

UK chemical company selects Sievers* InnovOx TOC Analyzer to ensure regulatory compliance and wastewater treatment plant performance

challenge

A large caprolactones manufacturer, located in the United Kingdom, needed to improve monitoring and controls to meet the site's discharge permit levels for water effluent and to avoid exceeding required limits for the operation of a downstream wastewater treatment plant.

Caprolactones are used in different manufacturing sectors including adhesives, automotive, resins, paints, and footwear, as well as a key material for polyurethane and thermoplastic polyurethane based products. Millions of tons are produced annually as a precursor for specialized polymers.

The chemical company discharges wastewater to the regional effluent treatment plant. Due to the capacity of the wastewater treatment plant and the factory's high overall organic wastewater load, the production effluents need to be monitored closely. Exceeding discharge limits and further increasing the organic load to the treatment plant would result in toxic or unstable conditions in the biological treatment process (activated sludge process). As a result, the wastewater treatment plant performance would be heavily impacted by potential complete loss of biological purification capacity. This could allow contaminated water being discharged to the environment.

Furthermore, higher organic loads would result in higher wastewater treatment costs including waste sludge disposal and aeration energy. These higher costs would be charged back to the chemical company.

Damages for exceeding discharge limits due to a wastewater treatment upset are significant:

1. Untreated wastewater could be discharged to the environment.
2. Replacing the activated sludge (disposal of damaged sludge and reseeded sludge) and related costs.
3. Ramping up the capacity of the wastewater treatment plant usually takes several weeks. During the ramp-up time only a fraction of the typically treated influents can be purified.

The municipality in charge of the wastewater treatment plant is entitled to assess fines when the chemical plant exceeds discharge limits. While ensuring proper treatment in the downstream wastewater treatment plant and ensuring environmentally safe treatment of its effluents are the primary goals of the chemical manufacturer, the plant also wants to manage its discharge surcharges. Thus, the plant decided to upgrade its organic control measures resulting in an environmentally and economically sound wastewater management guaranteeing discharge concentration and loads stay within proper limits.

solution

After extensive testing on-site, the chemical plant decided to introduce an organics' monitoring system utilizing the Sievers InnovOx Total Organic Carbon (TOC) technology. Currently four Sievers InnovOx On-Line TOC Analyzers are employed to monitor various process streams. The analyzers recently detected two major process upset. This allowed operators to buffer the increased organic discharge load and balance it with regular effluent to avoid exceeding discharge limits. As such, the system ensured reliable operation of the wastewater treatment plant during that period and helped the company avoid excess surcharges and fines as well as consequential

damages due to negative publicity. With just these two events, the investment of the monitoring system was financially and operationally justified.

conclusion

The online monitoring solution enabled the plant to manage its effluent regime in such a way that the discharge limits were not exceeded. The instruments also showed rapid recovery after the massive effluent spikes were detected. The customer is very satisfied with the Sievers InnovOx On-Line TOC monitoring solution:

“These Sievers InnovOx TOC Analyzers are working so well on this application and with the high instrument uptime we decided to use the readings to make immediate decisions on the effluent water quality. Today we have much better control over the wastewater process and have better visibility and understanding about root causes in the manufacturing process that lead to higher organic process effluents. This allows us to react immediately to irregular effluent conditions so that we can avoid treatment disruptions in the waste water treatment plant.”