

DUTCH MBR DEVELOPMENT ENTERS NEXT PHASE

Co-operation and innovation for a sustainable and safe living environment

Within the Dutch wastewater sector the national MBR development programme has grown into a classic example of co-operation and innovation, where fundamental research organisations, suppliers, consultants and water boards have been involved. With the official opening of the demonstration installation at Varsseveld on May 3, the second phase of the Dutch development programme shall commence. Here, amongst others, an intensive research programme will be carried out to address scale up issues. It has been seen that co-operation in the Dutch wastewater sector is of great importance and should be copied for other developments within the water sector.

As an introduction to the official opening of MBR Varsseveld, the third H₂O MBR special has been created. After the first and second MBR specials in 2001 and 2003 this edition will effectively close the first MBR development phase, which dealt with the possibilities of the MBR technology for the specific Dutch wastewater situation. The realisation of the MBR Varsseveld represents the beginning of the second phase of the national MBR development, which will demonstrate all the facets of scale up.

MBR Varsseveld can be seen as a product of a combined effort from the Dutch wastewater sector. Since the year 2000, fundamental scientific organisations, suppliers, consultants and water boards have all been involved with the development of the technology, and a positive spin off is that this has spread beyond the Dutch borders. In recent years the Dutch contribution to the MBR development has received worldwide

recognition, and through this third edition of the H₂O MBR special, the initiators, water board Rijn en IJssel (WRIJ), the Foundation for Applied Water Research (STOWA) and DHV Water BV (DHV) hope to give an increased impulse to the technology. We are proud to present you this H₂O MBR Special and wish you pleasant reading.

MBR technology

The MBR technology is based on the combination of the activated sludge process and membrane filtration in one treatment step, where the separation of the activated sludge and effluent is achieved with the help of membranes. The MBR technology maintains the good performance and flexibility of the conventional activated sludge process, but also has two major advantages:

- The required space is small as secondary clarification is not necessary and the

sludge concentration in the aeration tank is two to three times that of conventional systems;

- The effluent quality is significantly better as all the suspended and colloidal material is removed. Furthermore extra removal of heavy metals, micro contaminants, bacteria, viruses and colour is achieved and sludge disturbances no longer cause poor effluent quality.

Especially in Holland where almost all wastewater treatment plants are of the activated sludge type, where space is limited and the quality of surface waters must be strongly improved, the MBR technology has great potential. Until now, the Dutch have focused on possible improvements in the effluent quality and the space saving was considered less important. However, the MBR technology offers potentially compact solutions where space saving can offer advantages. The latter, particularly in situations where the treatment works is located in or nearby large cities where innovative solutions with MBR can be feasible.

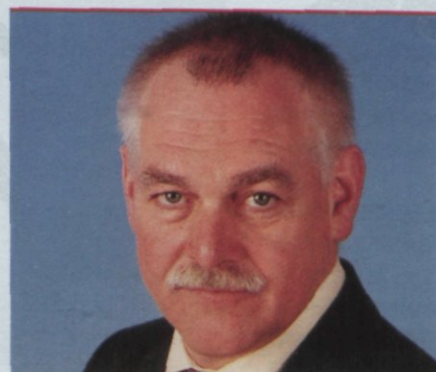
National development

The national MBR development in the Netherlands began in 2000, and five years later can be considered to have pushed the technology to new levels. The now worldwide famous pilot research at the treatment works Beverwijk was the starting point of the first phase of the Dutch MBR development. During an extremely short period of seven months the MBR technology had to be proven viable for the specific Dutch municipal wastewater characteristics and give reliable data for scale up. Water board Hollands Noorderkwartier and DHV in co-operation with four membrane suppliers and a number of foreign parties initiated this challenge, and within the first

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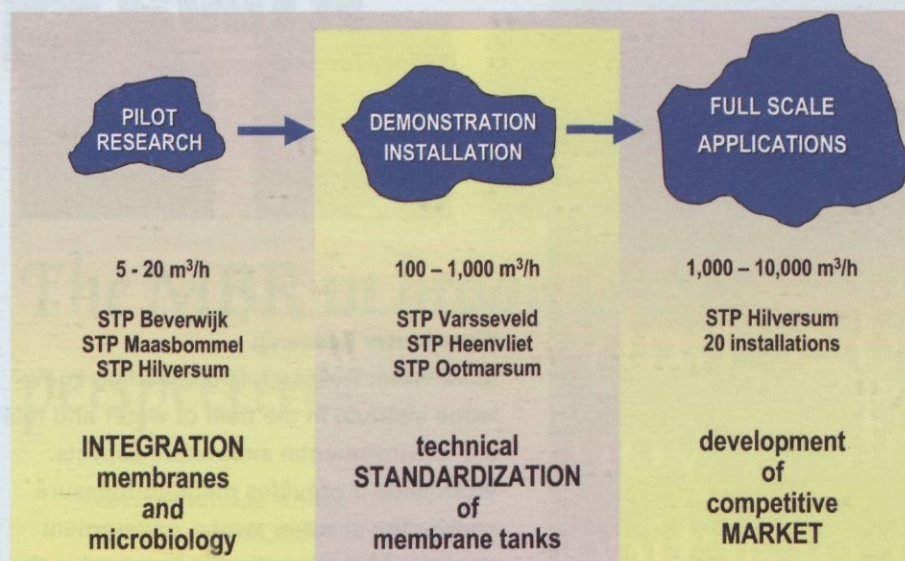


Figure 1: Development of MBR technology in the Netherlands (2000-2010).

year of the study the group was expanded to include other Water Authorities and fell under the coordination of the STOWA for the national MBR development programme.

From an economic perspective, the potential impact for the environment, innovation power and co-operation throughout the water sector, the significance of the MBR technology was addressed at administrative and political level. At the end of 2000 it brought the water sector and policy bodies together. It was understood that only through 'togetherness', a technology could be developed whereby the technical and financial risks were not for the individual but rather for the group. Shortly thereafter an innovation fund was created to initiate the correct start for the technology and not limit its further development. Based on these initiatives the Dutch water boards and the Ministry of Traffic and Public Works were able to agree on long term financial commitments.

We are now a few years down the line and the national MBR development is at full steam. After the successful completion of the research phase the commissioning of the demonstration plant Varsseveld signals the start of phase II. In the next 1.5 years WRIJ, STOWA, DHV, TNO, Delft University of Technology and Wetsus shall cooperate in intensive research in order to address the consequences of scale up. The water authorities Hollandse Delta and Regge en Dinkel will also realise MBR installations in 2005 to address the applicability of various hybrid configurations. All three full-scale projects are being supported out of the innovation fund.

Already, preparation is being made for

the realisation of the full-scale system of MBR Hilversum and will signal the start of phase III of the National development. This phase has the goal of generating a mature product for the MBR market with an emphasis on economics. Figure 1 is a schematic of the national MBR development.

All activities in the MBR development programme are coordinated via the STOWA, and through a steering committee, a supervisory commission and platform meetings, all the participants are informed regarding knowledge dissemination and project progress. The educational branch Wateropleidingen has been carrying out courses over the last few years to ensure the future of the technology.

The future for MBR?

The future of the MBR technology depends on many factors. The fact that cost plays an important role is obvious, even though the membrane cost has significantly reduced in recent years. The latter is reinforced by further developments in countries such as China, Korea and Taiwan, and together with the rapid technical and technological development the cost differential between MBR and conventional technologies is narrowing, and in some cases the MBR is a viable economic alternative. Future European guidelines, the drive for innovation in combination with economic perspectives, possibilities to free up expensive inner city ground, can all lead to arguments for further MBR development, despite the fact that on the short term the technology is more expensive than available traditional technologies.

Further technical and technological developments will concentrate on solving everyday problems and expanding the MBR

advantages, and through a combined focus on the development issue the progress will be accelerated. For this it will be clear that courage at managerial level is indispensable, the example of the Dutch MBR programme has shown the positive consequences. It is of great importance that the generated co-operation in the Dutch wastewater branch can be learnt from, and applied to other (technological) developments, so that the water authorities can develop a beautiful perspective for the future.

Book marker

This third edition of the H₂O MBR special is a celebration of the official opening of the MBR Varsseveld and also to give an idea into the current activities surrounding the Dutch MBR development programme. This edition is in English and also available as a complete pdf-format on the world wide web (www.mbrvarsseveld.nl), which was especially set up by WRIJ, STOWA and DHV for the Varsseveld project. The website will be available until July 2006.

All participants in the development programme will be addressed in this edition of the H₂O MBR special. The first five articles will describe the vision of the government, water authorities, fundamental research institutions, consultants and industry. Thereafter, a short overview of the development of other countries outside of the Netherlands is enlightened, and an insight given to two articles covering the first two phases of the national development programme. Lastly, in six articles the running MBR projects in the Netherlands will be openly described, where the last deals with the educational aspect. Once again the initiators, water board Rijn en IJssel, STOWA and DHV are proud to present you this H₂O MBR special and wish you pleasant reading.

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