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ABB reactive pump control saves £100,000 for Severn Trent Water

Severn Trent Water is saving a total of £100,000 per year on energy and maintenance costs across a number of its wastewater treatment plants following the installation of award winning technology from ABB and its Drive Alliance member, Inverter Drive Systems (IDS).

Developed by IDS and known as reactive pump control, the new method of controlling sludge in sewage treatment plants uses an ABB low voltage AC drive, combined with a specially written software algorithm to measure viscosity and achieve the flow control demanded by the sludge pumps.

The system was initially trialled at Severn Trent Water's sewage treatment site at Pye Bridge in Nottinghamshire. It reduced pumping time by 90 percent by running the pump on average for 10 minutes per five hours, saving £42,000 a year.

Andy Berry, O & M Standards, Service Delivery Partner for the East, within the company's Wastewater Services, says: "The system at Pye Bridge is still working well, giving us power savings and improved desludging through better control of the pumps."

Maintenance costs are cut as with the variable-speed drives, gearbox failures have been eliminated, each of which meant four hours of staff time to manually drain the sludge tanks.

Since the installation at Pye Bridge became operational, a number of other installations are operational at Severn Trent sites at Rainworth, Boughton, and Calverton, which has seen a 49 percent reduction in pumping. Overall, savings in energy and maintenance hours across the sites have totalled £100,000 a year.

With reactive pump control, the drive starts pumping on an internally set time delay and stops pumping when sludge viscosity drops to a pre-determined value. The pump maintains a constant speed using the viscosity measurement to ensure only the correct percentage of solids is pumped. Costs are cut through reduced energy use, reduced sludge transport vehicles and lower maintenance of the sludge pumps.

The method tackles much of the waste of resources involved in current sludge pumping, leading to reductions in operating costs, cuts in transport of sludge and savings in capital equipment for new projects.

In current wastewater treatment practice, sludge is pumped from settling tanks to either holding tanks or decanting tanks using progressive cavity (PC) pumps, from where it is pumped into road tankers for transfer to digesters.

With this method before the sludge can be pumped from the settling tanks, it needs to be of a certain viscosity. Measuring this viscosity is achieved using PLCs and sensors inserted within the sludge to determine the percentage of dry solids.

Yet, whatever the level of solids present in the sludge, the pumps need to be run frequently to prevent clogging. As well as wasting energy, this also leads to a requirement for monthly maintenance of the pumps.

This excessive pumping also leads to holding tanks having a relatively low percentage of solids and storage tanks requiring regular manual decanting. Road tankers also take on higher water content than required, while further energy is used to pump the decanted water back to the head of the works.

Reactive pump control does not need sensors and is therefore inherently reliable. Using proven components such as diaphragm pumps and ABB drives means the application needs no other control products. Capital costs are reduced as there is no need for surge vessels, pressure release valves or electromechanical timers and can be retrofitted to existing diaphragm pumps.

The reactive pump control technology won the Pump Industry Award for Technical Innovation of the year in 2011. It has also been successful at the Water Industry Achievement Awards 2013, winning Most Innovative Use of an Existing Technology and Outstanding Innovation award, both for another end-user water company.

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Caption: Severn Trent Water is saving £100,000 per year on energy and maintenance costs following the installation of reactive pump control for controlling sludge in sewage treatment plants.

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