Brewing industry
pH control of trade effluent discharge

A brewery, historically had difficulty controlling the pH of its final effluent discharge. This had resulted in the customer breaching the site's trade effluent consent on a number of occasions.

High pH levels were being generated when effluents arising from cleaning processes, Clean In Place (CIP) sets, were being discharged. The pattern of flow and pH suggested that little or no buffering of the CIP discharges occurred within the effluent collection system on site. There were no balancing volumes in the system to attenuate the high peaks in flow and allow the high pH effluents to mix with lower pH effluents, which theoretically could produce a combined effluent that was within consent.

Space at the brewery was at a premium, so the solution to the issues had to be able to treat the peak flow rates and fit in a very small footprint.

Optimiser conducted an investigation to:

- determine the patterns and characteristics of the effluent discharges from the site. The survey determined variations in peak flows/volumes, pH strengths, temperature, buffering capacity and reaction times and identified several control strategies for further investigation.
- identify solutions to the site's pH correction that fit within restricted space available on-site. The project reviewed several pH control strategies and determine potential solutions for the customer.
- highlight the advantages and disadvantages of each control strategy to allow the customer to determine the best solution for their business requirements.
- provide the customer with details of process specifications and suppliers to enable the project to easily be passed to an in-house engineering team to progress.

study findings:

Optimiser produced a report for the customer detailing the site's discharge patterns and characteristics. This allowed a full evaluation of the potential pH control strategies available to the customer which included an evaluation of;

- chemicals to be used in pH correction;
- methods of chemical dosing control;
- continuous or batch neutralisation;
- monitoring and control of systems.

Optimiser then further evaluated these options to provide the customer with a document identifying the strengths and weaknesses of each pH control strategy.

This evaluation looked at the ability of the process to treat all potential site effluents scenarios, space restrictions, health and safety issues and indicative installation and running costs.

The project work undertaken by Optimiser has allowed the customer to identify the most cost effective solution to control the site's pH to consented levels.

Optimiser has given the customer process specifications, indicative costs and supplier contacts to enable the site to purchase and install an appropriate pH control system.

recommendations:

Due to the variation in volumes, pH, buffering and reaction times of the effluents, batch neutralisation was recommended over continuous neutralisation.

It was recommended that only high strength effluents would be diverted for treatment, reducing the size of the reaction tank required for batch neutralisation and reducing chemical dosing and pumping costs.

To achieve adequate batch neutralisation the site would need to provide a larger reaction volume than was currently present in the existing final effluent pit. The minimum size of this reaction tank was provided to the customer.

Multiple acid dosing stages were recommended in order to perform adequate pH correction control.

The pH control system would have to be completely effective with minimal operator intervention.

benefits:

The customer has gained considerable knowledge about their sites effluent discharge characteristics.

The customer has been able to determine a cost effective solution that can effectively deal with the site's worst case effluent discharges, which also meets their restricted space requirements.

With tank volumes, outline process specification, indicative costs and supplier contacts the customer has all the information needed to pass the project to an internal engineering team to progress.

Once the pH control strategies are in place the customer will be able to return site discharges within consented levels.

The reaction tanks at the final effluent point proposed provide additional storage and fail safe facility should any effluents need to be prevented from being discharged to foul sewer.