**FUCHS OXYSTAR Aerator**

**Effective aeration and mixing of refinery wastewater**

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.

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 m², ~ 2.0 m (depth)
- Second lagoon 20,000 m², ~ 1.8 m (d)
- Third lagoon 8,000 m², ~ 2.2 m (d)

**Wastewater flows:**
- Average daily flow 300 m³/hr
- Wet weather flow 500 m³/hr (approx.)
- Design flow 1,000 m³/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. Furthermore, the client asked for low service demand.

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 12 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 m³) with 12 FUCHS OXYSTAR Aerators