

Optimisation of the drinking water supply in the area of the Hochsauerland Water Association

The challenge

European and national laws and directives requirements for all forms of drinking water supply from surface waters encourage that particle retention is carried out to the maximum. It is only through such measures that downstream disinfection processes (e.g. chlorination) can be guaranteed. It is then possible to prevent special forms of pathogens (spores), which normally would be difficult to deactivate, from entering the water supply system. In Germany this is especially true for reservoirs, but also for other sources with water that has not remained underground for a sufficiently long period of time in order to achieve the required cleaning level. This is, for example, often the case in geological karst formation areas. For this reason it will be necessary to monitor drinking water supply plants over the next few years and to optimise them when required.

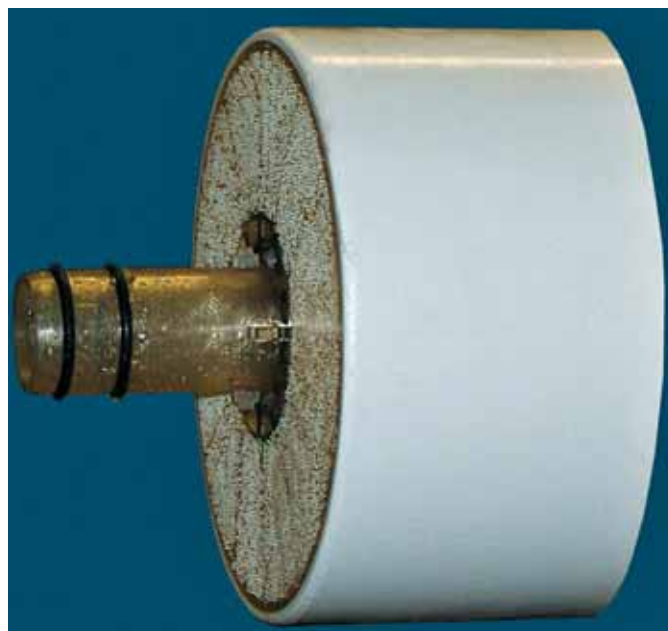
The target

Due to the increased demand for water in the area of the Hochsauerland Water Association, it has been decided that the drinking water purification performance of the water works at the Sorpe reservoir should be extended (while in operation). This should take place in such a way that current and future demands placed on water treatment should be solved in the most economic and problem-free method. The required plant technology should be automatic, as far as possible, and include a remote monitoring capability via data telecommunication. Constructional changes to the waterworks should be avoided, in order to minimise the probable shutdown of the waterworks.

The solution

As a result of the comparison between varying processes (flocculation, slow sand filter and membrane filtration) clear advantages became apparent with regard to membrane filtration. This was due to the lack of available space and the required absolute separation of the smallest particles. However at that time membrane filtration had not been implemented in Germany for such large scale drinking water treatment projects. Therefore doubts arose with regard to costs and operational safety. The result of various research projects had shown that the most suitable ultrafiltration membrane in this field was from polyethersulphone, in the form of capillary modules most suited for this separation stage.

This material has a high chemical resistance against cleaning and disinfection agents. Additionally, the suitability of the drinking water was proven by independent institutes. Due to the existing building geometry it was very easy to set up the modules in horizontal pressure pipes, which led to a very compact solution.



The total installed membrane area of 2,960 m² was installed in 3 racks, each with 2 x 7 pressure pipes, and could be placed in a room that was previously only used for certain control functions. The distribution of the service and flushing water including the necessary pumps and receiver tanks were one floor below.

As a result of the partitioning into three blocks, in combination with the control and regulation technology, it was possible to achieve a wide spectrum regarding the treatment performance of the waterworks. The whole installation was made of plastics



approved for drinking water treatment, which led to a considerable reduction in investment costs when compared to the initial plan.

Technical data

- drinking water treatment plant Capacity 2 Mio. m³ per year
- 3 blocks each 83 m³/hour
- recovery > 95 %
- particle rejection > 99.999 %
- flushing cycle 1/hour
- pressure loss approx. 0.5 bar

Project time line

August 2000 to March 2001

Investment costs, running costs and economic success

The investment costs for the complete plant technology, including the membranes and electronic control, amounted to approximately 1 million €.

The guaranteed lifetime of the membranes is 7 years. The result from the allocation of all capital and operating costs came to treatment costs of approx. 0.14 € per m³ at an annual utilisation of < 50 %, and to less than 0.10 € per m³ at higher utilisation.

Other application domains

Due to the positive experience gained by this plant a further ultrafiltration plant of comparable size (220 m³/hour) is being built (2004) in the supply area of the Hochsauerland Water Association for the water works of Meschede. A further development of the vertical modular construction will be implemented. This technology, for drinking water treatment, is gaining great international attention as a pre-treatment stage for e.g. desalination plants, which can be run much more safely this way.

Plant operator

Wasserverband Hochsauerland
Auf'm Brinke 11
D-59872 Meschede
Germany

Contact: Mr. Sommer
Phone +49 | 2 91 | 54 97 14

Experience with the system

"Membrane cycles have proven themselves for a long time, and the guaranteed cleaning twice a year has only been mini-

mally exceeded and could be improved with the experience gained additionally. The quality of the cleaned water has increased considerably. The high flexibility in throughput and the high treatment quality (previously approx. 5,000 particles > 0.5 µm per ml) have been reached. The plant has been running in a stable operating mode since March 2001."

[Urban,Simon,Schwarberg in gwf 144(2003)Nr.11]

Contractor

Pressure vessels / Process equipment:
WAT-membrantec GmbH & Co. KG
Gruitner Str. 17
D-40699 Erkrath
Germany

www.wat-membrantec.com

Phone +49 | 21 04 | 94 55-33
Fax +49 | 21 04 | 94 55-30

About the company

Since the foundation in 1978 WAT-membrantec has manufactured components and complete plants for various applications in the treatment of water and sewage. The company is an independent family company owned by the managing director Mr. Rolf Haake. Since 01.09.2004 WAT-membrantec has expanded its product portfolio with components and services from the brand Kyll Wasseraufbereitung.

Key figures

Turnover approximately 4 million € (2003)
Employees 28 (2003), 32 (2004)
Sister company: Rohrleitungsbau, Berlin

Specialisation

Water and sewage equipment and plant construction with a high manufacturing penetration including TÜV (German Technical Inspection Agency) tested module and apparatus construction as well as automation technology for industry, supply companies and building systems.



Contact

Mr. Norbert Selzer (engineer)
Phone +49 | 21 04 | 94 55-36
n.selzer@wat-membrantec.com