CASE STORY

Improving power quality and reliability in water treatment with Comsys ADFs

» **LOCATION**
United Kingdom

» **INDUSTRY**
Water Treatment

» **LOCAL PARTNER**
CP Automation

» **INSTALLATION DATE**
January 2025

BACKGROUND

A large water treatment facility in the UK runs continuously to meet regional water demand. The site depends on several high-power drives and pumps, and the electrical network is subject to the kind of harmonic distortion that comes with modern variable-speed equipment.

Routine checks showed a clear pattern: current distortion levels were increasing, and the overall power factor was drifting away from target. The operator wanted to address these issues before they began to affect process stability or equipment life. At the same time, redundancy was essential – the plant could not risk any downtime during maintenance or in the event of a component failure.

CHALLENGE

Power quality measurements on the site's main low-voltage switchboards revealed that harmonic currents were rising, reactive power was increasing, and the transformer was experiencing elevated thermal stress. The power factor had also begun to slip, indicating that the electrical system was no longer operating as efficiently as required for a continuously running facility.

These trends pointed to a clear need for dynamic compensation capable of adapting to changing load conditions in real time. The operator needed a solution that could bring harmonics under control, stabilize power factor, and reduce the strain on the transformer – while maintaining full redundancy and avoiding any interruption to water treatment operations.

SOLUTION

CP Automation, Comsys' trusted partner in the UK, handled the project independently – from onsite measurements to installation and commissioning. Four Comsys ADF P300 units were installed across the facility's two main low-voltage switchboards, with each board receiving a pair of filters. This ensured full redundancy, allowing the plant to maintain harmonic mitigation even if one unit is taken offline.

Once operational, the ADFs began continuously analyzing the electrical network and compensating for harmonic distortion, reactive power, and power factor in real time. The filters automatically adapt to the site's varying load profile throughout the day. Operators have full visibility through the ADF interface, and remote access enables quick reviews of system performance or support tasks without requiring a site visit.

RESULT

The improvement in power quality was immediate. The ADFs effectively reduced harmonic currents and brought both current and voltage distortion well within acceptable limits. Power factor stabilized at a high, efficient level, reactive power decreased significantly, and the transformer now operates under far lower stress thanks to the reduction in harmonic content.

Voltage distortion remained stable throughout the process, and the redundant configuration ensures the facility always has filtration capacity available – an essential requirement for a site that must operate without interruption. With harmonics under control and the electrical network running more efficiently, the plant now benefits from improved reliability and a more resilient power system.

PRODUCT USED IN THIS CASE

ADF P300

- » HARMONIC ELIMINATION
- » LOAD BALANCING
- » DYNAMIC VAR COMPENSATION
- » MODULAR & SCALABLE DESIGN
- » FLICKER COMPENSATION
- » 208-690V NOMINAL VOLTAGE
- » CLOSED LOOP, OPEN LOOP & SENSORLESS CONTROL