Future proofing and pumping technology

Now that the dust of the AMP 4 round has settled, the UK's water and sewerage companies are underway with their plans to maintain, upgrade and develop their asset base over the next five years. It is probably true to say that uncertainty and risk have played a greater role than in any of the previous AMP planning processes – a trend that is now set to continue for some considerable time to come.

The previously risk-averse water and sewerage companies are now having to build risk and uncertainty into their planning, investment and business processes. However, while they have a significantly greater ability to understand their asset base and analyse operational and performance data in order to make more informed predictions, two issues in particular are currently turning this into something of a crystal ball gazing exercise, namely the upcoming Water Framework Directive (WFD) and the wildcard of climate change.

Water and waste companies are already taking climate change into account, with various scenarios forming a key part of AMP business plan submissions to the water industry regulator, OFWAT, and the long-term water resources planning process. However, despite the fact that the WFD – (likely to be the most significant piece of legislation ever to impact on the sector) is now looming large on the horizon, OFWAT did not allow any WFD - related expenditure in AMP 4. It is clear that AMP 5 will have to address this but if, as in previous planning rounds, draft business plans have to be in by March 2008, this only leaves a relatively short period of time to quantify the impact of WFD on their business operations. Some serious crystal ball gazing will be necessary if the sector is to adequately plan to meet its likely requirements.

One of the key areas of concern is the Directive's aim of reducing or phasing out emissions of Priority Hazardous Substances (PHS) and Priority Substances (PS) that enter Sewage Treatment Works. The WFD establishes a list of priority substances, 33 of which have been shown to be of major

concerns to European waters, requiring environmental quality standards and emissions controls. Within this list, 11 substances have been identified as priority hazardous substances to be subject to cessation or phasing out of discharges, emissions and losses within a maximum of 20 years. Another 14 substances are candidates for being considered as priority hazardous ones and are currently subject to further scrutiny.

Boxed text : WFD 11 Priority Hazardous Substances

Brominated diphenylethers
Cadmium and its compounds
C10-13 – chloroalchanes
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocycloexhane
Mercury and its compounds
Nonylphenols
Pentachlorobenzene
Polyaromtaic hydrocarbons
Tributyltin compounds

At the moment there are considerable variations on cost estimates for the additional treatment required – DEFRA, for example, quote a figure of between £450M and £630M per annum, while a UK Water Industry Research study suggests that extra treatment for the removal of priority substances would be required at half of all water treatment works in England and Wales at a cost of some £6 billion. This would be on top of the £7 billion Ofwat says should be invested in maintaining and improving sewerage in 2005-10.

Given that achieving the proposed stringent standards for the PHS and PS in the sewage effluent discharges is likely to require huge investment at wastewater treatment plants, running into billions of pounds for the water industry, water companies are being urged to take action now by reviewing their wastewater treatment systems.

Key to this process will be the extent to which the water and sewerage companies can ‘future-proof’ their existing wastewater treatment systems - but is it possible in practical terms to future-proof complex systems in such a way to cope with as yet unspecified requirements?

In one key area the wider opportunities offered by an existing process are increasingly being viewed in the light of its significant future proofing capabilities. The WFD may well require water companies to look at additional dosing systems for other priority substances – an area where peristaltic pumping technology is now being seen by a growing number of water and sewerage companies as not only ideally suited to meet existing legislative and quality requirements but also capable of meeting as yet unspecified and potentially major additional WFD requirements. Peristaltic pumps are already used for a wide range of applications in water treatment works – for example, dosing and metering ferric chloride to ensure phosphorus removal (meeting the requirements of the Habitats Directive), sampling raw water and final potable water, transfer of settled sludge.

Philip Bolton, water industry specialist at Watson-Marlow Bredel, one of the world’s leading pump manufacturers, comments that a growing number of water companies are approaching them to discuss how they can incorporate and capitalize on the technology in their wastewater treatment processes. According to Bolton, peristaltic technology provides water and sewerage companies with a ‘future proofing’ process solution which no other pumping technology is currently capable of delivering.

‘Peristaltics are ideally suited to wastewater treatment plant operations – they can cope with harsh environments and corrosive materials. They are also outstandingly accurate - delivering either a teaspoonful of chemicals or a tanker load and at variable rates, according to local weather conditions, time of year, differing levels of algae etc.

The key benefit of peristaltic dosing technology from the point of view of future proofing over alternative systems, is its massive flexibility. The Watson-

Marlow Bredel 520 series, for example, enables operators to use up to eight different diameters of tubing in one pump. Effectively it's like having eight different individual pumps incorporated into one single piece of equipment. Add in the ability to cope with a flow range from 3000:1 depending on plant/operational requirements and you've got a system in place which can cope with significant increases without **any** need whatsoever to upgrade, let alone replace or retrofit.'

In comparison, several diaphragm metering pumps in varying sizes would need to be installed to cope with the same demands. When you also compare the order of magnitude differences between a typical diaphragm metering pump flow range capacity of 1 to 100 as against a flow range capacity of 1 to 1,000,000 with a peristaltic pump, the unmatched capability to cope with unquantified demands and unspecified increases in capacity considerably further down the line, coupled with its ease of integration into any SCADA system, suggests that peristaltic pumping is a technology which is about to really start coming into its own.

To sum up, guidance issued by DEFRA on PRO4 stated that 'it would expect companies to consider whether current solutions can be designed to facilitate later upgrading to meet any changes that can be reasonably anticipated". As the water and sewerage companies get closer to the realities of implementing the WFD, they will increasingly be looking for this level of future-proofing capabilities across a wide range of technologies.

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