Reuse filter backwash-water - Reuse of filter backwashwater from groundwater treatment for drinking water purposes with a submerged membrane system
LIFE98 ENV/D/000509

Project description

Environmental issues

Beneficiaries

Administrative data

Contact details:

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Project description:

Background

Many supplies of drinking water contain substances (e.g. inorganic matter, microorganisms), which must be removed in order to allow it to be used for human consumption. The frequently used filters, therefore, have to be washed out. This backwashing requires up to 3% of the fresh water volume, which is then disposed of as wastewater. This practise puts more strain on the environment and is avoidable by micro filtration of the backwash water - as previous research has shown on a small-scale. Through microfiltration and using a submerged membrane system, the backwash water is recovered and becomes reusable. The project demonstrated the feasibility and the potential for optimizing the membrane process, resulting in high filtrate quality and economical viability.

Objectives

The project aimed to demonstrate, on a large-scale, the ecological, economical and hygienic feasibility of membrane micro filtration to recover nearly all the water from this backwash water in compliance with drinking water regulatory limits. The technique employs a submerged membrane system. The objectives were to: * Reclaim 99.9 % of the backwash water for use as drinking water (observing national and international hygienic requirements) * Investigate and optimise regeneration * Prove environmental benefits: minimised effluent and better disposal. * Prove economical feasibility: no additional costs versus
conventional discharge. The decisive factor was the adequate and safe separation of the suspended particles, with particular reference to microorganisms that needed to be removed to provide hygienic conditions.

Results

The project showed, that 99.85% of the backwash water could be recovered and used as drinking water - increasing the amount of drinking water and decreasing the amount of effluent. Savings were also made on energy consumption, as due to the very low pressure needed for the water to flow through the membranes, the process is a low energy process (0.8 - 2 kWh/m³ of recovered drinking water). A further advantage of the submerged membrane modules is the potential for implementation in existing settling tanks, resulting in important savings on additional buildings. No sedimentation interval is needed. To prevent the development of a coating on the membrane, a cross-flow between the membrane modules is induced by strong aeration. Economically the costs for recovery are not higher than the effluent costs, making the technology cost neutral. Costs are some 1.5 € per m³ of treated backwash water. As there probably is further room for optimisation (e.g. engineering costs for further plants may be lower), the technology should be viable wherever discharge costs are high or drinking water is a scarce resource. From the technical point of view this technology is successful and ready for use in the market from 2002. It also offers good transferability to other European countries. A follow-up report, carried out in April 2005 by the LIFE external monitoring team, showed the plant is still running efficiently. The original set of membranes is still in use, which means a considerably longer life span than originally planned. Also no other components had to be changed or spare parts implemented. This is also positive news in terms of costs: economically the costs for recovery are no higher than the effluent costs, making the technology cost-neutral. According to the beneficiary, there is further room for optimisation (e.g. engineering costs for further plants will probably be lower), and so the technology is likely to be viable wherever discharge costs are high or drinking water is a scarce resource. Meanwhile the 2005 costs for membranes have dropped by about half in price and the technology is gaining ground in the market.

Top

Environmental issues addressed:

Themes

Water - Water management and supply

Keywords

water reuse, drinking water, groundwater, energy saving
Target EU Legislation

- Water

Natura 2000 sites

Not applicable

**Beneficiaries:**

<table>
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<tr>
<th>Coordinator</th>
<th>Erlanger Stadtwerke AG</th>
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<tr>
<td>Type of organisation</td>
<td>Public enterprise</td>
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<td>Description</td>
<td>Erlanger Stadtwerke AG (ESTW) is a public-owned supplier of drinking water, electricity, heat and gas.</td>
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<td>Partners</td>
<td>WABAG Wassertechnische Anlagen GmbH, Kulmbach Technische Universität München (TUM Technical University of Munich): Lehrstuhl und Prüfamt für Wassergüte- und Abfallwirtschaft</td>
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<td>EU contribution</td>
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**Environmental issues**

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