

Technical service

UV DISINFECTION PERFORMANCE ASSESSMENT

OUR APPROACH

The successful operation of a UV plant depends on good hydraulic design and acceptable performance of upstream processes. We've seen more than one site where hydraulics are not optimal or upstream processes deliver below-par treated effluent. Let's briefly consider two case studies.

STUDY 1: HYDRAULICS

Our client operated a UV plant that discharges to an important body of water. Our analysis showed that extra UV banks had been retro-fitted in such a way that the hydraulics of the plant led to significant short-circuiting. The client is now designing changes to the channel configuration which will improve hydraulics and disinfection performance.

STUDY 2: UPSTREAM PROCESSES

Our client's UV plant struggled under certain conditions. Analysis showed this was largely due to the performance of upstream processes. A review found ways of improving upstream performance, guaranteeing UV consent compliance & reducing power use by changing the control strategy.



UV disinfection is widely used in the UK, with over 300 plants installed around the country. The size of these plants ranges from small sites with a few tens of lamps to very large sites with 3,000 lamps or more. The amount of electricity used by UV can be large and so optimising power use while maintaining compliance with UV dose consents is essential. BWC has developed an assessment method which reviews the performance of UV plants & pinpoints opportunities for improving energy efficiency & UV equipment operation.

Stage 1 – data analysis: evaluating data about UV dose, flow through the plant, power consumption and performance of upstream processes is essential. This defines if the plant is over-dosing and how dose relates to upstream asset performance.

Stage 2 – hydraulic analysis: here we assess the whether the hydraulics of the UV channels meet recognised guidance.

Stage 3 – control assessment: more than once we have found banks of lamps are not switched on and off optimally. This stage identifies how and why banks are switched and how that can be improved.

Stage 4 – control improvement: adding a predictive model to the control scheme can improve control by forecasting exactly when more power is needed to meet the dose consent (and so avoid over-dosing)

We've used this procedure at a number of UV plants and found great benefits for the clients. This shows that a simple but systematic approach can reduce operational problems and power-related costs while maintaining consent compliance.

Pictures are for illustrative purposes only