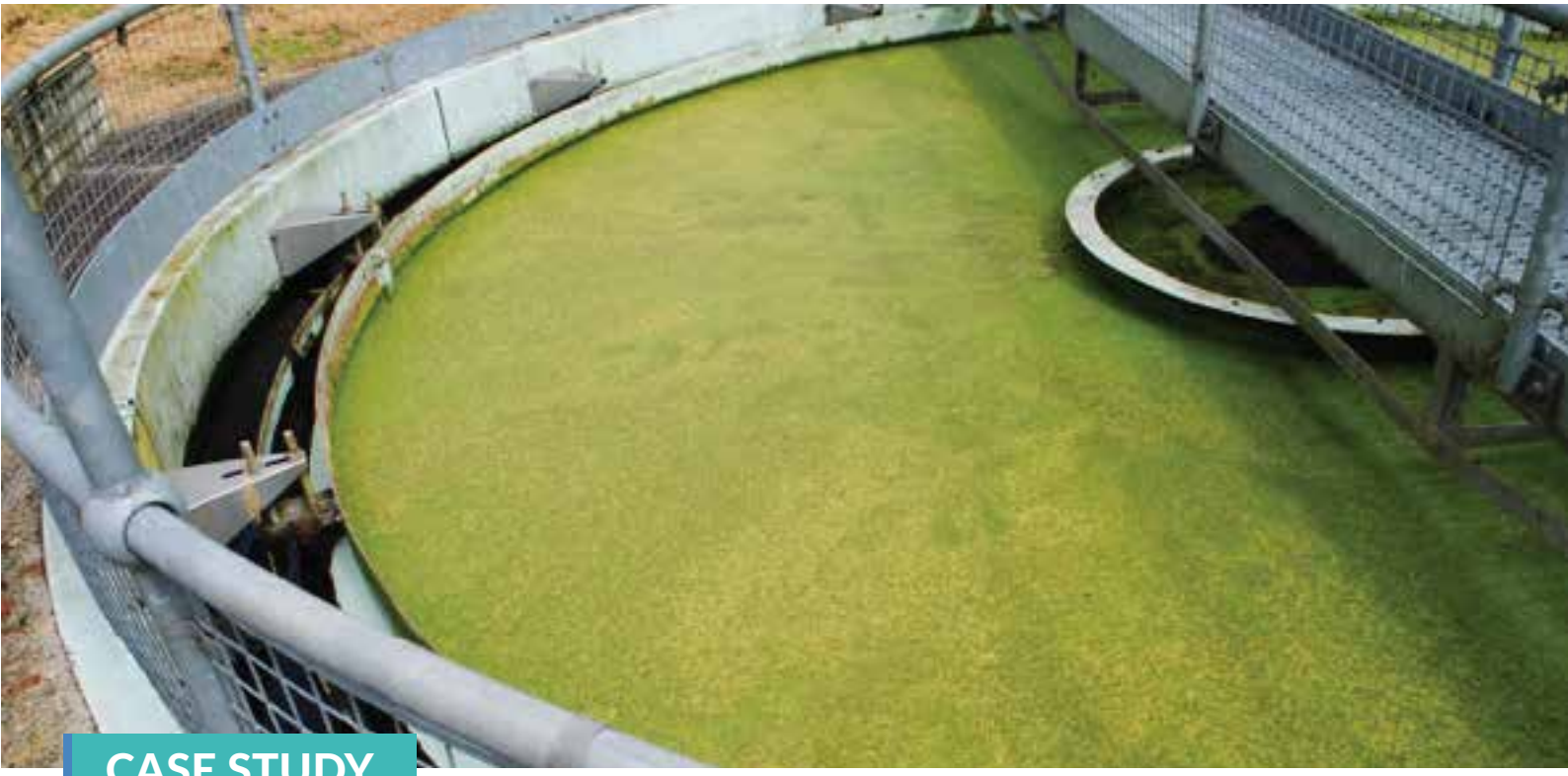
Power & Water

Purification through Innovation



CASE STUDY

Wastewater Treatment

Phosphorus Removal
Southern Water - UKWIR Chemical Investigations Programme

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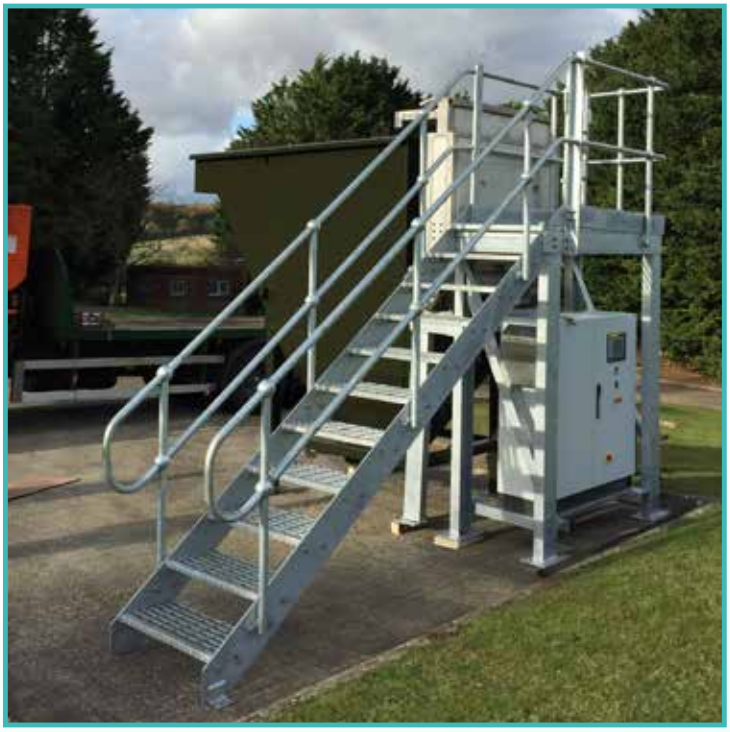
Background

Phosphorus (P) is a natural but limited element that is used by all living organisms and is essential to food security due to its effect as a growth promoter, but excessive levels of P overstimulate the growth of algae in our lakes and rivers and leads to a gradual depletion of oxygen, which can ultimately render the waterway lifeless (eutrophication).

Traditional sources of P (Rock Phosphate) are depleting, but sewage, including farmyard manures, is a rich and renewable source, but its re-use as a fertiliser is commonly the cause of excessive P-loads being released into our water courses, increasing the problems associated with water treatment.

Historically, P has been removed by 'adsorption', where metal salts in the form of liquid chemicals are used, but the disadvantages of this (H&S issues with transport, handling, storage, overdosing etc) are legion, so new, more effective treatment measures are constantly being sought in order to consistently achieve discharge targets.

Solution: Soneco®



Soneco®: Power & Water's (P&W) patented treatment process is an economic and technically optimised alternative to liquid-chemical dosing. It ingeniously combines 'Electrolysis' with 'Ultrasound', ensuring safe and efficient water treatment by electro-generating pH-neutral reactive reagents (metals) and metering them directly into the process stream.

The efficacy of Soneco® as a method of phosphorous removal has been rigorously evaluated and validated over a 12-month period by UKWIR, Southern Water Plc. They compared the Soneco® iron electrodes with ferric salt dosing as part of the wider 'National Phosphorous Programme', and concluded that Soneco® was the more environmental friendly and cost-effective process.

"A pleasure to work with this innovative company. Results have been consistent and reliable with a definite potential on small wastewater sites where the ideal solution for P removal has not yet been found. This process certainly provides an answer to be considered and P&W have been very receptive to our demand".

Cécile Stanford

Process Capacity Engineer – Integrated Planning, Southern Water.

Results

"Following the good results observed at East Meon WTW for P removal using the Soneco technology, the project was extended by Southern Water."

Southern Water Report for R&D: Soneco® (UKWIR, PRN: 639287) Based on 40 influent and 38 effluent samples.

Key conclusions from this extended study are:

- Soneco® efficiently and reliably treated the flow rate to achieve consistent Total Phosphorus removal to levels below 0.5mgl-1, Soneco® also achieved Ortho P results as low as 0.03mgl-1 during the trial.
- Soneco® produces an effluent with a highly de-watered ferric sludge which can be recirculated to the head of the works, adding to the treatment potential and providing a 'double treatment' from the single process.
- Soneco® achieved consistent P removal of 98% Total P and 99.7% Soluble Reactive P.

Benefits

The application of Ultrasound is what makes Soneco® stand out from the competition in P removal. It improves treatment efficiency through the generation of oxidative radicals and by the increase in nucleation sites, ensuring better coagulation and flocculation.

Ultrasound acts as a cleaning-in-place (CIP) tool for the electrodes, keeping the surfaces clean by cavitation, thereby maintaining an evenly reactive treatment surface.

The benefits of using Soneco® for P removal include:

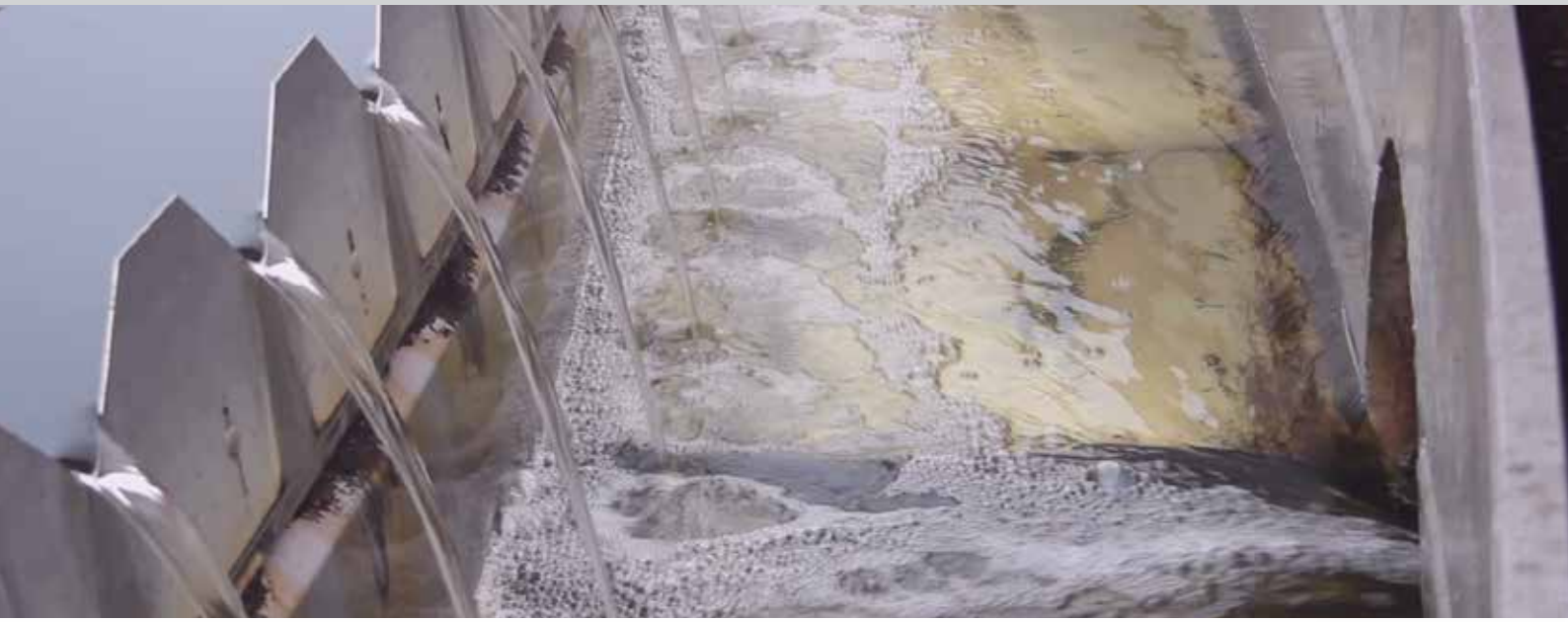
Reliability - Soneco® provides consistent P removal, even during storm or high-load conditions.

Cost effective – Soneco® has proven to be highly cost effective as a method of P removal, especially at smaller works.

Eco-friendly: Soneco®, in comparison with other methods, has a greatly reduced environmental impact & improved carbon footprint

Reduced H&S hazards: Soneco® has no H&S risks.

Simple and holistic approach: Soneco® has a small physical foot print, is easily integrated or retro-fitted to existing over-loaded or under-performing works, and sludge volumes are up to 50% lower than with other methods.



Next Steps

Following Southern Water's successful validation of Soneco® for P removal and progressing until AMP7, P&W and Southern Water are now working on the fully engineered solution.

Soneco® has the potential to create a paradigm-shift in P removal processes and wastewater treatment technology.

Going forward, Soneco® will make a significant contribution to the National Environmental Programme (NEP) during the remainder of AMP6, AMP7 and beyond.

Power & Water

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"Power & Water is a UK water technology company specialising in sono-electro chemistry. We aim to deliver Circular Economy solutions allowing recovery of waste products, and to produce clean, safe water for drinking, re-use or discharge back into the environment."





The company knowledge and expertise is founded on more than 35 years' experience in the Water and Environmental industries. Our in-house expertise includes engineering, power electronics, software and MEICA.

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