WWTP maintains phosphate discharge compliance using Hach BioTectors

Problem

The municipal wastewater treatment plant in Oijen had no nutrient analyzers to monitor their influent or effluent. Instead, the plant relied on periodic third-party lab testing. which was insufficient to monitor and react to sudden C:N:P load changes due to unpredictable influent from industrial sources. This led to exceedance of phosphate discharge limits and required costly remediation after parameter spikes.

Solution

After considering installation of an effluent control loop using a Phosphax sc and Amtax sc, a Hach® BioTector B7000 TOC/TN/TP analyzer was installed to monitor effluent. On the strength of initial results, a second BioTector was installed to monitor influent, to better understand the mix of industrial and municipal wastewater influent, and to identify the frequent spikes from industrial sources.

Benefits

The BioTector TOC/TN/TP analyzer units alert plant managers to changes in water composition, and speed up the search and tracking of industrial pollutants. The system eliminates the high costs associated with restoring the process after a disturbance, as the dosing regime of iron salts for the removal of phosphate is automated and immediate. The plant has been in compliance ever since the BioTector units were installed.

Background

WWTP Oijen is located in the province Noord-Brabant in the Netherlands, and is responsible for the wastewater treatment of four municipal authorities (Oss, Landerd, Grave, and Rosmalen). These municipal authorities are home to approximately 350,000 people, as well as several regionally important industrial and pharmaceutical companies. The plant has a capacity of 12,250 m^3/h.

A mix of technology

The plant is well equipped with an online portfolio from Hach, relying on our SC-platform, with an installed base of several SC1000 controllers, Amtax sc, Phosphax sc, Nitratax sc, LDOs, Filtrax, A-ISE, Solitax sc, and two RTC-Phosphorus control loops (one single channel for the sludge return water from the sludge thickening process and one dual channel for phosphate removal for both aeration tanks), as well as a DR3900 spectrophotometer in the lab.

Discharge violations

Since Oijen did not have any nutrient analyzers installed on their effluent, the plant had little to no insights about the real composition of their water. Periodic, mandated third-party lab tests provided only a glimpse into nutrient levels. Moreover, spikes in discharges from the local industrial plants could not be tracked. So, WWTP Oijen struggled with phosphate releases that could not be reliably monitored or clarified, resulting in exceedance of their phosphate discharge consent.

The Oijen WWTP serves a population of approximately. 350,000

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Effluent monitoring

For the outlet application at WWTP Oijen, a measurement control loop using a phosphate (Phosphax sc) and an ammonium (Amtax sc) analyzer was first thought of. But in order to optimize the water treatment process - knowing what comes in and goes out of the plant - insights of the WWTP's C/N/P-ratio are crucial. The BioTector B7000 TOC/TN/TP analyzer delivers highly accurate and reliable results with its proven and patented online TOC/TN/TP technology. The installation and commissioning of the analyzer went according to plan and the analyzer was fully adopted by the WWTP operators. A few times a year, results from the Biotector analysis are compared to the results from the external laboratory analysis. This comparison confirms that the measurements done by the BioTector are accurate and helpful in improving the wastewater treatment process.

Influent spikes

Plant liaison Rita van de Craats reports that the composition of the WWTP inlet water has changed over time, often due to these industrial discharges. "The severe costs of restoring the process after a disturbance, along with the lack of information about what comes with it, made us decide that insights into the C/N/P-ratio of the WWTP's inlet are very important too. If effluent limits are not met we would like to know the root cause - is it a problem in our process, or are we receiving external discharges?"

Ultimately, a second BioTector (TOC/TN/TP) analyzer was purchased to gain insights on C/N/P fluctuations effecting their influent and to speed up the search and tracking process of the pollutant by the controlling authority, and the additional influent TOC/TN/TP measurements allowed them to automate and control the dosing regime of iron salts for the phosphate removal.

Technicians making the rounds

Conclusion:

The customer needed to know more about the composition of their influent and effluent wastewater. This resulted into the installation of a BioTector B7000 for reliable monitoring of their effluent streams for C, N, and P discharge.

The second phase involved gaining insight on C/N/P ratios hitting their wastewater influent, so a second BioTector B7000 (TOC/TN/TP) analyzer was purchased. This unit reliably monitors the influent in real-time, and allows a rapid response to sudden composition changes, eliminating the significant costs of restoring the process after such a disturbance. Real-time data drives insights into whether there are problems with the process, or problems caused by external discharges.

Additionally, The additional influent TOC/TN/TP measurements allow plant operators to automate and control the dosing regime of iron salts for the phosphate removal.

Rita van de Craats concludes, "With the B7000 BioTectors from Hach on inlet and outlet monitoring, we have managed to keep our process on track, and haven't exceeded our phosphate limits ever since."

Biotector unit at the Oijen WWTP

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