

SpotView

Newsletter # 5

Technology demonstration for resource efficiency in Dairy, Steel and Paper industries

The SpotView project, started in October 2016, entered in its last year with demonstration trials.

In 2019, the project partners carried out technology demonstration trials in operational environments of paper, dairy and steel industry. These trials were performed over a period of months to cover process fluctuations and to determine key indicators about process performance, maintenance, as well as operational costs and applicability.

The results of these pilot scale testing will be used to demonstrate the potential of improved water management in the different industries. Collected data and evidence will serve for the future business cases, exploitation plans as well as environment impact assessment.



Exploitation strategy

In order to maximize the SpotView project impact, exploitation strategies and business plans have been developed for 5 Key Exploitable Results:

1. Ultrafilter-CR (Valmet);
2. Chemical Heat Pump (Qpinch);
3. Biocontrol Concept (XerChem);
4. Capacitive Deionization (BFI);
5. Anaerobic/aerobic membrane bioreactor (CERTH).

Two Exploitation Strategy Seminars were held at month 18 (April 2018) and month 30 (April 2019) of the project, to characterize the SpotView KERs, analyse the market, model the business, and assess and prioritize the risks. For broader exploitation of SpotView results joint workshops are organized (see elsewhere in this newsletter) and technology leaflets are used. These leaflets summarize the key elements of the KER on a non-confidential bases and address the roadmap for full exploitation, including possible needs for partners, funding, or additional development.

The exploitation strategy is reported in the intermediate and final SpotView impact and exploitation plan.

Eric FOUREST & Hank VLEEMING

SPOTVIEW

Zoom on Demonstrators

- > CTP / Kadant / Saica
Valuable substances recovery in paper and board industry
- > VTT / Xerchem / Essity
Onsite generation of biocides from paper mill process waters
- > BFI / Valmet / Essity
Ten months experience with Valmet Ultrafiltration T at Essity Nokia tissue mill
- > Arcelor Mittal / BFI
Demonstration of selected technique for solid and salt removal in the steel industry
- > Certh / Megval
Demonstration of an anaerobic/aerobic Membrane bioreactor in dairy industry



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Valuable substances recovery in paper and board industry



Demonstration trials for starch recovery from industrial mix cardboards slushed with industrial process waters, were carried out from February to June 2019 at Kadant and CTP technology centers in realistic environment, to determine Key Performance Indicators of extraction and separation technologies selected (washer, dissolved air flotation, centrifuge decanter).

Pilot trials results showed yield of 7 to 8 kg of starch recovered per ton of recovered card-

board, corresponding to 20% to 25% of the total starch amount in the raw material. Starch concentration in the recovered mixture is up to 50%. These KPIs will be used as input data to simulate the global impact of starch extraction on paper mill process model.

Recycled mixture characterization and valorisation trials are in progress to define the exploitation strategy and confirm the overall environmental impact.



Pilot trials at Kadant and CTP facilities

Onsite generation of biocides from paper mill process waters

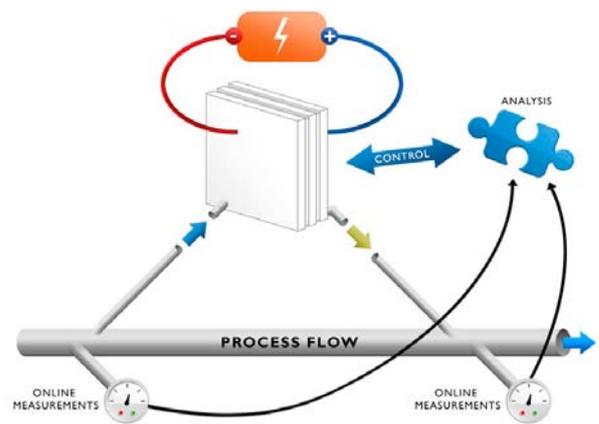


XerChem's new BioControl unit combining membrane technology and electrolysis is made for in situ biocide production. Existing in situ units use saturated brine solution for similar task, but BioControl unit does not need it. The biocide is made by using existing chlorides from process water, which means that transport or storage of hazardous substances is not needed. In situ biocide production also helps to minimize the amount of chemicals introduced in the water circuits and limit the risk of detrimental impact on

the WWTP. BioControl unit has been used and tested and optimized at Finnish paper mill since February, 2019 and also at Finnish steel mill since August, 2019.

The program was as follows :

- chloride concentration with nanofiltration membranes;
- mill scale Electrolysis trial with increasing chloride solution flow rates;
- evaluation of biocide performance in different process conditions.



Ten months experience with Valmet Ultrafiltration T at Essity Nokia tissue mill

Valmet's new ultrafiltration technology is a solution for decreasing tissue mills' fresh water utilisation. Valmet Ultrafiltration T process for disc filter clear filtrate has been a good solution for decreasing the fresh water consumption at Essity Nokia tissue mill as fresh water utilisation has decreased 1-2m³/t produced paper. The capacity, i.e. permeate flow has been steady 6-8m³/h, and during the warm summer months 10m³/h. The quality of the permeate has been good.



Valmet Ultrafilter CR at Essity Tissue Mill

Most of the micro stickies we removed. The continuous removal of bacteria, solids, micro stickies and colloids from white water has several benefits:

- less slime and clogging problems, cleaner paper machine with better runability and better paper quality;
- lower wet end chemical consumption and costs.

Permeate has been used in wire section high-pressure showers since January 15th, 2019.



Valmet 

essity 

Bfi
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Demonstration of selected technique for solid and salt removal in the steel industry

During Filter backwash water was selected to be recycled into the steel process with a double aim: water quality improvement and fresh water saving. Innovative treatment technologies were assessed:

- low footprint pretreatment combining flotation with submerged microfiltration to remove suspended solids (TSS), oils, grease and turbidity;
- capacitive deionization (CDI) for decreasing the salinity of the water.

Demonstration trials were realized during several months to validate these technologies in ArcelorMittal Asturias site, Spain.

The pretreatment delivered a water quality that can be fed into the CDI (TSS < 10 mg/L), although, cartridge filters were needed in between. The CDI was able to obtain a quality to be recycle back as make-up water (< 200 µS/cm).



Complete CDI test pilot including the pre-treatment


ArcelorMittal

Bfi
Excellence in Applied Research

Demonstration of anaerobic/aerobic Membrane bioreactor in dairy industry

Dairy wastewater and byproduct streams contain biodegradable organic matter that is removed by a novel two stage anaerobic/aerobic membrane bioreactor (an/a MBR).



Communication



Eric FOUREST
Sandrine PAPPINI

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a) Anaerobic/aerobic membrane bioreactor pilot-scale installation
b) Programmable logic controller (PLC) touch panel of the anaerobic MBR

Some typical advantages of the combined anaerobic and aerobic treatment with the membrane technology are as follows:

- significantly smaller sludge production;
- reduced energy consumption (since the produced biogas can be used as a renewable energy source);
- superior quality of treated effluents for recycling.

The fully automated and remotely controlled an/a MBR unit has been operating for a six months demonstration period in the premises of MEVGAL in Koufalia, Greece.

Pilot plant operational data reveal that high removal of organic load is achieved (>99.8%), resulting in a high quality effluent stream that can be used in secondary uses in dairy industry such as cooling water. At the same time, biogas of satisfactory quality (>70% CH₄) is produced. All collected data will be used in the subsequent Life Cycle and Environmental impact Assessments, whereas a techno-economic evaluation of the demonstrated technology is underway.

Save the date

SpotView Workshop

EU Water Innovation Conference 2019 (EUWIC) held on December 11-12, in Zaragoza, Spain

More details and registration on #EUWIC website



Contact CTP, Ioana Stanciu

SAVE THE DATE

Cross cutting issue conference

Holistic approaches for water and resource efficiency in process industry

25 – 26 March 2020
Brussels · Belgium

supported by the Representation of the State of Hesse to the European Union

Joint initiative of SPIRE projects:

www.inspirewater.eu www.spotview.eu

An exciting programme awaits you in which the final results of the INSPIREWATER and SPOTVIEW projects will be presented.

More information will follow soon.

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