AKTIONSBÜNDNIS WASSER

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Technical guidance for deriving environmental quality standards
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Chapter 3 Standards to protect water quality
Chapter 3.9 Deriving quality standards for water abstracted for drinking water

Dear Mr. Dekker

The European Water Framework Directive (Article 7 (3)) calls on EU member states to ensure that identified bodies of water are protected and that the deterioration of their quality is prevented in order to reduce the purification effort required for the production of drinking water.

The technical communication, dated 23 February 2010, regarding the derivation of environmental quality standards provides, in terms of chapter 3.9.1, for the derivation of quality standards for the production of drinking water ($QS_{dw, hh}$) from the limits set in the EU Water Framework Directive (98/83/EC) and a so-called "purification factor". This applies in the case that the limits set by the EU Water Framework Directive are less strict than other environmental quality standards ($AA\text{-}QS_{water}$).

$$QS_{dw,hh} = \frac{drinking\ water\ \text{standard (98/83/EC)}}{F_{\text{not removable by treatment}}}$$

This derivation leads to environmental quality standards for bodies of surface water that vary depending on the efficacy of purification and thus to less stringent environmental quality standards in the case of high purification standards. This means, conversely, that higher concentrations of pollutants are accepted in untreated water because, in particular cases,

intensive water purification methods compensate for high pollutant levels through a high elimination rate.

This approach:

- Reduces the safety of drinking water supplies and, in particular, the reliable provision of excellent quality drinking water because it must be produced from raw water resources that are not protected to the required extent by the member states, which might, for example, be possible through direct measures directed at the source of pollutants entering bodies of surface water.
- Is not an adequate reaction to the growing knowledge about transformation products that only arise during the water purification itself. In this regard, it would be prudent to keep the substances that give rise to these transformation products out of sources of untreated water (e.g. tolylfluanide -> ozonation -> formation of the carcinogen NDMA).
- Is not practicable, because the purification factor must not only be determined for each water treatment site but also for every substance in the water and for every water environment (redox conditions, pH value).
- Undermines the goals of article 7 (3) of the Water Framework Directive
- Is contrary to the precautionary protection of water bodies and the polluter pays principle.

The organizations acting in the **Water Alliance** call on political decision makers to act in accordance with these arguments and to drop the inclusion of a purification factor in the determination of environmental quality standards.

Background

Bodies of surface water are an important resource for the provision of drinking water. They have been used successfully for this purpose either directly, or after passage underground, for a long time.

Water companies are only able to exert a limited influence on the economic use, protection and monitoring of the river basin areas from which drinking water is produced.

In all cases, the producers of drinking water always remain responsible for the safety and quality of the drinking water they produce according to the legal prescriptions.

The protection of bodies of water is a vital precondition in order to be able to provide drinking water at a high level of safety and reliability. This is due to simple scientific principles: the lower the contamination of the water used, the more reliable the functioning of the plants used for abstracting and treating the water and the lower the technical effort required.

It is well known that treatment processes have limits:

- Removal of impurities is never 100%,
- Treatment never remove only a *single* substance
- Effectiveness does not remain constant over time
- New chemical substances may occur

It therefore must be the objective in line with WFD to protect bodies of water so that natural or simple purification methods are sufficient to produce drinking water. These processes are characterized by very little material or technological effort.

From a technical scientific viewpoint, it is practically impossible to set concrete elimination rates for the purification process used to produce drinking water. The reasons include the following:

- The specific elimination rates for every specific substance must be determined individually depending on the substance's physical, chemical and biological characteristics.

- The elimination of organic substances through the underground passage of water (bank filtration, dune filtration, artificial groundwater recharging) depends on many parameters such as the duration of the passage underground, the redox conditions, the TOC content, the concentration, temperature, etc. Often, the purification plants also produce “mixed water” which then shows specific elimination rates for various trace substances for a particular purification plant.
- If subsequent ozonation is used, the effectiveness of the ozone, and hence oxidation and transformation, also depends on many different parameters (ozone dosage, concentration, pH value and the concentrations of TOC, bromide and hydrogen carbonate).
- Even when activated carbon is used (either in granular or powdered form) the boundary conditions are determinant in the elimination of organic compounds.

Using DOC content as an example, it can be clearly shown that the elimination rates of individual treatment steps are clearly dependent on the quality of the untreated water. Water with a high DOC content is always more difficult to purify than water with a low DOC content. It is possible that at two different waterworks situated on two different rivers, the substance could eliminated at one (e.g. lower DOC concentration) and not at the other (e.g. higher DOC concentration). Especially with regard to bank filtration, it is known that there are substances that can be eliminated under aerobic conditions but not under anaerobic conditions. The redox conditions during the passage through the banks can vary over the course of the year (e.g. anoxic in summer, oxic in winter).

Furthermore, there will always be individual substances that are almost impossible to eliminate during treatment, such as EDTA and acesulfam.

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