

# Beyond phosphorus removal

*Meeting new phosphorus consent levels is a priority for the water industry – but what method works best for the many wastewater sites that are inaccessible, where space is limited and where environmental concern and regulatory measures are paramount?*

Phosphorus removal has often been achieved using 'adsorption' techniques in which metal salts in the form of liquid chemicals are added to wastewater – but as with any process that involves chemical application there are associated risks involving the transportation, handling, storage and mis-dosing of the chemicals, as well as the steady increase in the cost of liquid chemicals.

## New hope ahead

The size and inaccessibility of some wastewater sites, especially given that some are unmanned makes the application of chemicals even more of a challenge. However, promising results yielded by the UKWIR Chemical Investigations Programme trials indicate that a new approach is possible.

Soneco®, a patented technology combining 'Electrolysis', together with 'Ultrasound', has been successfully utilised by water treatment specialist Gareth Morgan, CEO of 'Power & Water', to provide a safe, efficient and innovative method of treating water by electro-

generating pH-neutral reactive reagents (metal cations) and precisely metering them directly into the process stream.

In the recent trials, their Soneco® system achieved consistent Total Phosphorus removal to levels below 0.5mg/l-1, with Ortho Phosphate results as low as 0.03mg/l-1.

Not only is the system extremely effective, however, it is also cost-efficient, as the operational costs are lower than traditional methods, primarily compared to chemical treatment. Soneco® has been proven to be a highly cost-effective method of P removal, especially at smaller works and those where alkalinity dosing is required.

With a small physical footprint, Soneco® is easily integrated or retro-fitted to existing over-loaded or under-performing works, and sludge volumes are up to 40 per cent lower than with other methods. The system is eco-friendly and has a greatly reduced environmental impact and improved carbon footprint.

## Optimising finite resources

The capabilities of this technology reach beyond wastewater treatment as it has been successfully used in mining and groundwater, agriculture and aquaculture applications.

Making the best use of the earth's finite resources is a priority and recycling nutrients, like phosphorus, wherever possible is crucial, so it is important to recognise that Soneco® systems have the capacity to not only remove, but to capture nutrients for re-use.

Soneco® technology has been installed at a land-based aquaculture plant in Norway, for example, which has allowed the introduction and development of 'circular economy' principles into operations at the waste management plant, meaning fish sludge can be turned into usable fertiliser without the need for liquid chemicals, polymers and filters.

## Better slurry management

A robust and effective example of nutrient capture can be found at the Gelli Aur campus of Coleg Sir Gâr, where Power & Water has installed an economically and environmentally viable slurry management system which will address the agricultural industry's impact on the environment by tackling pollution with a 'head-on' approach.

The need is pressing; in Wales alone, as Natural Resources Wales has found, there have been between 85 and 120 pollution incidents in each of the last six years, caused by dairy and beef farms in the region.

Power & Water's Soneco® technology is the 'beating heart' of the innovative slurry-dewatering and purification process, which recovers nutrients whilst removing pathogens and recalcitrant organics from farmyard slurry.

The treated water can be recycled for use on the farm or safely discharged into a local watercourse, which is not only useful for the farm and beneficial for the environment, but economic too; reducing water costs and over-reliance on raw materials throughout the supply chain.

Given that the slurry produced has been dewatered by up to 80%, it can be stacked, stored and applied more easily and effectively, reducing the associated costs and the risk of pollution. As the system is low voltage and can

## Agricultural Slurry Dewatering and Purification System using Soneco® technology

be powered by renewable energy, it is also a sustainable and low-carbon alternative.

## Mining the potential

The challenge posed by the legacy of the abandoned metal mines which pepper our landscape is another example of how Soneco® treatment systems have been applied to good effect, facilitating the removal of iron, lead, zinc and cadmium.

The Cwm Rheidol mine complex, 15km east of Aberystwyth, is a good case in point, having been cited as one of the ten most polluting mines in Wales: independent laboratory test confirmed that the Soneco® system achieved 99.5% removal of metals in filtered samples.

Where once eight tons of iron were being discharged into the water, following treatment, it was found that no metal deposits were released into the local watercourse



Soneco® DB4 Reactor



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at all. Not only does the process help the environment, but it holds the potential for precious metals to be extracted and re-used, helping to make the best use of the earth's depleting natural resources and potentially providing another revenue stream.

## Practical, effective, viable

The rugged design, small footprint and potential for remote, online-operation, make the Soneco® water treatment systems ideal for use on remote sites, whether wastewater treatment facilities, in agriculture, aquaculture or elsewhere. Moreover, it is a practical, viable system which delivers consistent results.

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