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WITHOUT WATER EVERYTHING COMES TO A HALT

WMD Drinking Water in the Netherlands produces more than 35 million m3 of drinking water every year and prevents everything from coming to a halt in 200'000 households and businesses. A visit to the Ruinerwold production station gives an insight into the extensive water supply system and highlights the contribution made by the DCX-22AA groundwater data loggers from KELLER Pressure.

Ruinerwold is one of 12 WMD production stations that supply drinking water to end users via thousands of kilometres of pipes. To ensure that the supply of water is reliable and effective, the water catchment areas have to be monitored closely. As in many other water catchment areas, until recently the groundwater level was measured manually twice a month. This was always done on the same day of the month and, if possible, at the same time of day.

New legislation and new opportunities

Following the introduction of the BRO Act (Basis Registratie Ondergrond or basic registration of subsoil) in the Netherlands, more is required than simply manual measurements and records. The new legislation has also had a positive side effect: "In the past we were not concerned about the data we had collected. Instead we were busy meeting the requirements of our licence. We didn't appreciate the added value that the data had to offer. The result of the new BRO registration was that we looked at the entire measurement network for the first time, which gave us a genuine feeling of responsibility," says Joop Mentink, a geohydrologist at WMD.

"In the past, the focus was mainly on monitoring the costs and meeting the requirements. Now we have a better understanding of the background and can put more effort into managing the measurement network. We need enough accurate data so that we can always make the right decision about each transition.

The Basis Registratie Ondergrond (BRO)» is a new piece of legislation which introduces a basic registration programme in the Netherlands and which is working to establish a national facility with reliable information about the soil in the country.



BRO information box, logo <https://basisregistratieondergrond.nl>



© WMD, Louis Snelders records well data



An important part of this is an accurate and regular record of the groundwater used per head of population," says Mentink, summing up the change in the company's culture.

The BRO Act has made it possible for the entire management system to be digitalised with the help of smart software. The information collected in relation to the water catchment areas and the monitoring of groundwater make it possible to carry out an accurate analysis of the relationships between activities and water levels. Now, together with other hydrologists, WMD Drinking Water can record increasingly accurate information which allows it to find better answers to ever more complex questions. "We can now supply the hydrological models with good-quality data and that represents a big step forwards," says Mentink, who is very happy about the digital developments.

A mix of old and new

But the BRO Act was not the only trigger. A few years ago, a policy came into force in the province which requires every water extraction licence to be updated every 10 years from now on. "As a result, we carried out a thorough inspection of the entire monitoring network. Our plants are made up of old and new components. At the new plants, measurements were made using modern measuring equipment, but we were not able to take measurements at the old plants with the same level of accuracy. We had to find out from every measurement well how the coordinates had been obtained and how accurate they were."

Mentink explained that the company decided to remeasure all 800 sites. Over a period of around year, the coordinates of the individual measurement wells were recorded again and a comprehensive inventory was carried out. All the wells were photographed and information about the materials, diameter and condition of the wells was obtained. A new software package

was purchased specially for the purpose and the surveyor Louis Snelders was promoted to become manager of the monitoring network. This is a pleasant role, because the monitoring wells are located in beautiful spots where there is an interesting variety of flora and fauna.

Investigative work

Snelders and Mentink both speak with pride about WMD Drinking Water. The company has, after all, been in existence for 85 years. "The first municipal drinking water companies were established at the end of the 19th century. These municipal companies merged to become one provincial organisation."

The work carried out by Mentink and Snelders could be described as investigative. One of them ensures that the data can be collected and the other puts the pieces of the puzzle together and looks for connections. "For example, we can find out where contamination comes from and what effects certain decisions have had. To create accurate models, we obviously need long-term data and there is also a calibration phase. When there are deviations, we can fine-tune the models. But when we know the source and understand how the model works, we can estimate the impact of problems in advance. There is a growing demand for drinking water and we are investigating the right approach to take in changing conditions."

The catchment areas are all very different. The soil structure and the composition of the groundwater, the deposits made by the sea, rivers, the wind and the ice age all vary depending on the location and can be tasted in the water. "Every formation layer was created by specific deposits. For example, here at this production station we pump iron-rich water with a hint of methane so we have to degas the water," says Mentink, explaining the specific smell at the site. "We do this by aerating it in a vacuum and using a sand bed to filter it."



© WMD, Joop Mentink on the tour through Ruinerwold



© WMD, The Monitoring wells are located in beautiful spots

Drinking water with a future

Mentink is working on understanding the effects of local activities on the surrounding area and vice versa. This involves evaluating the risks and monitoring certain critical performance indicators: "We are turning from a management business into an investment organisation that aims to be future-proof.

How can we make sure that adequate supplies of good-quality drinking water will still be coming out of our taps in 2100? In the past we were mainly concerned with extracting water from the ground to produce drinking water, but now we are increasingly focusing on the effects of these activities in the region. Our key considerations are integrating our business more effectively into the water system and, together with our stakeholders, searching for the best-quality drinking water, both now and in the future.

We have to monitor all types of developments and attempt to predict what will happen in relation to demographics, the climate and the quality of the environment. Water catchment areas need a lot of time to develop, so if we have to expand them, we must start the process very far in advance."

Comprehensive monitoring network

While Mentink is concerned for the future, Snelders is busy making the most of the present. In the past, five people were needed to carry out the surveys manually twice a month, but now technology has taken over. "In future, we plan to carry out on-site surveys, but only twice a year. Digitalising our systems has given us much more time for maintenance at the different bore holes. As a result, I look at the area quite differently as I drive through it and pay much more attention to changes."

As head of the monitoring network, Snelders now has everything under his control and is focusing specifically on the quality of the network, which means greater commitment and responsibility. He says, with legitimate pride: "The data quality and, in particular, the density and accuracy of the measurements have improved significantly."



© WMD, The high-quality monitoring network belonging to WMD



© WMD, Production station Ruinerwold



© WMD, Supplying drinking water to 200'000 premises

The monitoring network is being laid out around the water catchment areas. The job of the network is to monitor the effects of groundwater extraction and this work is done mainly by DCX-22AA data loggers from KELLER. "The province of Drenthe investigated the market to find suitable measuring instruments and KELLER Pressure offered the best price-performance ratio. The atmospheric pressure compensation system is very simple and convenient. We don't actually have to do anything. Everything is extremely user friendly and we can easily link a serial number to a location," say Mentink and Snelders.

Atmospheric pressure compensated level logger system

At the bottom of the measurement shaft is a level sensor which is connected by a fixed cable to the battery pot at the top. The entire component hangs from an adapter ring so that the monitoring shaft can be sealed. The atmospheric pressure compensation is carried out by a second pressure sensor at the top of the shaft. The real-time atmospheric pressure compensation allows the DCX-22AA to be used in measurement shafts to record the groundwater level and sewage overflows. The entire system is watertight (IP67) to ensure that it remains undamaged if the measurement shaft floods.

The PC connection is on top of the monitoring shaft pipe, which allows the logger to remain in the pipe during the read-out



© WMD, Hydrostatic level measurement with a KELLER data logger

process. This has the major benefit that the current measured value can be seen live, which means that it is very easy to compare it with a manual value. The atmospheric pressure compensation system makes additional air pressure loggers superfluous and, as a result, they do not have to be installed or read. Manual atmospheric pressure compensation is also not required, which is an advantage for the operation of the system.

A happy and poetic end to the project

The digitalisation and automation project brings benefits for the environment and for everyone involved. All the measured values are checked and any faults are rectified. WMD Drinking Water has a clear overview of the system. Mentink draws a poetic conclusion: "We now have one single genuine source of the truth, the absolute truth, when it comes to our data."

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