

## Effective aeration and mixing of refinery wastewater

### FUCHS OxyStar Aerators

A UK-based refinery has a series of three lagoons making up the final stage of the refinery effluent and wastewater treatment process.

The three lagoons were originally designed and built in order to operate as a biological treatment facility, the first lagoon in sedimentation service, the second aerated with activated sludge and the third lagoon providing clarification/polishing of the final effluent before discharge. Aeration of the second lagoon ceased after some years with cumulative odor nuisance. Furthermore, the effluent requirements spiraled downward.



**FUCHS OxyStar Aerators in a large lagoon system**

The client concluded returning the second lagoon into an aerated lagoon with the objective of removing the organic and dissolved components from the effluent and therefore to eliminate the source of odor.

In 2003 a study carried out that about 2 tons of oxygen per day are needed for effective aeration.

In December 2005 FUCHS received an inquiry with the following data:

**Dimensions of the lagoons**

First lagoon: 12,000 m<sup>2</sup>, ~ 2.0 m (depth)  
Second lagoon: 20,000 m<sup>2</sup>, ~ 1.8 m (depth)  
Third lagoon: 8,000 m<sup>2</sup>, ~ 2.2 m (depth)

**Wastewater flows**

Average daily flow: 300 m<sup>3</sup>/hr  
Wet weather flow: 500 m<sup>3</sup>/hr (approx.)  
Design flow: 1,000 m<sup>3</sup>/hr

**Average load (measured over a five days period)**

BOD: 110 mg/l  
COD: 300 mg/l  
Total oil: 35 mg/l

Important requirements set by the client were:

- efficient aeration without spray water in order to avoid additional odor nuisance
- continuous circulation of the full water body with gradually suspending the piled up bottom sediments
- aerators suitable for installation in a corrosive salt laden coastal environment
- low service demand

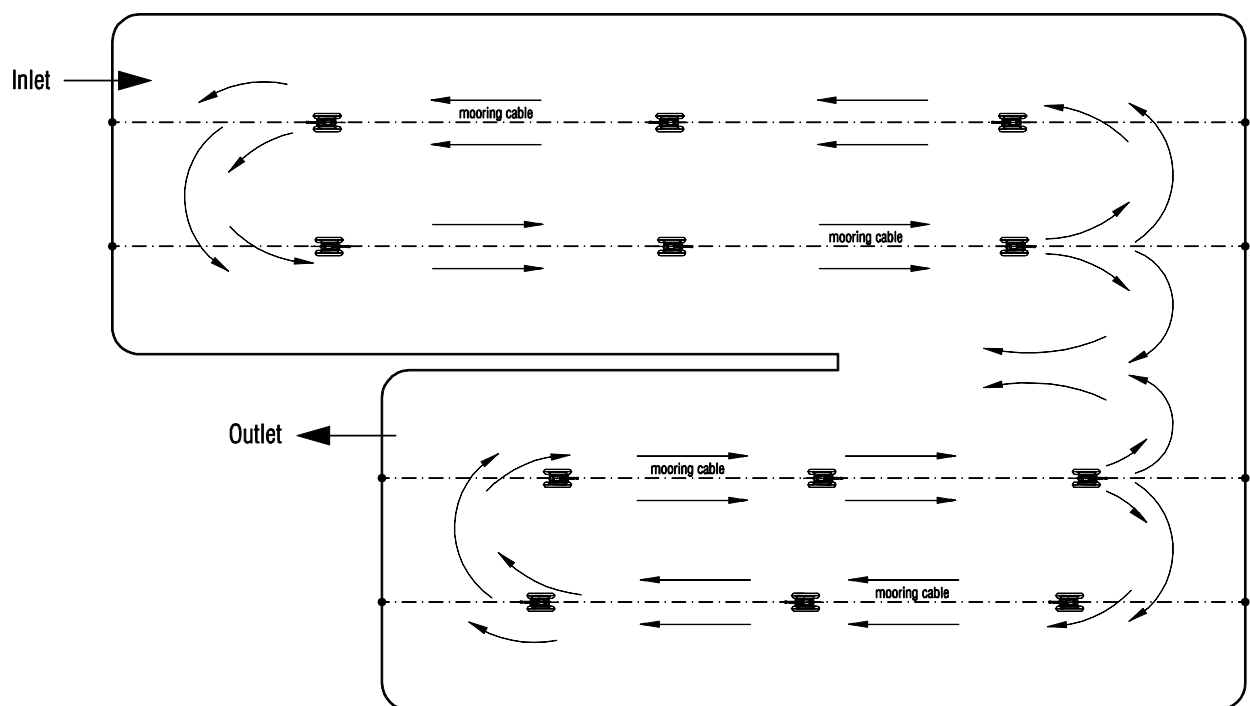


**FUCHS OxyStar Aerators on floats**

In close cooperation, the client and FUCHS met the challenge to step by step suspend the compact deposits constantly accumulated over the years.

FUCHS equipped the second lagoon of the refinery lagoon system with twelve OxyStar Aerators on floats (nominal power 11.0 kW each). Due to the shape given the aerators were installed with mooring cables in lanes.

The realized arrangement can be found in the following sketch:



2 nd. lagoon (volume ~ 36,000 m<sup>3</sup>) with 12 FUCHS OxyStar Aerators

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