

PRESS RELEASE

Treating wastewater as a resource

Kempton, Germany / Sheffield, UK, October 2016. A number of UK landfill operators are turning wastewater into a resource by utilising OTT monitoring and control systems to manage the irrigation of Willow crops (for renewable energy generation) with pre-treated effluent.

Background

Leachate from landfill sites represents a significant potential environmental liability, extending long into the future after a landfill site has closed. Conventional treatment and disposal options involve biological treatment and consented discharge to either the wastewater treatment network or to the environment. Alternatively, effluent may be collected by tanker for treatment and disposal off-site. However, to improve sustainability and broaden the treatment options, work initiated in the 1990s developed an approach that sought to use effluent as a source of nutrients and water for a Short Rotation Coppice (SRC) crop planted upon the restored landfill.

Following the success of early trials, the UK Environment Agency published a Regulatory Position Statement in 2008, which said: 'SRC as part of a landfill leachate treatment process... is a technique (that) can be an environmentally acceptable option if managed appropriately.'

Early systems were operated and managed manually but with the addition of OTT sensors, telemetry and control systems, the process was automated to optimise irrigation and maximise both the disposal of effluent and biomass yield.

In the UK, Willow SRC has become increasingly popular in environmental restoration work, providing a cost-effective material for stabilisation and reclamation of disturbed landscapes, bioremediation and biomass production.

SRC involves the planting of high yielding varieties of willow at a high density, typically 15,000 plants per hectare. The crop can be expected to last for around 30 years, with harvesting taking

place every 3-5 years, and yields varying from 8 to 18 tonnes of dry woodchip per hectare per year. Willow grows quickly and has a particularly high demand for water, so it is ideal for the disposal of large volumes of treated effluent. In addition, the high planting density results in the development of a dense root hair system; effectively creating a biological filter for the treatment of organic compounds and the absorption of nutrients and some heavy metals. Soil fauna help to break down the effluents applied to the crop and soil particles control the availability of nutrients to the willow.

Monitoring and control

In early schemes, irrigation was managed manually on a timed basis with irrigation quantities based on external estimates of evapotranspiration. However, increased levels of monitoring and control are now possible. Matthew Ellison from OTT UK explains: “The key objective is to supply the crop with an optimised amount of water, whilst minimising the requirement for staff on site. Too much irrigation would cause run-off and too little would under-utilise the treated effluent and result in poor growth conditions which would affect yield and potentially threaten the crop.”

An on-site weather station feeds local weather data to the system which uses crop data to predict evapotranspiration that is used to determine irrigation rates. Soil moisture sensors then check that soil moisture status is correct. Other sensors monitor the performance of the system; checking irrigation feed reservoir level, in-pipe pressure and there are sensors to check flow rates from the drip-feed irrigation. This communication capability is made possible with OTT’s Adcon Telemetry radio network.

“Our latest monitoring and control equipment automates the management of the system for unattended operation and staff are only required by exception. This means that the system is able to operate autonomously, delivering regular data reports, and staff are notified by email or text if alarm conditions occur.”

Emphasising the advantages of controlling the entire network, Matthew adds: “This system facilitates the ability to control and synchronise the main pump, and to open and close the valves at each irrigation zone.”

The latest OTT monitoring and control systems include:

1. Soil moisture sensors
2. Irrigation tank level sensors
3. Irrigation function check sensors
4. Pipe valves and pressure sensors
5. Automatic weather station (to calculate local evapotranspiration)
6. Radio telemetry
7. ADCON Gateway and PC running addVANTAGE software
8. Internet connectivity for remote log in

Summary

Looking back over a number of SRC projects, Stephen Farrow one of the instigators of this approach in the UK, and now an Independent Consultant says: “When viewed practically, environmentally and commercially, experience has demonstrated the viability of the overall approach.

“It is also clear that process optimisation with relatively low cost investment in OTT’s monitoring and control equipment has significantly added to the support functionality in terms of both operation and regulatory management.”

OTT’s Matthew Ellison agrees, adding: “SRC clearly offers a sustainable option for effluent treatment, with highly positive effects on carbon footprint and biodiversity”.

In addition to the environmental benefits, process automation has significantly reduced labour requirements and helped to demonstrate compliance with the site-specific requirements of the Environment Agency.

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About OTT Hydromet GmbH:

The globally operating OTT Hydromet GmbH can look back on a more than 140-year history with its headquarters in Kempten in Germany. The company manufactures products that enable water professionals to monitor the planet's most precious resource. Through the delivery of accurate reliable data, OTT's instruments and services provide essential tools to help protect the environment.

From precipitation through surface and ground water to marine monitoring applications, OTT's measurement and communication technologies provide a complete picture of the water cycle. Adcon Telemetry was acquired in 2011, and Sutron and Lufft joined the OTT Hydromet Group in 2015/16, which means that the company is able to offer the best sensors and data handling technology for every application.

Based in Sheffield, OTT Hydrometry Ltd is dedicated to serving the needs of its clients in the UK and Irish Markets. The company is a subsidiary of OTT Hydromet GmbH, Germany.

Picture captions:

Picture 1:

Soil moisture station with Adcon Remote Transmission Unit



Picture 2:

Irrigated plantation of fast-growing willows for short rotation crop production



Source: OTT Hydrometry Ltd