



Power & Water

Purification through Innovation



CASE STUDY

Mining & Groundwater

Safe pH neutralisation of Acid Mine Drainage
- Removal of Iron, Lead, Zinc and Cadmium



Client: Natural Resources Wales (NRW)

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Introduction

Wales has the unenviable record of being home to 9 of the 10 worst metal-mine polluted catchments in the UK, and overall has more than 1300 abandoned metal mines which impact 67 waterbodies and over 600km of Welsh Rivers.



Background

Ranked among the top ten most polluting mines in Wales, the Cwm Rheidol mine complex comprises the combined workings of four separate metal mines, each connected underground and discharging at the two adits situated on the steep banks above Afon Rheidol.

The heavily contaminated and highly acidic water from these extensive workings drains into the river via a passive filter bed, but this has proved to be an inadequate method of removing the heavy metals, which include lead, iron, cadmium and zinc.

Solution

Soneco® is an innovative combination of Electrolysis and Ultrasound in a highly effective package plant which efficiently electro-generates water treatment reagents directly into the process stream, ensuring maximum precipitation of contaminants.

This novel, fast and controllable treatment system uses a state-of-the-art, in-house designed Power Control System (PSU) to ensure fine-control of the system and its ancillaries, and its rugged design, small footprint and an optional online-operating facility make it ideal for use on remote sites such as the Cwmrheidol mining complex.

In-line monitoring equipment controls the levels of reactive reagents that produce the outstanding removal rates recorded during the project.

The pH from the acid mine drainage was rapidly corrected (average pH levels being around 2.0) and the high levels of heavy metals were efficiently removed using specially selected electrode materials.

Results

Independent laboratory results confirmed the Soneco system's success at treating this problematic minewater:

Parameter	% Reduction
Iron	99.84%
Zinc	99.95%
Cadmium	96.69%
Lead	99.00%



Benefits

- A Safer Means to Neutralise Acidic Waste Streams;
- Removes H&S and Environmental Concerns;
- Low Operation & Maintenance Requirements;
- Small footprint, yet capable of high flow rates;
- Robust design tolerates rugged upland locations;
- Remote Access allows Performance Monitoring, Control and Automation;
- Low voltage, Low Carbon Systems can be operated using Renewable Energy Sources.



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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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