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Risk assessment for bank filtration: **The Challenge of Aquatic Micropollutants**

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Client:
Stadtwerke Greven GmbH

Challenges:
The increasing worldwide contamination of aquatic systems with thousands of industrial and natural chemical compounds such as pharmatheuticals, personal care products, industrial chemicals and pesticides represents a tough challenge for water suppliers relying on natural fresh water resources. Although many of these compounds are present at nano- to micromolar concentrations, they raise considerable toxicological concerns. Especially surface waters in areas with dense population and active industry that are used for sewage discharge and drinking water abstraction need to be surveyed with respect to such contamination to ensure a safe water supply. We were asked by the public services of Greven to develop an integrated water supply concept that accounted for the possibility of emerging pollutants in the surface water-derived ground water that is withdrawn for municipal drinking water.

Solutions:
A **risk assessment** was conducted for the catchment in question in addition to a rigorous collection and analysis of the available hydrochemical data. For the **determination of a number of micropollutants in our lab following DIN EN ISO / IEC 17025** we collected samples from the river, from ground water and from the river water percolating through the aquifer. The results showed a number of river-borne pollutants to be abundant in the ground water abstraction, well albeit at lower concentrations as compared to river water. Using Gadolinium as an inorganic tracer we were able to **demonstrate the principle pathway of pollutant entry** into the aquifer. We estimated that up to 43 % of the water in the abstraction wells may be derived from the adjacent river. The calculated probability for any of the pollutants under review to be above values considered to be harmless according to the German drinking water ordinance was shown to be almost zero. During infiltration of river water natural processes such as degradation, sorption and dilution resulted in a sufficient reduction of concentrations of emerging pollutants. Additionally, **we developed an optimized well management** that further allows reducing emergent pollutant concentrations.

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