Power & Water

Purification through Innovation

CASE STUDY

Slurry Dewatering & Purification

Prosiectslyri Project:

Gelli Aur Farm & Agricultural Resource Centre, Carmarthenshire.

Introduction

Statistics from Natural Resources Wales' (NRW) put the number of pollution incidents caused by Welsh dairy and beef farms at between 85 and 120 for each of the last six years, with over 60% of the local pollution incidents occurring within the dairy industry.

Wet winters and a significant downturn in the dairy market have added to the pressure on farmers who are facing reduced income and reduced capacity to invest in slurry/silage store management.

Background

Power & Water (P&W) are working in collaboration with Coleg Sir Gâr at their Gelli Aur campus on 'Prosiectslyri Project', an exciting new initiative to develop an economically and environmentally viable slurry management system to address the agricultural industry's impact on the environment. This can be achieved by improving slurry management and reducing air and water pollution and producing water that is clean enough for re-use on the farms, or safely discharged back into the watercourse.

"With the intensification of the dairy industry, slurry management is becoming an increasing issue for farmers and the environment. There is an increasing demand and need to efficiently extract nutrients and clean water from slurry, this in turn could save on the cost of commercial fertilisers and reduce serious environmental impact. Poor slurry management can cause pollution with nutrients entering the water cycle through run-off or drainage. We are delighted to be working with Power & Water to design, develop and validate an economically viable system to help alleviate the issues."

John Owen, Farms and Project Manager at Gelli Aur Farm

Solution

P&W's Soneco® sono-electrocoagulation technology, with its advanced oxidation process (AOP), was applied in the development of this innovative slurry-dewatering and purification process. Its aim was for nutrient recovery in Nitrate Vulnerable Zones (NVZ's), destruction and removal of pathogens and removal of high levels of recalcitrant organics. The resultant cleaned water can then be re-cycled for use within the farm, or safely discharged back to the local watercourse. Reducing the water content of slurry and making it easier to store, manage and spread will also help reduce soil compaction caused by forced spreading of slurry in unsuitable weathers.

This exciting new technology will maximize the recycling nutrient value: water content is substantially reduced, producing a stackable end-product containing 25% dry matter which will allow farmers to use the nutrients from slurry in a more effective way through targeted application, with substantially reduced storage and handling costs as well as lower risk of air and water pollution. The systems have the added advantage of being low voltage and with the potential to use renewable energy sources, are low carbon.

Prosiectslyri Project has received funding through the Welsh Government's Rural Communities Rural Development Programme 2014-2020, which is funded by the European Agricultural Fund for rural Development and the Welsh Government.

Results

Initial Results using the Soneco treatment process:

Nutrient Parameter	Recover Rate Achieved
Total Phosphate	93%
Total Nitrate	76%
Potassium	95%

Benefits

- Sono-electrochemical purification; removing any H&S / Environmental concerns;
- Nutrient Recovery in Nitrate Vulnerable Zones (NVZ's);
- Low operational / maintenance requirements;
- Small footprint, yet capable of high flow rates;
- Robust, resilient skid-mounted process;
- Water recycling and re-use;
- Remote access allows performance monitoring, control and automation;
- Highly dewatered slurry, resulting in lower storage and handling costs for the farm;
- Potential to reduce reliance on raw materials within the supply chain.

Next Steps

As concern over nitrate levels in waterways increases, so the developments in this project will be of increasing interest for existing slurry storage facilities globally.

A method for the effective treatment of farm slurry is urgently needed and long overdue; this has been made patently clear by the unprecedented volume of enquiries from farmers about the process, both local and further afield, since news of the successful operation at Gelli Aur has been made public. It is rewarding to know that the wider implementation of this technology would significantly reduce agricultural pollution incidents, bringing immense benefits, not just to Wales, but to the global environment and economy.

There is an urgent, global need for a sustainable way forward in processing farm manures, storing of slurry and in the recovery and re-use of water, and the technology developed by Power & Water and Coleg Sir Gar's 'Prosiectslyri Project' has the potential to put Wales on the map by providing *just* that.

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 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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