



Thames Water Employs Reservoir Profiler to Reduce Costs

Queen Mother Reservoir Improves Water Management during Drought

A water quality profiling system from YSI has been installed in the Queen Mother Reservoir near London's Heathrow Airport. The system is able to move through the entire water column, taking and recording water quality measurements automatically, thereby helping to improve water management decisions.

London lies in one of the driest parts of Britain, and the average annual rainfall is only 750 mm (30 in), four inches less than Dallas, TX.

Thames Water is the largest water company in England, supplying water to around eight million people in London and the Thames Valley. Between November 2004 and July 2006, the Thames Water region received only 68% of expected rainfall and has experienced below average levels for every month except one. During June 2006 London only received 25% of normal rainfall levels and the summer months have been the driest on record.

The drought, which has included low rainfall over two consecutive winters, has resulted in a depletion of water reserves and the company has had to implement a number of measures in order to protect the region's resources.

Naturally, the drought has served to increase focus on the efficient use of water resources; one of the measures that staff at Thames Water have been able to implement has resulted in significant improvements in the efficiency of abstraction, storage and production. This has been facilitated by the installation of

new profile monitoring technology coupled with a compressed air mixing system.

The Queen Mother Reservoir was built in 1976. In conjunction with a number of other reservoirs, it fulfills a crucial role in the drinking water supply to the west of London.



A YSI multiparameter water quality sonde is fixed to, and lowered from, a tower in the Queen Mother Reservoir. It will profile the entire water column of the reservoir.



Reservoirs form an important step in the water supply chain because, through sedimentation and natural enhancement of biological quality, they represent a low-cost method for water quality improvement. Therefore, Thames Water has a minimum retention time for reservoir storage of ten days.

Profiling Entire Water Column Informs Abstraction

Commenting on the new monitoring equipment Terry Bridgman, Field Scientist in the water quality team at Thames Water, says "We have always wanted a technology such as the Profiler because knowledge of water quality throughout the entire column helps to improve decisions on water abstraction. Water can be drawn from different depths and if we know the position of the best quality water we can minimize water treatment costs."

Bridgman continues, "For example, if we are able to ensure that the algal load in water supplied to the drinking water treatment plants remains low, we can save costs by optimizing the treatment process."

YSI Hydrodata installed the Profiler system in the Queen Mother Reservoir in May 2006; as a result of the success of the system,

three additional Profilers have been installed at other strategic reservoirs and further installations are planned in the near future. The data that these systems provide will enable Thames Water to not only choose a depth for the abstraction of the best quality water, but also to choose the most appropriate reservoir.

Thames Water's largest drinking water treatment works are generally designed to treat stored water, which will typically have a low turbidity. The Profiler enables the company to analyze water quality data and determine the areas of low turbidity. Consequently, continuous monitoring helps to maintain the continuous provision of drinking water.

YSI has launched three types of Profilers – buoy-mounted, pontoon-mounted or, in the case in the Queen Mother Reservoir, fixed-site.

Each of these is able to take measurements at user-defined intervals throughout any water column up to a maximum depth of 100 meters, recording at minimum intervals of 0.5 meters.

The Profilers are able to interface with any of the YSI multiparameter 6-series measurement sondes and as such offer the opportunity to record a wide variety of water quality parameters.

The YSI Profilers can be deployed quickly and easily with the help of the 'Profile Wizard' software and data management and export is achieved with 'ProFile Manager' software.

The multiparameter sonde is automatically lowered and raised throughout the water column by a non-corrosive mechanical winch and drive mechanism located above the water surface. Data can be stored on the sonde's internal data logger and transferred by any of the latest communication technologies.

Well-timed Mixing Improves Quality, Reduces Costs

The sonde in the Queen Mother Reservoir records chlorophyll, dissolved oxygen, temperature, pH, conductivity and turbidity. However, Thames Water's future requirements will include a sensor for phycocyanin, which is a good indicator of blue-green algae levels.

This will provide useful information to Terry Bridgman and his colleagues because, while storage improves the turbidity and microbiology of water, algae can have a serious deleterious affect on water quality.

At certain times, Thames Water is able to suppress algal growth with 'active mixing' within the reservoir by jets and aeration. Diatom algae levels peak in Spring and Autumn and should be detected by the chlorophyll sensor. The blue-green algae peak in mid to late summer, but do not have the same impact on filtration that filamentous diatoms do.

Mixing does not suppress diatoms, but does assist with the control of green and blue-green algae. However, this process consumes energy and thereby increases costs. It is therefore important that mixing is employed in a timely and efficient manner, and it is anticipated that the Profiler data may assist in this regard.

In summary, Terry Bridgman says that he and his colleagues have been looking for a way to continuously monitor the entire water column for nearly thirty years and he is delighted that, at last, his search has come to an end.

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