Cost-efficient power generation operations through algae control

LG Sonic technology is in operation at the Termosol 1 and Termosol 2, a Saeta Yield power generation facility in western Spain, to control algae levels in a raw water pond. The water in this pond is essential to ensure the continued generation of electricity.

- **90% Blue-green algae reduction**
- **Reduced turbidity levels**
- **Decreased maintenance activities**

Preventing risk of power generation failures

The project began in 2014 with the previous owner of the power generation facilities. Due to satisfying results of the MPC-Buoy on the water quality of the raw water pond, new operator Saeta Yield incorporated MPC-Buoy in their own water treatment processes.

In the power facility, the raw water flows from a pond to the pumps that pushes the water through filters in order to reduce total suspended solids. The water had high nutrient contents and high concentrations of Cyclotella ocellata (diatoms).

This type of filamentous algae is responsible for the generation of biofilms that cause the blockage of the pipes, filters and pump. Such blockages reduced the flow of raw water from 160 m3/h to almost 0 m3/h, putting the generation of electricity at severe risks of having to shut down operations until the pumps and filters had been manually cleaned. In economic terms, this issue involves around 4,000 €/h.

An ecological solution in a eutrophic environment

In order to find a solution to their algae problem, Termosol 1 and Termosol 2 conducted a study in which multiple treatment options were evaluated.

Given that the pond is located in a protected area called ZEPA (Special Protection Zone for Birds), chemical treatment was immediately rejected.

Image 1: Water sample after initiation of LG Sonic algae treatment

LG Sonic MPC-Buoy

LG Sonic MPC-Buoy out-qualified other technologies based on three selections criteria:

1. A remotely operated technology that is effective in controlling various algal groups
2. Safe for aquatic life such as fish and Zooplankton
3. Continuous water quality monitoring with integrated software

The technology was rapidly approved by the local authorities in charge of environmental conservation. LG Sonic ultrasound technology targets the buoyancy of algae.

This ecological approach prevents the algae from absorbing sunlight for photosynthesis and allows them to be degraded by bacteria while the cell wall remains intact. Preventing the release of toxins into the water. Unlike conventional ultrasound systems that use a wide-range frequency, MPC-Buoy adjusts the frequency based on specific algal groups.

This avoids resistance to ultrasound and increases efficiency. Making it the only smart ultrasound solution for the control of algae.

Reduced algae levels and improved water quality

With the implementation of the MPC-Buoy systems, Blue-green algae values were reduced by over 90%, keeping these improved levels stable throughout the year.

The turbidity values also reflected a clear difference with a reduction of more than 95%. In addition, the color of the water changed from green to a clear blue and biofilm growth in the self-cleaning filters was prevented.

This reduced operating costs since the manual cleaning was no longer necessary every day, but rather once a month.

"The advantages that we found were that, since the technique is free of chemicals, it was very welcomed by authorities. Also, this technique allows to cover wide surfaces without an annual cost of consumables. As a conclusion, it can be said that the implemented technique was effective resulting in a correct control of the algae blooms in the pond."

Elena Hernández, Environmental & Reliability Leader at Saeta Yield

Image 2: The raw water pond free of algal blooms.