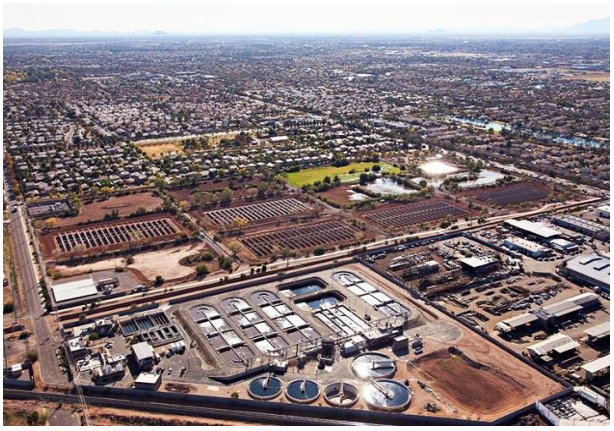
PeCOD® Case Study #15

Sewer Use By-Law Monitoring: Batch Release Tracing
City of Austin, Texas

Municipal wastewater treatment plants are designed to process a calculated range of organic loading in the raw influent. The calculation of this loading is based on characteristics of the plant's region, such as population and industry type. Organic loading is most often quantified by the concentration of parameters such as Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Total Organic Carbon (TOC), and Chemical Oxygen Demand (COD). These parameters all sum a specific aspect of the organic concentration and provide different insight. Looking at one specific parameter can sometimes help determine incoming organic load to the treatment plant, for example COD. COD is a quick test that can measure the reactivity of the influent organic load to better optimize plant operation.



When the influent wastewater experiences a spike in COD concentration, the plant is forced to take on excess costs of treating the above average organic load. Consistent spikes in COD over a long period may force a plant to upgrade their system to accommodate the increasing load. To recover some of these excess costs, municipal authorities will often monitor industrial sites connected to the system and administer a monthly sewer-use surcharge to companies that consistently discharge high organic loads. This typically involves an initial assessment of the daily organic load from a specific industry, which is used to establish a surcharge fee, followed by monthly sampling from these industries to ensure their loading does not increase. If monthly sampling shows a spike above the average loading, then the industry is charged an additional fee to account for increased costs at the treatment plant.

The greatest challenge of monitoring industry discharge to a municipal wastewater treatment plant is obtaining samples that are representative of a 'normal' and 'high' organic load. Many facilities collect their high-level organics in a holding tank, which is periodically released to the sewer system in what is called a 'batch release'. These batch releases greatly contribute to costs at the treatment plant as they can quickly bring the overall organic load well above the average threshold. This forces plant operators to react quickly and efficiently to maintain proper treatment, which can lead to over-dosing of treatment reagents, poor effluent quality and increased operating costs. Recovering these costs relies on industrial monitoring activities to catch batch releases. However, this is relatively unlikely due to low sampling frequency and tendency of these releases to occur over a short time frame making it difficult to detect.

The City of Austin, Texas recently purchased a PeCOD® Analyzer to integrate into their monitoring program. They recognized an opportunity to use the peCOD (photoelectric Chemical Oxygen Demand) method to provide a new aspect of monitoring with the goal of finding the source of these batch releases. The treatment plant, which is constantly monitoring influent wastewater for abnormalities, will alert the wastewater enforcement authorities of a spike in influent quality indicating the occurrence of a batch release. The enforcement team will then go out to key manhole locations where multiple sewer lines converge, collect samples from the various converging lines, and run COD analysis on the peCOD. They would be searching for the samples containing over-strength wastewater. They will then repeat the process at subsequent manhole locations to follow the over-strength wastewater through the pipes upstream, until it is traced back to its source. As the wastewater is followed upstream, the organic spike will become easier to distinguish as the effects of dilution from other waste streams decrease. Once the source is found, an official sample can be taken from the facility's effluent to effectively charge the company for the organic load they are discharging to the wastewater treatment plant.

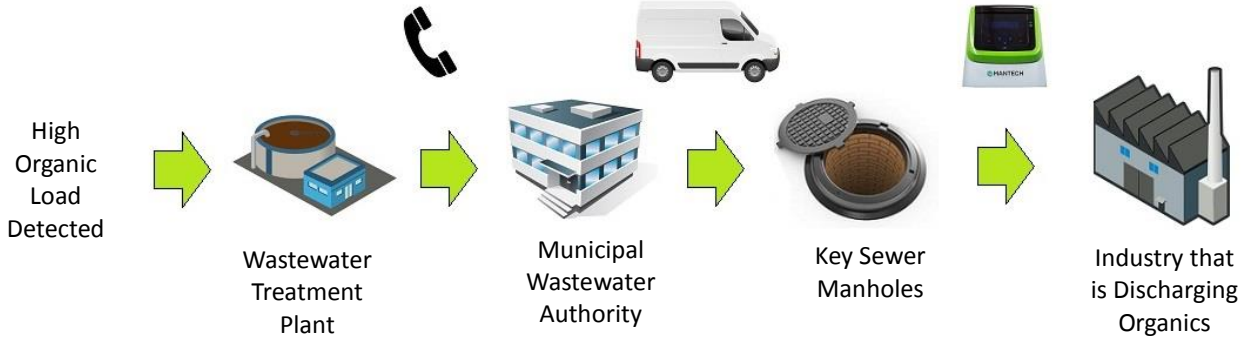


Figure 1: Process diagram of COD tracing with the use of the peCOD method

This effective procedure is made possible by the PeCOD® Analyzer's rapid 15-minute analysis, and can be further improved by bringing a portable unit into the field for on-site analysis. The diagram in Figure 1 outlines the process of COD tracing. This process is most effective by having a baseline level for each sampling location. Obtaining a baseline requires multiple samples to be taken at the same location at different periods in time to reflect an average organic load. This will take some time to complete, but once a baseline is established for each manhole any future samples can be effectively compared against that baseline value to determine if a spike is present. The City of Austin first established a baseline for the treatment plant and each of the manholes containing sewer mains that connected directly to the plant. They found these baselines had a COD concentration that was between 500 – 700 mg/L. When a spike occurs, it is instantly recognized by the PeCOD® Analyzer with values ranging from 1,000 mg/L up to 30,000 mg/L COD. Due to the significant increase above the baseline the spike is easy to trace at the key manhole locations.

The peCOD method provides unprecedented monitoring solutions for COD tracing made possible by the quick analysis time and robustness of the method. The PeCOD® Analyzer technology improved the municipality's ability to enforce its by-laws and increased recovery of operating costs for the wastewater treatment plant. As industries begin to recognize the value of rapid wastewater analysis it will change how they view by-laws regarding sewer use, and provide motivation to mitigate their wastewater contributions on-site.