



SUMMARY

Challenge

Reduce energy, manage storm events & bulking

Solution

Multivariable control of ASP, blowers, FST

Results

Compliance improvement, robust operation

Northumbrian Water provides water and sewerage services to over 2.7 million people in the north of England, as well as drinking water to 1.8 million in Essex and Suffolk.

The company has a strong focus on customer care, to provide value for money meeting or exceeding their environmental commitments.

Their largest site – Bran Sands at Teesside – serves both industrial and municipal clients. A new method of operation was being considered, to reduce operating costs while improving environmental performance.

BACKGROUND

Northumbrian Water Limited (NWL) commissioned a detailed assessment of process performance – the **Perceptive Audit** – to identify and quantify the operational and cost benefits that might be derived from Advanced Control on the municipal treatment area of their largest works, Bran Sands Train C.

During the assessment, NWL identified several key process issues for investigation: storm events which caused a hydraulic surge through the plant, increasing the risk of solids consent failure; sludge bulking from filamentous bacteria which required high levels of chemical dosing; high energy consumption to achieve quality targets.

PERCEPTIVE SOLUTION

Perceptive identified the process conditions that were promoting bulking, then classified process operation before, during and after each storm event. **Advanced Process Control** was implemented to optimise ASP operation, take control of RAS and SAS pumping, and optimise operation of bellmouth position (sludge blanket level control) on the 8 final settle tanks (FST).

To ensure more reliable operation, the WaterMV system included soft sensors: dissolved oxygen to make ASP operation more robust; sludge blanket level for improved solids management; sludge settleability (SSVI) – a key indicator in controlling the process and avoiding solids loss.

RESULTS

Solids levels have been maintained within consent limits, even when sludge blanket detectors have failed, or during severe storm events. The new controller manages the process automatically when FSTs are closed for maintenance. Storm and ‘first flush’ conditions are identified and the process is automatically adjusted to accommodate the high variability in loading, with **no additional intervention by the operators**. Sludge bulking has been reduced almost to zero. Energy consumption has been **reduced by more than 20%**.

The operation is now so robust that operators are able to focus their efforts elsewhere in the plant.

“The Perceptive Controller has delivered significant benefits to the process, in terms of ease-of-use and treatment quality. The process is now more robust and more reliable; the operators don’t have to worry about Train C. And saving energy is an added bonus.”

Ken Black, Asset Optimisation Manager, NWL