

Advanced Coagulant Control

Like many water treatment plants in Ireland, Carlow's water sources suffer from high variability in water quality. This variability is common in river and lake intakes especially after a heavy rain event. These sources are characterized by high concentrations of natural organic matter (NOM) which can produce unwanted by-products. The removal of NOM is a general requirement in producing this potable water and is carried out by the dosing of coagulants – usually Alum.

Up to now the chemical dosing on these sites has been manual, making it both difficult and expensive to control. The dose rate used to be calculated based on manual Jar tests which the operator carried out periodically, usually once or twice a day however the parameters of the raw water source changes continuously.

For plant operators maintaining the floc used to settle and filter out the NOMs can be difficult and can result in too much chemical being added causing water discolouration and human health problems. Under-dosing can affect the efficiency of the treatment plant and can lead to the treated water failing to meet the quality standards.

CSL, based in Carlow, were tasked with automating the coagulant dosing systems on 4 plants using a variety of control measures including UV and streaming current. Since NOMs absorb light in the UV spectrum, the Irish Water approach is based on a measured increase in UV absorbance which indicates increasing NOM concentration and hence increasing coagulant demand.

In-line Ultraviolet (UVT) monitors were installed on all 4 plants along with streaming current, pH and other instruments. Auxiliary signals already on site were also used as a control measure e.g. raw water turbidity and flow. All sites were fitted with a set of new digital dosing pumps with changeover arrangement. On some sites the pH had to be adjusted to optimise dosing, which required additional dosing equipment and control. The dosing can be controlled using different combinations of parameters and each can act to verify signals from the others. The control system can also seamlessly tie in with existing PLCs and SCADAs on site.

The parameters on site were monitored remotely for 3 months to build up the water profile before control was switched to automatic, initially controlled by streaming current. CSL's Control and Automation Manager, Sean McGillicuddy, told us "the challenge for these sites is integrating existing equipment and site conditions to optimise new dosing control while working very closely with the plant operator and minimising disruption".

The automated dosing now means rapid response to change in conditions, reduced chemical wastage, lower cost and improved plant performance leading to better water quality.



CASE STUDY



Service, Instrumentation & Telemetry solutions for the water industry

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