Water Intake Monitoring System Provides Reliable Data while Reducing Frequency of Site Visits

Single-Chamber HydroSAM Takes Long-Term Readings

Severn Trent Water was one of the first utility companies to try YSI's new multiparameter intake protection system, the HydroSAM, and works manager Natalie Horton says, "The performance of the new water quality monitor has been absolutely brilliant."

The HydroSAM is designed to replace older water quality monitoring systems that draw samples through a network of pipes which feed a series of in-line sensors.

Until now, these wall-mounted systems have been installed to monitor water quality upstream of river abstraction points, so that plant managers are provided with data that can inform water treatment decisions. However, such systems require a high level of maintenance and frequent calibration.

In contrast, the HydroSAM has been designed for minimum maintenance and long-term deployment. The heart of the HydroSAM is a multiparameter probe known as a 'sonde,' thousands of which are in use all over the world as *in situ* water quality loggers in both freshwater and marine applications.

Water quality monitoring sondes are often left in remote and difficult to access locations and it is for this reason that YSI has, over many years, developed sensor technology that is able to take accurate readings without the need for frequent site visits.

The sondes have also been designed to be compact and this provided a further benefit to the HydroSAM; river water is pumped through a single sample chamber in which the sonde is located, so that all of the sensors are exposed to the same sample.

The compact HydroSAM provides long-term water quality monitoring for intake protection with less maintenance than larger systems. Shown here inside a protective shelter upstream of the water intake.

The HydroSAM employed by Severn Trent Water monitors **pH, temperature, conductivity, turbidity, optical dissolved oxygen, and ammonia**. It is also possible to add sensors for **chlorophyll and blue-green algae**.

The sequence of events that ended with the installation of the HydroSAM began with Natalie Horton becoming increasingly frustrated with the problems and high maintenance requirements associated with traditional monitoring systems. However, she had heard that the UK Environment Agency deploys multiparameter sondes in rivers and approached YSI Hydrodata to discuss the possibility of the sondes' use for intake protection.

As a result, a sonde was installed directly in the River Severn, upstream of the Shelton water treatment works (WTW) near Shrewsbury, England, on a three-month trial.

Prior to the trial, Natalie Horton admitted to a fair degree of skepticism over the sonde's ability to cope with occasional high levels of biological fouling. However, after visiting the site, she said that she was "delighted to discover that, as a result of the inbuilt sensor wiping mechanisms, the sensors were completely free from fouling and the readings correlated very closely with our own calibrated equipment."

Continuous Monitoring and Remote Data Collection

Following the success of the trial, Severn Trent Water ordered a full HydroSAM system which has been permanently installed ten miles upstream of the water intake.

The system provides almost continuous monitoring data to the Shelton works and operators have been provided with the ability to dial in to the unit from anywhere or to visit the site and collect

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data with a portable computer. Alarm conditions have been set and the unit will issue alarms via the PMCS (Severn Trent's alarm and control system) should those conditions arise.

Natalie Horton has since become Risk and Safety Manager for Water Supply at Severn Trent Water. Looking back over the HydroSAM trial she says, "It is vitally important for our water treatment works to be provided with advance knowledge of water quality and trends so that we can manage the treatment process as effectively as possible. It is always our aim to maintain stability in the plant because unforeseen changes in the intake could necessitate a need for reduced flows to maintain water quality.

"For example, turbidity can range from 1 NTU to over 200 NTU, but this can be accommodated quite easily if we have an accurate and reliable intake protection system. However, the main benefit for us has been the reduced requirement for calibration and maintenance; site visits used to be necessary every week, but now a simple 6-week calibration check is all that is needed. We have been delighted with the HydroSAM. It was simple to install and operate, it has proved to be reliable, and it saves labor costs."

Note: *YSI's multiparameter sondes are currently undergoing evaluation in order to achieve MCERTS accreditation for monitoring treated wastewater and receiving waters. MCERTS is the UK Environment Agency environmental monitoring certification scheme.*

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A YSI sonde contains multiple sensors for water quality parameters. To collect data, water is pumped through a single chamber past the sensors.

Close-up of sensors. The two larger optical sensors have integrated wipers to keep them free of fouling from organic compounds.