

The Minister of Housing,
Spatial Planning and the Environment
Postbus 30945
2500 GX Den Haag

TCB S45(2007)

19 July 2007

Re: Advisory Report MTBE Standards

Dear Minister,

In February 2000 the Soil Protection Technical Committee (TCB) recommended that the then Minister of Housing, Spatial Planning and the Environment should conduct a survey of contamination by methyl tert-butyl ether (MTBE) in the Netherlands. Following questions in parliament, a national survey was carried out.¹ In addition the National Institute of Public Health and the Environment (RIVM) has calculated, at the request of your Ministry, risk limit values for MTBE in soil, sediments, groundwater, surface water and drinking water.² In response to your request for advice,³ the TCB is pleased to present its conclusions below on the nature and magnitude of the remediation standard for MTBE in groundwater.

The problem

At present there are no regulatory standards for MTBE. The Circular *Streef- en Interventiewaarden Bodemsanering* (Target and intervention values for soil remediation) of February 2000 gives an indicative intervention value for groundwater of 9200 µg/l. The aforementioned RIVM report contains proposals for the main risk limit values for MTBE. It recommends an intervention value of 9420 µg/l, based on the limit value for human risk assuming the groundwater is used directly for drinking purposes. The proposed target value for groundwater is 26 µg/l, which was arrived at by reducing the MPR_{eco} (maximum permissible risk level for ecosystems) of 2600 µg/l by a factor of 100.

Cases of pollution by MTBE are governed either by the licensing provisions of the Environmental Management Act or by Section 13 of the Soil Protection Act (duty of care provision). In instances where the pollution was caused by an establishment subject to the Environmental Management Act and a baseline investigation is available, the baseline concentration will be used as the remediation

¹ Tauw, *Landelijk inventariserend onderzoek MTBE-verontreiniging in Nederland*, 29 March 2007.

² Swartjes et al., *Risicogrenzen voor MTBE (Methyl tertiar-Butyl Ether) in bodem, sediment, grondwater, oppervlaktewater, drinkwater en voor drinkwaterbereiding*, RIVM report 711701039, 2004.

³ Reference BWL/2007050847, see Annexe.

objective. In most cases however, there will be no baseline figure for MTBE, or the baseline investigation will have shown zero MTBE in the groundwater. In that case, Section 13 of the Soil Protection Act applies.

In cases of contaminated land as referred to in Section 13 of the Soil Protection Act, the basic principle is that the person or entity that caused the contamination is responsible to the greatest extent possible. This can be expressed formally in terms of a uniform, across-the-board remediation standard. Section 13 also provides for a criterion of reasonableness, meaning that the remediation objective depends on the specific situation. This will apply where the polluter can show that the remediation objective is unreasonable and indicate to the competent authority the level of clean-up which is feasible.

At your request this advisory report considers which remediation standard should apply in the case of clean-up measures taken under the Section 13 duty of care.

MTBE: production, use and contamination

MTBE has been manufactured in the Netherlands since 1984 and has been used here on a large scale since 1988 as an anti-knock agent in petrol, replacing lead. Contamination of groundwater by MTBE has been an issue in the Netherlands since 2000. In the US the substance has been in use for a longer period and in larger quantities. MTBE was banned in California in December 2002 when it was found to be contaminating groundwater. It is highly mobile, slow to biodegrade (particularly in an anaerobic environment) and causes odour problems.

A national survey was undertaken from late 2005 to early 2006, involving 54 petrol filling stations. The results of the field studies of this random sample were extrapolated to all filling stations in the Netherlands which sell or have sold petrol containing MTBE. There were 6000 such filling stations, 4000 of which are still in operation. In almost half (45%) of the filling stations tested, MTBE was detected in concentrations exceeding 1 µg/l (= trigger value). The concentration was in the range 1 - 26 µg/l (= proposed target value) for 28% of the locations studied, 26 - 260 µg/l (= 10 x proposed target value) for 15% and over 9400 µg/l (= proposed intervention value) for 2% of cases. The target value proposed by the RIVM was thus exceeded at 17% of locations. MTBE concentrations in groundwater may be in excess of the target value at some 1000 petrol stations. On enquiring, the TCB learned that the MTBE concentration exceeded 15 µg/l at 18% of the filling stations investigated by Tauw (verbal communication).

The Filling Stations (Environmental Management) Decree required filling stations to take measures to protect the soil by 1 July 1999. This obligation was not created until more than 10 years after MTBE was introduced. In that time MTBE was used on a large scale. The Tauw study was unable to link the introduction of soil protection measures to changes in the concentration of MTBE in groundwater. MTBE was found in the groundwater despite the introduction of measures. The sources of MTBE contamination are not always known. It is not clear to what extent factors like inflow of rivers, such as the Rhine, and petrol vapour emissions are contributing to the MTBE contamination of groundwater. Another factor is that remedial measures to tackle pollution from filling stations may fail to remove all the MTBE contamination because MTBE is more mobile than benzene. The TCB supports your Ministry's initiative to study the origins of MTBE contamination.

A report on drinking water quality in the Netherlands in 2005 concluded that considerably more effort was being put into MTBE monitoring now than in 2004.⁴ The MTBE content in untreated water at 149 abstraction points, in the treated water from 148 pumping plants and in 66 distribution areas was analysed. A total of 1742 samples were taken. The concentration of MTBE in untreated water was over 1 µg/l for five of these points (four surface water abstraction points and one groundwater pumping station), with the maximum value being 7.3 µg/l. All the measured concentrations in drinking water were below 1 µg/l. The report on drinking water quality in the Netherlands in 2006 will be published in 2007.

Water supply companies also have monitoring data. To get the most complete picture of contamination of drinking water by MTBE, these data should be collected.

Specific questions

Your request for advice was accompanied by a document containing proposed standards for MTBE. The plan is to set either a uniform national remediation standard or area-specific remediation standards. The document adds that this standard should be realistic both technically and financially. It states that policymakers presently favour a uniform remediation standard equal to the odour threshold for drinking water of 15 µg/l.

You ask whether the TCB supports the idea of a single uniform remediation standard equal to the odour threshold. You also ask whether the TCB can endorse the decision not to adopt a special policy for drinking water abstraction areas, and finally, what the TCB's view is on the magnitude of this odour threshold.

A single uniform remediation standard

The TCB generally considers groundwater protection an important matter,⁵ and is therefore in favour of using a single uniform remediation standard for MTBE. It supports the decision of the Minister of Housing, Spatial Planning and the Environment not to adopt a separate policy for drinking water abstraction areas.

Magnitude of the remediation standard

In basing its risk limit value for drinking water on the odour threshold, the RIVM report drew on the European Union Risk Assessment Report (EU-RAR) on MTBE.⁶ The value was selected from the reported range of 2.5-190 µg/l. One study suggests that 2.5 µg/l is the lowest concentration at which MTBE could be detected in water by a number of panellists. Various other studies report the lowest measured odour threshold as 15 µg/l. The EU-RAR report gave considerable weight to a detailed study carried out by the Oxygenated Fuels Association in the US because it used an odour panel of 57 persons. The results of this study suggested an odour threshold for MTBE in water of 15 µg/l. But it should be noted that some studies indicate a lower odour threshold for more sensitive groups.

⁴ Inspectorate of the Ministry of Housing, Spatial Planning and the Environment, *De kwaliteit van het drinkwater In Nederland in 2005*, published 2006.

⁵ See TCB reports *Advies Stysteemgericht grondwaterbeheer* (TCB S24(2003)) and *Systeemgericht grondwaterbeheer* (TCB R17(2003)).

⁶ European Chemicals Bureau, European Union Risk Assessment Report tert-butyl methyl ether, 2002.

The Drinking Water Advisory Council of the US Environmental Protection Agency (EPA) published a report in 1997 indicating that the odour detection threshold for different persons for MTBE in water varies from 15 to 180 µg/l.⁷ In fact this report is based on some of the same studies used in the EU-RAR report. The EPA report held that it is not possible to determine a single odour threshold because this varies for different individuals, populations, temperatures, etc. But these independent studies gave consistent, comparable results. The Advisory Council therefore concluded that it would be reasonable to set the advisory level at 20-40 µg/l.

To summarise, the EU-RAR report proposed an odour threshold for MTBE in water of 15 µg/l, while pointing out that for sensitive groups of the population the odour threshold may be lower. The EPA report refers to a spectrum of values between 15-180 µg MTBE/l, but eventually chooses to adopt the range 20-40 µg MTBE/l. Values of 15 and 20 µg MTBE/l are not significantly different. Making some concession for more sensitive groups, the TCB feels that the remediation standard should be set at the MTBE odour threshold as estimated by RIVM/EU-RAR, i.e. 15 µg/l.

Conclusion

The TCB recommends that a single uniform remediation standard for MTBE in groundwater should be set of 15 µg/l, the odour detection threshold for MTBE in groundwater. The TCB did not consider the technical feasibility or financial consequences of this recommendation.

Yours faithfully,



Ir. L.E. Stolker-Nanninga.
Chairman, Soil Protection Technical Committee

Annexe: Request for advice on standards for MTBE

⁷ EPA Drinking Water Advisory, Consumer Acceptability Advice and Health Effects Analysis on Methyl tertiary-Butyl Ether (MtBE), 1997