REFINERY WASTEWATER

### The Challenge

Petrochemical refineries convert crude oil into petroleum products. The crude oil is distilled and separated into different streams, producing end products like gasoline, chemicals, waxes and oils. While each refinery is unique, they all incorporate a variety of separation and purification processes to produce their products.

Because refinery production processes are so diverse, the water utilities that support these processes result in a wide variety of wastewater streams, both from processing streams and non-processing streams like sanitary sewage and storm water. Refinery wastewaters require creative, thoughtful and effective treatment strategies.



Petrochemical Processing Plant

This application profile focuses on two test sites with different treatment requirements and describes how Aqua-Aerobic Systems' OptiFiber® pile cloth media filtration was used at both sites to address the removal of harmful constituents from refinery wastewater.

### Site 1

This site targets the removal of both total suspended solids (TSS) and chemical oxygen demand (COD) in their discharge water. The site has a daily average and maximum daily load limits (TMDL) in pounds for both of these constituents. Process upsets could result in violating these limits if the upsets were not properly addressed.

### Site 2

This site was sending their wastewater to a lagoon and wanted to minimize the TSS being sent to the lagoon. Under normal operation, the wastewater stream has a TSS of approximately 10 mg/L; however, a large process upset might create a wastewater stream with up to 500 mg/L TSS. The proper functioning of the lagoon depended on treatment of these upsets.

## The Solution

Each site elected to undergo a pilot study to evaluate how Aqua-Aerobic® pile cloth media filters could improve the treatment of their wastewater. Pilot studies can help predict the level of treatment that is possible with pile cloth media filtration and also help determine proper sizing of the equipment by capturing and evaluating peak flow and load events.

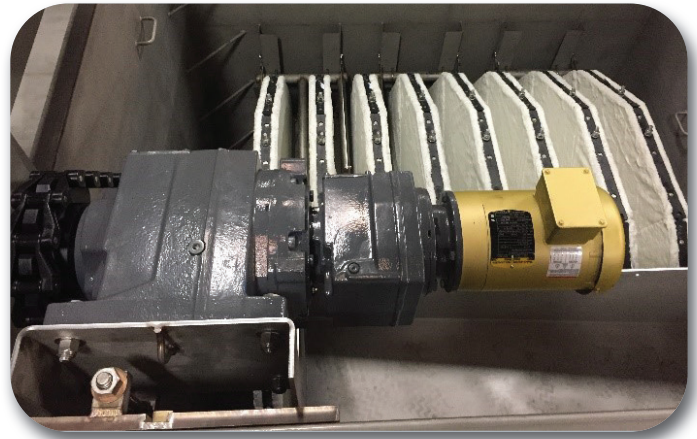
During the study at **Site 1**, the wastewater treated with the OptiFiber® pile cloth media filter from Aqua-Aerobic Systems had an average TSS of 43 mg/L and a maximum TSS of 139 mg/L. The pile cloth media filter reduced the TSS to an average of 6 mg/L, for an average removal of 74.5%. It is notable that the removal rate was over 94% when the influent TSS exceeded 100 mg/L.

The study at Site 1 found that the influent COD to the filter never exceeded the target of 212 mg/L. COD removal averaged just under 23% but when COD exceeded 100 mg/L, the removal was far better at more than 50%.

	Target average (mg/L)	Influent (mg/L)	Effluent (mg/L)	Average Removal %
TSS (average)	28	43	6	74.5%
TSS (upset conditions)		133	8	94.3%
COD (average)	212	86	62	22.8%
COD (upset conditions)		151	73	50.5%

Site 1: TSS and COD Removal Performance of OptiFiber® Pile Cloth Filtration Media Pilot Test

Following a successful pilot study, Site 1 installed three 8-Disk AquaDisk® pile cloth media filters in stainless steel tanks. This configuration allows the refinery to treat 3,000 GPM (avg.) of wastewater flow with one unit out of service and available as back-up.



Internal view of an 8-disk AquaDisk® Cloth Media Filter at Site 1

The study at **Site 2** was able to simulate clarifier upset conditions and found that the pile cloth media filter removed an average of 79% of the TSS from its clarifier effluent. Based on data generated during the study, the plant purchased and installed two 24-Disk Aqua MegaDisk® cloth media filters in stainless steel tanks. These filters have the capacity to treat 4,500 GPM (avg.) of the refinery's wastewater.

## The Proven Result

Aqua-Aerobic has pile cloth media filters operating at several petrochemical plants. Our decades of experience in cloth media filtration, combined with the ability to demonstrate the technology onsite, can help petrochemical processing plants find proven solutions to their specific wastewater treatment needs.

### OptiFiber® Pile Cloth Media Advantages:

- Small footprint with vertically oriented disks
- Low maintenance with few moving parts
- Effective backwash system fluidizes cloth media filters for cleaning without chemicals
- Configurable for small or large flows
- Long media life
- Automated PLC for backwashing
- Option for automatic startup and shutdown