

Source Water Protection For Drinking Water Production: A European River Memorandum

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INTRODUCTION The Association of River Waterworks (RIWA) and International Association of Waterworks in the Rhine (IAWR) aim to ensure the production of perfect drinking water through natural treatment only, such as bank infiltration. The 'Rhine memorandum' of 1973 was updated in 2008, to include collaboration with representatives of the rivers Danube and Meuse. The 2013 edition also includes Elbe and Ruhr. It addresses decision makers, large industrial and agricultural associations, as well as national governments, the European Union and international commissions for the protection of the Rhine (ICPR), Danube (ICPDR), Meuse (IMC) and Elbe (ICPER).



Quality objectives

- **Regulated pollutants not considered**
Some exceptions e.g. nitrate (nitrite formation during bank filtration) and chloride (corrosion risks)

- **Focus on anthropogenic pollutants**
Natural pollution (e.g. algal toxins, microbes,...) usually due to anthropogenic influences
- **Distinction between pollutants with / without known biological effects**
- **Precautionary approach dictates “unknowns” to be dealt with as “possibly having biological effects”**
- **Pollutants with known biological effects – 0.1 µg/l**
Pesticides and metabolites
Pharmaceuticals and metabolites
Endocrine disrupting chemicals
PFCs and other halogen-containing pollutants
- **Pollutants without biological effects – 1 µg/l**
Any persistent pollutant that would pass ‘simple treatment’
- **“Unknowns” - 0.1 µg/l**
Any persistent pollutant with unknown toxic properties that would pass ‘simple treatment’

Main characteristics

Water management demands:

- Priority for drinking water production over other uses
- The embedding of protective legislation which permits natural treatment techniques
- Strict application of the Stand-Still principle
- Consideration of consequences to drinking water standards in the authorization process of new substances (REACH)
- Monitoring networks to detect new insights / substances

Motivation for precautionary principle and simple treatment:

- Adoption of the Threshold of Toxicological Concern (TTC) concept, and tuned to EU legislation for pesticides
- Recognition that advanced (oxidation) treatment only converts pollutants, it does not remove them

Positive development

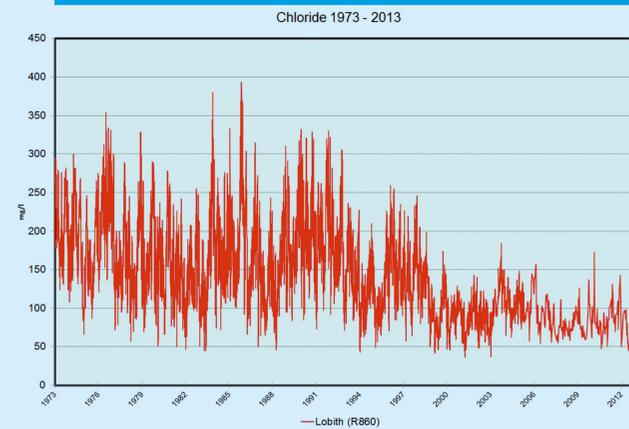
Reduction of ecotox irrelevant pollutants MTBE & Diglyme in the Rhine basin

- Indicates rising awareness by the International Commission for the Protection of the Rhine (ICPR) of drinking water issues
- Raises hope for additional steps with respect to similar pollutants

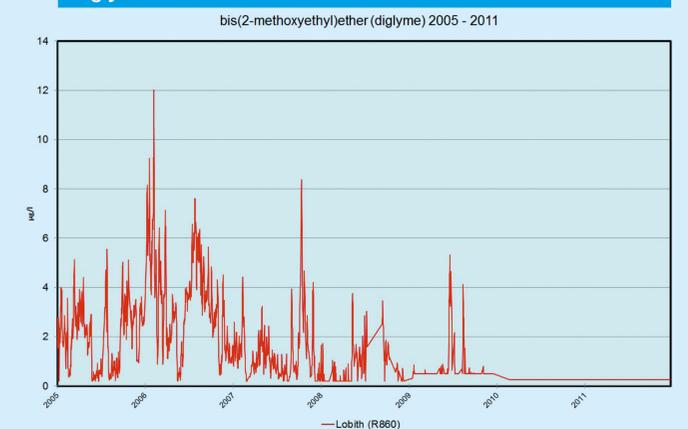
Incorporation into Dutch legislation of general limit for “anthropogenic pollutants causing problems for drinking water production” (1 µg/l)

- Positive first step – although no legislation as yet on biologically active compounds such as pharmaceuticals or endocrine disruptors (EDCs)

Chloride measured in Lobith 1973 to 2013



Diglyme measured in Lobith from 2005 to 2011



MTBE and ETBE measured at Lobith, from 2003 till 2012



Cadmium measured in Lobith 1973 to 2013

