



# Power & Water

Purification through Innovation



CASE STUDY

## Oil-Water Separation



Separating water from oil for safe discharge or re-use

## Introduction

Engineering companies traditionally use large volumes of cutting fluid, lubricating oils, water, and cleaning chemicals within their operation.

Typically, contaminants and bacteria build up within these fluids affecting product quality and producing nuisance odours, thus necessitating replacement.

Yet, disposal of the contaminated fluid may involve dilution for discharge to a foul sewer or storage prior to landfilling which takes time, money, and resources.

Chemical analysis of these complex waste streams generally shows that 95% of the waste is water. To stem escalating disposal costs and wasteful practices these wastes can be treated and recycled.

## Background

In aqueous systems, hydrocarbons generally carry a negative charge at their surface. Often, they are steadily dispersed into small droplets because of their repellent forces. This makes it difficult to break apart and therefore chemicals are usually required.

However, chemical treatment is often costly, harmful to the environment and carries an inherent safety risk.

Furthermore, there are technical difficulties associated with this kind of treatment e.g. the separation of oil/water emulsions, breakdown of synthetic oils, removal of high levels of putrefying bacteria, and removal of metals.

Adjustment of pH can be used to break surfactants and release oils from emulsions. However, acidic rinse waters containing high levels of dissolved metals may result.

Ultra-filtration, biological breakdown or chemical treatment using coagulants or flocculants all offer alternative solutions. Disadvantages include cost, time and space requirements as well as variable performance.

## Solution

Soneco® - our industry-leading sono-electrochemical technology - avoids all of these pitfalls. By combining both electrolysis and ultrasound in a single reactor, we have created a revolution within the industry that is highly effective, energy efficient and environmentally friendly.

The Soneco® treatment process will coagulate and destabilise oil-water emulsions to allow maximum recovery of oil for reuse or reprocessing.

The Soneco® process operates without liquid chemicals and can remove contaminants from wastewater whilst recovering oil, ensuring easy discharge of the treated wastewater and maximum recovery of oil.

Crucially, Soneco® is the only water treatment technology that features a unique cleaning-in-place (CIP) tool. This innovation ensures that our electrodes maintain peak efficiency for longer and keeps power consumption to a minimum.

Its compact modular design makes it ideal for a job of any size. Soneco® is also highly flexible, and can be installed as a stand-alone system, easily integrated to existing treatment processes or used alongside a number of proprietary processes.





# Results

## Typical Removal Rates

POLLUTANTS REMOVED	UNTREATED	TREATED	% REMOVAL
Turbidity NTU (surface water)	4,420	32	-99
Cadmium mg l-1 (engineering)	17	0.003	-98
Mercury ug l-1 (ground water)	0.554	0.008	98
Total suspended solids mg l-1 (mining)	458	15	96
Oil & Grease mg l-1 (engineering)	134	5	96
Total petroleum hydrocarbons mg l-1 (oil E&P)	13,000	58	-99
PCB 28 mg l-1 (ground water)	3.51	0.038	-99
Aluminium ug l-1 (surface water)	5600	60	99

# Benefits

- Low-maintenance requirements – CIP means fewer electrode changes. Electrode changes can be completed by a single operator.
- Low-Energy Use – CIP tool keeps power use consistent whilst maintaining peak system performance.
- Safe – No liquid chemicals allow for safer operation.
- Low operational-carbon – Liquid chemical free operation reduces the need for large tankers traveling to and from site.
- Low embodied carbon – Our system can reduced the embodied carbon on some sites by 85% and the equipment is more than 90% recyclable.
- Modular – Compact modular design allows for easy installation.
- Scalable – Our system can be easily integrated into existing treatment systems to improve their performance.

# Project Examples

## Aviation Fuel Spill Clean-Up

“The spill consisted of approximately 50 to 100 litres of aviation fuel this, combined with the water run-off on the dispersal point would have entered the main drainage system on the site and subsequently polluted a number of environmentally sensitive water courses within the area. The spill was contained within the area with absorbent matting and pollution prevention spread booms...

The installation of the EC Technology at Swansea proved to be more than up to the task of preventing and capturing any contaminated particles and chemicals released into the drainage system it also stored all contaminants prior to disposal by licensed carrier. This was seen as an essential and timely purchase...and on its first test passed with flying colours.” - Lynn Wilkinson, Environmental Manager at DARA St Athan.





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“Power & Water is a UK water technology company specialising in sono-electrochemistry. We aim to deliver Circular Economy solutions allowing recovery of waste products, and to produce treated water for re-use or discharge back into the environment.”



The company knowledge and expertise are 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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