Cologne’s Drinking Water
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Dear readers,

There are supermodels who eat no meat, others who live without ice cream, some who shun chocolate and others who refuse to touch scrambled eggs. But they all drink water. After all, supermodels know: Drinking water makes us sexy! Whenever one of these catwalk beauties is asked about the secret to her flawless complexion and perfect figure, she will always at some point say: “. . . and I drink a lot of water!”

You can do the same thing without the slightest hesitation – comfortably from the water tap in your own home, because we guarantee top quality water in your pipes. In order to ensure a 100-per cent natural product, we conduct thorough and precise checks and have amassed a great deal of experience to draw on: RheinEnergie AG and its predecessor companies have been supplying Cologne and the surrounding region with revitalising fresh drinking water for over 140 years now.

Water by the glass isn’t the only thing that makes us sexy: You can also take a relaxing bath in it or get ready for a sparkling evening with a cooling shower on a hot summer day. Don’t try that with any other foodstuff!

This brochure explains where our water comes from, how we treat and test it and why we can guarantee top quality at all times.

We hope you will enjoy learning more about where your water comes from!

Dr. Andreas Cerbe,
RheinEnergie AG
Water Production

Water from the Cologne Basin
The Cologne Basin offers very favourable conditions for the production of excellent drinking water. A continuous stream of groundwater slowly flows through the subsoil. Surface water and rain water that have seeped through the ground mix in the gigantic underwater reservoir that we use as a source of drinking water.

Before the water reaches our wells, it has spent a long time seeping through the extensive gravel and sand layers of the Rhine Valley, being filtered and cleaned naturally by microorganisms.

In order to ensure that Cologne and the region have ample drinking water available, we operate eight waterworks with associated well galleries.

Many ways lead to the waterworks
The water follows different paths before reaching one of our waterworks: The Weiler Waterworks, for example, are located on the left bank of the Rhine in the north of Cologne. Five kilometres east of the waterworks, we pump what is known as raw water – a combination of groundwater flowing to the Rhine and river bank filtrate – in the Langel/Worringen well gallery. This water is pumped through several kilometres of pipe to an infiltration basin in Esch, in direct proximity to the Weiler Waterworks.

There it is sprayed into large reservoirs, absorbing oxygen at the same time. This improves living conditions for certain microorganisms which help to clean the water naturally. In addition, this seepage process decreases the water hardness and the nitrate levels of the natural groundwater. From the seepage reservoirs, the water flows to the Weiler Waterworks, where it is pumped in wells. The Severin II Waterworks on the left bank of the Rhine in the south of Cologne and the Hochkirchen Waterworks are fed by the “am Weiler Bogen” wells in the south of Cologne, close to the river, as well as by the groundwater wells of the Hochkirchen Waterworks.

These waters have also undergone a long natural cleaning process in the ground before we mix them together and treat them in the two waterworks. Both the wells of the Hochkirchen Waterworks and the Weiler Waterworks in the north of Cologne are located in the midst of mixed woods, very rich in different species, planted by the city of Cologne and RheinEnergie specifically for protection of the groundwater.

Four of the five waterworks on the right side of the Rhine (Höhenhaus, Erker Mühle, Leidenhausen and Zündorf) pump only natural groundwater. The water from Leidenhausen and Zündorf is mixed in Urbach, treated there and fed into the supply network.

The wells on the right side of the Rhine pump primarily groundwater from the Bergisches Land region. The raw water pumped in the Westhoven Waterworks has a small share of river bank filtrate from the Rhine.

The wells of the Erker Mühle, Leidenhausen and Westhoven waterworks are also surrounded by mixed woods.

When considered as a whole, the drinking water for Cologne consists of two-thirds ground water and one-third river bank filtrate. We use a separate pumping system to produce the industrial water required by companies for different manufacturing processes. This water does not undergo any further treatment.
Treatment and Storage

Lots of carbon makes a good drink
Before the water reaches our waterworks, billions of microorganisms in the subsoil have ensured biological pre-treatment and effectively removed hazardous substances. As a result, we can limit our treatment to the necessary minimum, such as filtering through activated carbon. This substance is made of organic materials like black coal or coconut shells and broken down into millimetre-sized porous granules or rods. These very jagged activated carbon particles have a gigantic surface area. When spread out, six grams – that corresponds to approximately a teaspoonful – would have a surface area equivalent to a football field.

The activated carbon is kept in tanks with a capacity of 100 to 200 cubic metres. The water from the wells is transferred into these tanks, where it seeps slowly through a metre-high layer of activated carbon. The fine capillaries and micro-pores trap even the tiniest amounts of dissolved organic substances from the water – suspended particles, odour and taste substances. The filters also collect organic pollutants, chlorinated hydrocarbons and traces of pesticides. We use activated carbon in the Weiler, Severin, Hochkirchen, Westhoven and Zündorf waterworks.

Some waterworks in Cologne used disinfectant to prevent an increase in the number of germs and thus hygienic deterioration of the drinking water quality on the way to the customer. Our water lab proved, however, that the perfect hygienic quality of drinking water can be guaranteed even without the use of chlorine dioxide or chlorine.

All of the Cologne waterworks have disinfection systems installed so that they can respond immediately to any increase in the number of germs.

Sufficient reserves for all weather conditions
The water consumption in Cologne fluctuates considerably with the weather: On hot summer days, the demand for drinking water rises with the temperature. But we stay cool: Added together, all of the waterworks can pump up to 30,000 cubic metres of water per hour. That is enough water to fill 13 Olympic-sized swimming pools. And it enables us to handle peak consumption rates for the city of over one million inhabitants without a problem. Underground drinking water reservoirs buffer fluctuations in consumption and ensure a stable supply. The chambers in the Hochkirchen and Weiler waterworks on the left side of the Rhine hold a combined 27,000 cubic metres. Two tanks with a capacity of 15,000 cubic metres are in operation in the Frechen supply area.

RheinEnergie operates a series of further tanks on the right side of the Rhine, in particular in the urban area of Bergisch Gladbach.
Water Distribution

From the waterworks to the tap
Extensive technology is necessary in order to ensure that our customers receive their drinking water in the required amount and with the necessary pressure at all times. The pressure must be sufficient, for example, when the fire brigade needs large amounts of fire-extinguishing water from a hydrant at short notice. Numerous pumps, filters, sliders and pipes have to be managed, regulated and monitored.

RheinEnergie’s drinking water network unites all waterworks on the left and right side of the Rhine with the customers. As a result, the supply is secured even if one of the waterworks stops functioning. We continually monitor the network and are constantly renewing parts of it in order to prevent water losses due to leaky pipes.

On the way from the waterworks to homes, the drinking water distribution network branches out further and further. Pipe diameter decreases continually as well. Finally, the house service line connects the transport main laid under the street with the respective building. Parts of the network can be blocked off using sliders. When repairs and maintenance work are necessary, we direct the stream of water in such a way that as few customers as possible are affected.
Resource Protection

Water protection in forests, fields and rivers
Our commitment to sustainably safeguarding the high quality of our drinking water goes far beyond the doors of our waterworks. Prevention is especially important to us: The protected areas around our wells and waterworks cover an area of approximately 320 square kilometres on both sides of the Rhine.

In addition, about 300 hectares of mixed woods rich in different species have been planted around the water production plants in Weiler and Weißer Bogen to protect the groundwater. These are bordered by extensive fruit orchards. On the right side of the Rhine, the former Rechtsrheinische Gas- und Wasserversorgung AG (RGW), whose plants now belong to RheinEnergie, purchased and deactivated 175 hectares of agricultural land close to their wells in order to protect the groundwater from agricultural pollutants.

Water suppliers and farmers joined forces in the mid-1980s to help prevent agricultural pollutants from entering the water supply and have been working together ever since. This commitment was inspired by increasing nitrate residues in groundwater, which penetrated into the soil from fertilizers, etc.
The waterworks along the Rhine supply a total of about 30 million people with drinking water and are dependent on the Rhine and its tributaries for production of the raw water.

Our company has been actively committed to improving the quality of the Rhine water for decades now. The quality of the water in the river is tested extensively at numerous monitoring stations. The results are published in annual reports.

When legislative plans arise affecting the interests of the Rhine waterworks, ARW and IAWR assert their political influence to protect the water. These efforts have yielded fruit: The quality of the Rhine water has significantly increased over the course of the past several decades and the river has sustainably recovered its self-cleaning abilities.

At that time, the Cologne water suppliers and farmers on both sides of the Rhine decided to cooperate on a voluntary basis. This alliance set the tone for water protection in NRW. Since then, the farmers and water suppliers have been jointly developing fertilization and cultivation methods that protect the groundwater while at the same time taking the needs of agriculture into account. The latest findings from research projects are incorporated into agricultural practice. On a whole, the goal is to enable water supply and agriculture to exist side-by-side on a healthy economic basis and to jointly protect water as a resource.

These efforts extend far beyond the borders of Cologne – and they are well worthwhile: The rise in the nitrate content of groundwater has been stopped and in some areas even significantly lowered.

Like its predecessor companies, RheinEnergie has for many years been a member of the ARW (Association of Rhine Waterworks) and of the IAWR (International Association of the Waterworks in the Catchment Area of the Rhine).
Drinking Water and Legislation

Strict standards
Handling of drinking water is regulated by numerous laws and standards. The central body of regulations on drinking water is the German Drinking Water Ordinance (Trinkwasserverordnung). It lays down the requirements for drinking water. This ordinance also applies to water from individual suppliers and for water used in the production of foodstuffs. The Drinking Water Ordinance does not contain any guidelines for mineral water. Bottled mineral water is regulated by the German Natural Mineral Water, Spring Water and Table Water Ordinance (Verordnung über natürliches Mineralwasser, Quellwasser und Tafelwasser).

The Drinking Water Ordinance is valid up to the tap. The suppliers are responsible for the quality of the water up to the meter, while the owner of the building bears responsibility for the household installations. The Drinking Water Regulation also regulates which substances are permissible for treatment of water.

Another binding set of regulations for the waterworks is the DIN 2000. It contains guidelines for drinking water requirements as well as for the planning, construction and operation of plants for the central drinking water supply. Fundamentally:

- Drinking water must be free of pathogenic agents and may not have properties that are hazardous to health.
- It should be appetizing and enjoyable.
- It must be colourless, clear, cool, odourless and flawless in taste.
Quality Assurance

Detailed water analysis
As a result of the extensive and regular monitoring it undergoes, drinking water is among the most strictly controlled food products. In our water laboratory, a team of experts consisting of more than 30 laboratory assistants, technicians, engineers, chemists and biologists examines more than 16,000 water samples from all stages of production, treatment and distribution. In order to maintain a current overview of the future quality situation and be able to react quickly at any time if needed, a large number of samples are extracted even before the water reaches the well installations.

Our highly automated testing concepts and techniques ensure reliable, flexible and fast analytics. Modern analysis procedures are highly sensitive and make it possible to detect even the slightest traces of a substance. By way of illustration: It would be possible to detect the volume of a substance the size of a sugar cube dissolved in a mid-sized reservoir.

The RheinEnergie water laboratory has for decades now been working to ensure flawless quality drinking water in Cologne and the surrounding region. Experience and highly specialised knowledge have made the laboratory a competent and recognised partner to private customers, plumbers, engineering offices, industrial and commercial enterprises, operators of bathing lakes and swimming pools, municipalities, health authorities and other water supply companies. In addition to planning of testing via sampling and analytics all the way to evaluation of testing results, the lab also offers well-founded consulting on all issues related to water quality.

The professional competence of our water laboratory is state certified. The quality management system established in the lab is regularly evaluated, confirmed and monitored by the independent accreditation company Deutsche Akkreditierungsstelle GmbH (DAkkS) in accordance with DIN EN ISO/IEC 17025:2005. The lab has been included on the list of laboratories for drinking water testing maintained by the Ministry for Climate Protection, Environment, Agriculture, Nature and Consumer Protection (MKULNV) of the state of North Rhine-Westphalia (NRW) and is officially recognised.

The laboratory also participates in research projects on key quality aspects and further development of drinking water treatment. These projects cover topics such as risk management of new pollutants and pathogenic agents in the water cycle, preparation of drinking water by means of activated carbon and corrosion of materials.

What gives water its flavour: minerals
For some inhabitants of Cologne, the lime in the drinking water is a problem. The hardness of the water may pose a certain challenge for some household appliances, but the dissolved minerals responsible for the lime are actually beneficial for human health. In fact, water hardness is nothing other than the level of calcium and magnesium in the water. Both minerals are vital for life as well as being responsible for water’s refreshing taste.

Strict limit values that may not be exceeded have been established in legislation for other substances. The limit values for drinking water are based on the assumption that a person will drink two litres of water every day for their entire life and takes into account special requirements for infants. The reasons for limit values may be hygienic or technical in nature as well as toxicological. The drinking water that RheinEnergie offers its customers meets the strict standards laid down in the German Drinking Water Ordinance and is naturally suitable for preparation of baby food.

Our customers are welcome to contact the water lab directly if they have any questions regarding the water quality. We are available Monday to Friday, from 7:30 a.m. to 5:00 p.m. at:

Phone: +49 (0)221 178-3377
Fax: +49 (0)221 178-2237
E-mail: labor@rheinenergie.com
Historic Facts

From the long aqueduct of the Romans to the present
The central water supply in Cologne began in 1872. However, the history of the public water supply extends back to Roman times. Nearly 2,000 years ago, a 95-kilometre water pipe from the Eifel region pumped spring water into the Roman city. The pipe consisted of a masonry channel that ran both above and below ground. Remains of this water pipe can still be seen today in various locations along its former course.

In the early Middle Ages, after the decay of the Roman water pipe, the inhabitants of Cologne obtained their water from drawing wells, which were known as “Pützen”. From the mid-18th century onwards, the city set up pumps that were operated manually using large handles. This type of drinking water catchment posed the risk of producing water that was mixed with waste water, however. Pathogenic germs and bacteria thus reached the wells and caused epidemics. As a result, approximately 1,300 people died of cholera in Cologne in 1849 and another 700 in 1867.

Not until the end of the 19th century did bacteriologists identify the cause of this disease in the drinking water. The scientists recognized that hygienically faultless drinking water can only be achieved through a central supply. Such a supply was established in 1872 on the left side of the Rhine in the form of the first Cologne waterworks. The waterworks in Severin began operating in 1885. In 1905, a waterworks plant began operating in Hochkirchen to replace the waterworks in Alteburg, which was closed a year later. Last but not least, the waterworks in Weller began pumping in 1931. During World War II, the water supply in Cologne collapsed following the heavy air raids in March 1945. Four years later, the supply had been restored to the entire coverage areas with the exception of just a few pipes.

From the 1950s to the 1980s, the former GEW expanded the well galleries, opened up new water resources (Weißer Bogen), built the infiltration basin in Esch and installed the activated carbon filter plants. In 1989, the company commissioned the drinking water reservoir for the Hochkirchen Waterworks.

The Rheinische Wasserwerksgesellschaft (RWG), founded in 1872, opened the Mülheim Waterworks in 1876 on the right side of the Rhine. Today this is Stammheim. Construction of the Westhoven Waterworks followed between 1903 and 1904. In 1923, RWG assumed responsibility for operation of the Höhenhaus Waterworks belonging to Dynamit Nobel AG in Leverkusen-Schlebusch. The company name was changed to Rheinische Energie Aktiengesellschaft rheag in 1930. In 1938, the company commissioned the Wahn Waterworks. This was followed by construction of the Erker Mühl Waterworks from 1959 to 1961, construction of the industrial waterworks in Stammheim Süd and Nord between 1962 and 1963 and construction of the Leidenhausen Waterworks from 1968 to 1972. In 1971, the Cologne facilities of rheag were renamed RGW Rechtsrheinische Gas- und Wasser-versorgung AG, with a 50-per cent shareholding belonging to rheag and a 50-per cent shareholding belonging to Gas-, Elektrizitäts- und Wasserwerke Köln AG. RGW constructed the Zündorf Waterworks between 1977 and 1986.

GEW and RGW merged into the newly founded GEW RheinEnergie – today known as RheinEnergie – in 2002.

In 2008, RheinEnergie modernised its Erker Mühl Waterworks on the basis of a comprehensive ecological concept. This was followed in 2011 by extensive renovation and modernization work at the Severin Waterworks.
A company for Cologne and the region
Drinking water from the tap – our field of expertise. We and our predecessor companies have been supplying energy and drinking water for the inhabitants of Cologne since 1872. And for people in the area surrounding Cologne since 2002.

In total, our company bears responsibility for the sustainable supply of some 2.5 million people as well as industrial, trade and commercial enterprises with electricity, heat, gas, drinking water and service water – around the clock, 365 days a year.

As part of our activities, we are committed to protection of nature and the environment and thus make a valuable contribution to preserving biodiversity and a landscape that is intact and offers a high leisure-time value.

RheinEnergie is assuming its social responsibility as a regional company by helping to make the lives of the people in the Rhine region even more interesting and diverse and promoting sports, culture and science.