HACH®
Be Right™

H_2S Challenges at Treatment Plants

Liquid-phase H_2S sensor provides new insights at treatment plants

Problem

Despite causing severe odour, corrosion, and worker safety issues, H_2S is still a neglected process parameter at wastewater treatment plants (WWTPs). This case study examines how two of Veolia's French subsidiaries; Klearios and Société des Eaux de Marseille (SEM), gained new insights into the H_2S challenges at two WWTPs.

Solution

Liquid-phase H_2S sensors were installed at the inlet(s) of two WWTPs in France, to permanently monitor dissolved H_2S in the raw sewage. This gave operators a real-time overview of their H_2S challenge and locate the sources thereof.

Benefits

- Full, dynamic overview of H_2S concentrations in sewage from the collection system.
- Profile of separate H_2S impacts from multiple inlet sources.
- Proactive and data-driven approach to H_2S management.
- Improved worker safety.



Background

H_2S is a major challenge in wastewater collection systems where it causes odour and corrosion issues. If the H_2S challenge isn't mitigated, all of these problems are transported to the wastewater treatment plant (WWTP), where H_2S also poses a significant worker-safety concern. Finally, studies have found that H_2S inhibits biological wastewater treatment processes. Yet despite the severity of the issues caused by H_2S, it is still largely a neglected process parameter. Existing measurement solutions are unable to provide a dynamic overview of the true H_2S challenge. This lack of information limits the plant operators' capabilities to fully optimise the H_2S management at the WWTP.

Challenge

Two Veolia subsidiaries in France wanted to achieve a better understanding of their H_2S challenges. At Saint-Nazaire in Western France, Klearios wanted a better overview of H_2S in the plant's combined inlet to see how the existing H_2S treatment could be optimised using sensor data. And at Cassis in Southern France, SEM wanted to map H_2S from two separate inlet sources – a pressurised line and a gravitational line.

Setup

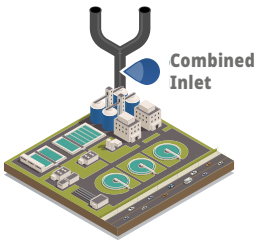
Three Hach® H_2S sensors were installed directly in the raw wastewater at the inlets of the two plants in a 'gatekeeper'-like setup. A single sensor was installed at the combined inlet at the WWTP in Saint-Nazaire, while two sensors were installed at the two influent sources at the WWTP in Cassis.

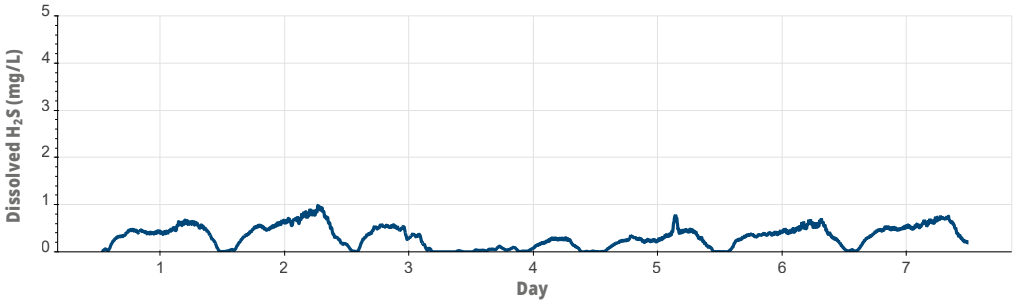
All sensors were connected to Hach's cloud-based IoT solution, which provided detailed graphs of the H_2S development over time.



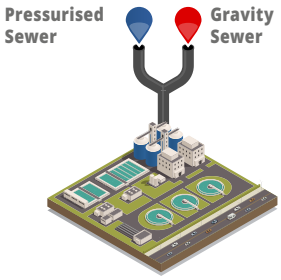
Two Hach H_2S sensors were permanently monitoring dissolved H_2S in the raw sewage at two influents at the wastewater treatment plant in Cassis.

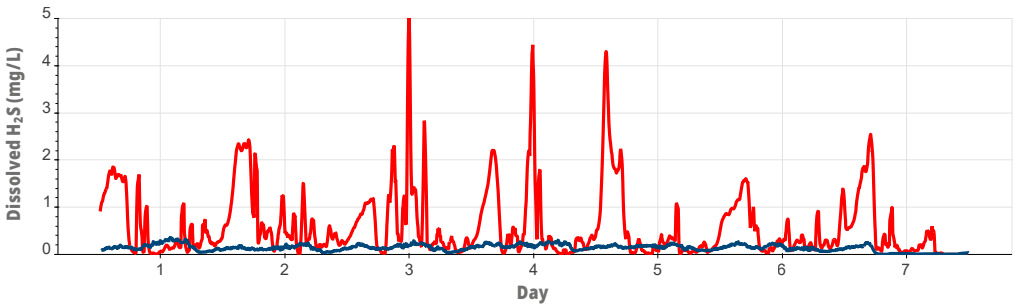
Saint-Nazaire WWTP





Cassis WWTP





Results

In both cases, it was possible to achieve a full, dynamic overview of how H_2S impacted the plants. These insights enable future H_2S mitigation activities to be started on a fully informed basis. To track the root cause of the issues, the operators could also initiate further measurement campaigns upstream in the collection system. At the Saint-Nazaire plant, Klearios gained insights into the plant's combined inlet (blue), which showed regular patterns with varying daily peaks between 0.2 and 1.0 mg/L H_2S.

At the Cassis plant, two different H_2S profiles were observed from two influent sources. The H_2S profile from the pressurised system (blue) followed a predictable pattern with consistently low H_2S levels below 0.4 mg/L, while a different profile was observed at the gravitational line (red), where frequent and irregular spikes above 5 mg/L were observed. The flow rate was significantly lower than in the pressurised line, indicating that the effect of the spikes would be less visible on the plant's combined inlet.

Perspectives

H_2S remains a neglected, dangerous, and expensive parameter at the WWTP. Although WWTP operators possess all the tools and techniques needed to mitigate the unwanted gas, readily available data is needed to optimise the effectiveness of the chosen H_2S mitigation activities. The Hach H_2S sensor delivers this knowledge by providing a true, reliable and dynamic overview of how H_2S impacts the WWTP.



Why is H_2S a problem at treatment plants?

- H_2S causes rotten-egg odours affecting quality-of-life for nearby residents and staff.
- H_2S induced corrosion significantly reduces the lifespan of valuable plant assets.
- H_2S inhibits treatment processes and is a problem in biogas production.
- H_2S is a worker safety concern causing several undesirable health effects. The gas is potentially lethal at concentrations above 500ppm.