

Biogas electricity generation

The Thames Water waste water treatment plant at Mogden, Twickenham is one of the largest facilities in the UK. The current large upgrade of the plant required improved and automatic data gathering and reporting. Here's how Wonderware's Historian real time database is helping with regulatory compliance and commissioning of new digesters.

The alliance project team working at the site has observed that Wonderware Historian has made a measurable contribution

The project to upgrade the water treatment works at Mogden is large and extending over several years, with work being done by an alliance of Thames Water, Patterson Candy and Binnie Black & Veatch, with real-time computing subcontracted to Adsys. The site is being renewed to deliver process improvements, to comply with the latest standards and regulations, and to increase energy production through stabilising the process and thus optimising the production of the generated Biogas.

in service, with 4 remaining to be back on line within a month. The plant has been kept running throughout the programme, the new digesters being integrated with the existing processes on a step by step basis.

The Digesters breakdown the sludge using bacteria. The sludge has to be heated to 35°C, this temperature being held through the process. For the process to be efficient and to meet regulations the sludge has to be retained for 12 days. The process is continuous with controlled extraction and inflow. The digestion process produces large amounts of gas. In order that the sludge is uniformly at 35°C the gas is pumped back through the sludge to provide agitation. Surplus Biogas is pumped off in large volumes and the remaining material is free of harmful content such as pathogens.

The site powerhouse has four large dual-fuelled engine and generators. The engines are run mainly by the biogas from the digesters. The system is now running at a level that allows 92% of the energy to be exported owing to favourable rates for renewable energy.

Remembering that the sludge has to be held at 35°C, this is achieved by extracting heat from the engine's cooling system and also from the exhaust. Without the engine, boilers would have to be used to supply heat to the process. The site is thus a true model of energy efficiency. The extracted heat warms the supply water that is used to heat the input to the digesters.

The long term upgrade of facilities at Mogden soon revealed that more information was required from the process than the existing SCADA system could provide. The Trend and Alarm information within the SCADA system has been supplemented to give additional



Digester

The process involves taking the raw sewage which passes through settling, and aeration prior to the resulting sludge being fed to digesters. The digesters are at the very heart of the process and ensure that the resulting digested sludge is safe for output. The plant previously had 20 digesters; these are now being refurbished and modified, 12 are back



Mogden panorama

functionality by Wonderware’s SolutionsPT-supplied Historian real-time database. Adsys Automation Ltd has integrated this to the new logic controllers that they supplied, installed and programmed for the new digesters. This provides semi-automatic completion of a standard Thames Water reporting spreadsheet that is used for plant reporting and proof of regulatory compliance. This report is large and also contains manually entered data from laboratory sampling.

in their task of the important updating of facilities at the Mogden site. Compliance with regulations, energy efficiency and process improvements have made the Thames Water site at Mogden one of the cleanest, safest, energy-efficient, and highest energy-producing sites in the industry.

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Utilising the Historian information from the new digesters has also help in commissioning and stabilising the process. The PLC’s that control this recycling of energy will eventually provide data sources for Historian. The information from Historian will then provide reports that will show the energy balance of the site.

The alliance project team working at the site has observed that Wonderware Historian has made a measurable contribution to them

Signage



GENERATED BIOGAS

Biogas generated from the digestion process is piped to the gas compressors which in turn supply the four CHP (Combined Heat and Power) engines.

The CHP engines generate power for the site and also export to the National grid. The engine cooling water provides the heat source for the digesters.

MONITORING THE NEW WORKS

Monitoring for the sewage works as a whole is carried out at the Control room by SCADA (Supervisory Control and Data Acquisition).

A process controller is on duty 24hrs a day and 365 days a year. Throughout his shift the progress of the sewage passing though the works is controlled and altered as required. An alarm will show up on pages on SCADA when a piece of plant fails and needs attention.

Wonderware UK wishes to thank the following companies for their valued contribution to this success story...

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