



WWTP

Comprehensive profiling of influent wastewater biological shocks

Problem Statement

The plant experiences acute shocks due to Inflow & Infiltration and Industrial discharges.

Deployment:

The WWTP operator installed 2 SENTRY probes to monitor toxic shocks and their effect on the system. There have been 3 previous reports on the subject and the sensors continue to perform.

Value Proposition:

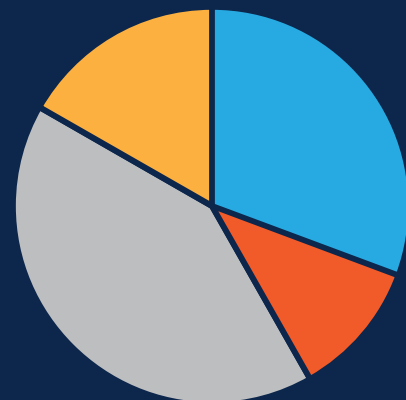
- SENTRY is the only real-time biological monitor for monitoring toxic shocks. It provides data every minute and requires minimal maintenance vs light based monitors and manual samples.
- SENTRY can provide information to adjust aeration, based on influent conditions.

The Experience:

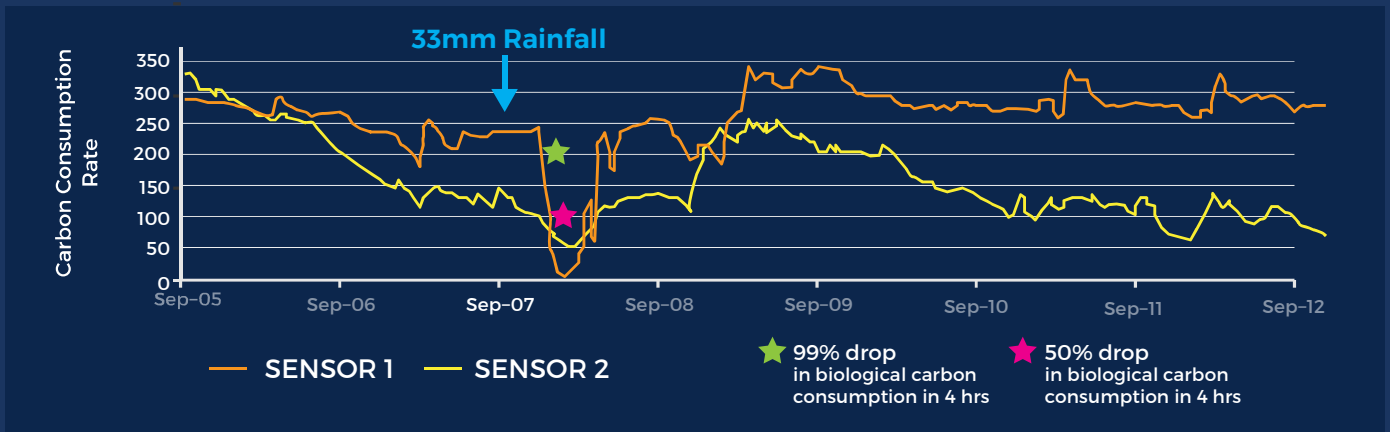
The SENTRY sensors identified 21 unknown / industrial and 15 precipitation events. This results in roughly 5 imbalance events per month, which is higher than other facilities profiled across North America.

- All precipitation events resulted in decreased biological activity due to high flow and dilution. 26% of precipitation events triggered a significant negative impact on both sensors (influent and effluent of Primary Clarifier - these key events would be detrimental to biological wastewater treatment.
- Comparing biological activity in 2020 to the same period in 2019, it shows the current year has been more variable than the last year which could be due to increased industrial discharge.

Biological Imbalance Events -2020



- Rainfall (Low impact)
- Rainfall (High impact)
- Toxicity
- Increased Organic Loading



What was solved:

- Rain events OVER 18mm typically trigger reduced biological activity through both sensors of the Primary Clarifier and will impact downstream biological treatment.
- Operation of equalization tanks should consider how fast storm water is discharged back into the facility. We have identified significant negative impacts on biological activity that could be linked to rapid discharge from equalization tanks. Further correlation to timing of these discharge events would confirm.
- Confirmation of successful operations by operator based on influent shocks.

What does this mean for the future?

- Real-time alarms support understanding of toxic shocks and allow operators insight while they still have the ability to act on them.
- Understanding conditions in the clarifier can lead to optimized aeration through developing a feed forward control strategy with either threshold based PLC control or through and Artificial Intelligence integration.
- Consultants can leverage this information to better advise operator on process improvements



Recommendations:

- Expand with the same problem statement at other wastewater treatment plants to replicate successful results.
- Ensure peace of mind through remote monitoring capabilities to minimize the need for onsite staff.
- Deploy sensors into the collection system in order to identify shocks further upstream and potentially pinpoint industrial dischargers.
- Develop a case study and article for the operator to publish and present.