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EU-wide control measures to reduce pollution from WFD relevant substances

Cadmium in the Netherlands

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Abstract

EU-wide control measures to reduce pollution from WFD relevant substances
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The present study investigated the availability of European legislation to reduce pollution of surface waters by cadmium and whether this European legislation is implemented in Dutch law. Implementation in Dutch law was complete. However, the demand of the Water Framework Directive to eliminate emission of the Priority Hazardous Substance cadmium is considered to be infeasible. This is due to the diffuse character of the cadmium sources: the link between source and water load is unclear. Sources are difficult to trace and to quantify.

In the Netherlands, main emission sources are agriculture, industry, water treatment plants and atmospheric deposition. A major part of cadmium in Dutch surface waters is imported via the international rivers. Agricultural cadmium originates from cattle fodder and phosphate fertilizers. Sources delivering cadmium to water treatment plants are probably households, smaller industries and run-off from paved roads.

Key words:
cadmium, community law, Dutch legislation, agriculture, fertilisers, industry, emission, load, Water Framework Directive, implementation, enforcement

Rapport in het kort

EU-maatregelen om vervuiling van oppervlaktewater door stoffen te reduceren
Cadmium in Nederland

De eis voor cadmium vanuit de Kaderrichtlijn Water, namelijk algehele stopzetting van emissies, is niet op korte termijn realiseerbaar. Dat komt omdat cadmiumbronnen niet direct aanwijsbaar zijn. Dit blijkt uit onderzoek van het RIVM. Daarin zijn de eisen van de Kaderrichtlijn Water over cadmium in oppervlaktewateren onderzocht, evenals de Europese wetgeving die cadmium in het milieu reguleert. Deze wetgeving is wel in de Nederlandse wetgeving geïmplementeerd, maar door het karakter van cadmiumbronnen is het niet haalbaar emissie volledig stop te zetten.

Het is uitermate ingewikkeld om cadmiumbronnen aan te pakken. De precieze bronnen van de cadmiumuitstoot zijn namelijk lastig te traceren en te kwantificeren. In Nederland raken oppervlaktewateren vooral met cadmium vervuild door de landbouw, de industrie en via waterzuiveringsinstallaties, en indirect door neerslag van cadmium uit de lucht. Het grootste gedeelte van het cadmium in Nederland komt vanuit het buitenland via de internationale rivieren. Cadmium vanuit de landbouw vindt zijn oorsprong in veevoeder en kunstmest. De bronnen van de cadmiumaanvoer naar waterzuiveringsinstallaties komen via de riolering waarschijnlijk uit de huishoudens, de kleine industrieën en vanaf verharde wegen.

Trefwoorden:
cadmium, Europese wetgeving, Nederlandse wetgeving, landbouw, industrie, emissie, belasting, Kaderrichtlijn Water, implementatie, handhaving

Preface

This report is part of the project ‘Supporting the setting of Environmental Quality Standards for Priority Substances within the Water Framework Directive’ (RIVM-project 601714). We want to acknowledge Jelka Appelman (Ministry of Housing, Spatial Planning and the Environment, The Hague, the Netherlands) for supporting this RIVM project. Wilko Verwey and Ton De Nijs of the Laboratory of Ecological Risk Assessment are acknowledged for reviewing this paper.

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Summary

The Water Framework Directive requires Member States to implement the necessary measures in order to comply with environmental quality standards of Priority Substances or to cease or phase out emissions, discharges and losses of Priority Hazardous Substances. Cadmium is one of these Priority Hazardous Substances. In commission of the Netherlands Ministry for Housing, Spatial Planning and the Environment (VROM), the National Institute for Public Health and the Environment (RIVM) investigated the following questions:

- What is legally regulated in international context and what nationally for emission control of cadmium? Have the Netherlands implemented the international rules?
- Which measures have been taken at the national level in addition to the obligatory European legislation?
- What is the present water quality and which emission sources are responsible for cadmium pollution in the Netherlands? Are the demands of the Water Framework Directive (WFD) regarding cadmium pollution fulfilled at present?
- Will the Water Framework Directive-demands be fulfilled in time regarding water quality and emission of cadmium?
- Which additional measures can be established at Community and at national level to reach water quality and emission demands for cadmium?

A stepwise approach was followed. Firstly, possible measures to reduce cadmium discharge, emission or loss were identified within existing European directives and regulations. Secondly, Dutch legislation was checked for compliance with these European legislative texts. Existing gaps between European and Dutch legislation were identified by searching for present and past derogations and infringement procedures. The level of enforcement was determined by studying the reports of various inspectorates and consultation of several experts. The information in the selected legislative texts was combined with previously established source identification for cadmium in Dutch surface waters to identify the most relevant and cost effective measures and the limitations. Possible alternative approaches for taking measures are discussed in the discussion section.

European legislation was found to be fully implemented in national law and enforcement of the national law was covered. In addition to European requirements, the Netherlands have established supplementary measures to handle cadmium-pollution, such as the establishment of a Dutch Priority Substances-list. Cadmium is appointed as one of these Dutch Priority Substances. For these Priority Substances, emissions need to be reported for all installations. Furthermore, Dutch law prescribes the application of best available techniques for all point sources and not only for Integrated Pollution Prevention Control-installations. Other measures are several subsidy programmes stimulating investment in environmentally friendly techniques.

Main Dutch sources of cadmium-load to surface water were agriculture, sewage systems and sewering, atmospheric deposition and the industry. Approximately 75% of cadmium was imported via the international rivers.
Emission sources not yet covered by international legislation (i.e. by the European Pollutant Release Transfer Registration) are the smaller combustion plants. A proposed Integrated Pollution Prevention Control-directive will add new categories of installations in the future, but will still not cover all installations. Moreover, the emission limits of the Integrated Pollution Prevention Control-directive are

in contradiction with the emission elimination demanded by the WFD for Priority Hazardous Substances.
Loss through the use of cadmium-containing fertilizers, manure and cattle fodder is an important source. Emission by agriculture is caused by use of cadmium-containing fertilizers, manure and cattle fodder. Efficient Community legislation on cadmium in fertilizers is lacking, although several EU Member States have drawn their own, national provisions. Cadmium in manure is complex to control, because it results from uptake via feed, it is produced in great quantities and it is costly to remove cadmium from these great quantities of manure.
The sources of cadmium transported to sewage systems are difficult to identify. Probably, this cadmium originates from households, small industries and washing of paved roads. At present, it is considered to be infeasible to eliminate this emission source. Knowledge on pathways into wastewater need to be gained in order to be able to control this diffuse pollution source.

In the current study it was concluded that elimination of cadmium emission is infeasible and/or disproportionally costly, considering the diffuse character of most of the pollution sources. Thus, at present the Netherlands do not comply with WFD-demands for cadmium. A small number of Dutch point sources contribute to exceedance of the Environmental Quality Standard. Measures to control the Dutch point sources need to be investigated in further detail. More detailed analysis per WFD-monitoring point is recommended in order to identify the relative contribution of various sources of cadmium to the total cadmium load to surface waters.

In the WFD, a paragraph is devoted to situations in which the environmental objectives are infeasible or disproportionately expensive. In these cases, Member States may aim to achieve a less stringent environmental objective, under a number of conditions. In case of cadmium, the Netherlands may have to consider redefining environmental objectives in order to comply with the Community's environmental policy.

1 Introduction

The Water Framework Directive (WFD) requires the European Commission to establish environmental quality standards (EQS) for the Priority Substances (PS) and the Priority Hazardous Substances (PHS) and to come forward with Community-wide control measures to reduce pollution from the PS, or to phase out emissions, discharges and losses of the PHS. In the Communication published together with the proposed daughter directive on PS (COM (2006/398), the European Commission has indicated that a wide range of instruments is already available and that numerous legislative proposals and decisions have been made since the publication of the WFD. Instruments to comply with the EQS mentioned in the Communication are for instance directive 91/414/EEC concerning the authorization and assessment of pesticides and directive 96/61/EC on integrated pollution prevention control for industries. In addition, the Member States are obliged to take into account 'any other relevant Community legislation' when formulating measures. The Communication also states that although marketing and use restrictions are regulated at European level, 'Member States may also, under certain strict conditions laid down in the Treaty, introduce national provisions to restrict marketing and use because of risk to the aquatic environment'.

The Dutch authorities have selected a few PHS and PS which do not comply with the presently proposed quality standards in a number of Dutch surface waters for further study. These substances are polycyclic aromatic hydrocarbons (PAHs), cadmium, copper and zinc. The present study is a follow-up of the research on Community legislation relevant as tool to reduce cadmium emissions as is demanded by the Water Framework Directive (WFD; Vos and De Poorter, 2007). That study was directed to survey, which Community legislation is in force to comply with the WFD requirements. One of the conclusions of the report was that for the establishment of efficient measures, the link between pollution found in the water systems and emission sources should be identified. Vos and De Poorter (2007) recommended analyzing the implementation of Community legislation at the national level, since one of the WFD prerequisites is full and correct implementation of European legislation in national law.

Under the WFD, cadmium is marked as PHS. Thus, cessation or phasing out of emission is demanded. Emission routes of cadmium are diverse, which was one of the reasons to choose this substance as a case study. Another reason was that concentrations of cadmium in several surface waters exceed the Environmental Quality Standard (Unie van Waterschappen, 2006; Van den Roovaart and Wagemaker, 2006). In the preceding cadmium study (Vos and De Poorter, 2007), European legislation relevant as measure to reduce cadmium pollution in surface water was already identified. The Netherlands Ministry of Housing, Spatial Planning and the Environment (VROM) commissioned the RIVM to investigate whether existing European legislation with regards to the WFD-objectives has led to national legislation in order to identify any gaps in European legislation and/or Dutch implementation. Succeedingly, enforcement of the relevant Dutch legislation and European Regulations is mapped.

Research questions:

- What is legally regulated in international context and what nationally for emission control of cadmium? Have the Netherlands implemented the international rules?
- Which measures have been taken at the national level in addition to the obligatory European legislation?
- What is the present water quality and which emission sources are responsible for cadmium pollution in the Netherlands? Are the demands of the Water Framework Directive regarding cadmium pollution fulfilled at present?
- Will the Water Framework Directive-demands be fulfilled in time regarding water quality and emission of cadmium?
- Which additional measures can be established at Community and at national level to reach water quality and emission demands for cadmium?

2 Methods

The identification of sources of cadmium load to Dutch surface waters was performed on basis of data of the year 2005 provided by the Dutch emission inventory authority situated in the Netherlands Environmental Assessment Agency (MNP). The database contains both data on emissions as well as data on loads to water, specified by emission source. The present study mainly made use of data on loads to water, since water loads represent the actual amount of cadmium reaching the surface waters.

An overview of European legislation relevant for the major cadmium sources was provided in Vos and De Poorter (2007). This overview is presented in the current report for completeness. However, since that search is performed in 2007, an additional search for Community legislation was carried out restricted to the period 2007-2008 using Eur-Lex ('The access to European Union law': http://europa.eu.int/eur-lex/). Used search terms were cadmium, fertilizers and heavy metals.

Derogations were searched in Eur-Lex using the search terms 'derogation' or 'national provisions' in the title combined with the word 'Netherlands' in the text. Failures of compliance with European legislation were tracked in Curia: The Court of Justice of the European Communities (www.curia.europa.eu). The search was carried out using the search form and by selecting the Netherlands and the Commission as parties in the cases. Since limited information is given in some court judgments, legal experts or experts on the specific legislation were consulted.

Implementation of the European legislation into Dutch law was studied using the Dutch government website www.wetten.overheid.nl which offers an open directory of Dutch legislation and policy. Search terms used were the reference numbers of the European legislation. An additional search using the term 'cadmium' was carried out. Experts on specific Dutch legislation were consulted to gain understanding of the implementation of Community law into Dutch legislation and to identify eventual gaps. National measures in addition to the European requirements were identified by comparing Community and Dutch law.

General information on enforcement was gathered from the different websites of the responsible ministries, competent authorities and a website specialized in environmental legislation, policy and execution: www.vrom.nl, www.ivw.nl, www.uvw.nl, www.infomil.nl, www.aid.nl, www.hetlnv-loket.nl, www.inspectieloket.nl. These sites give access to year reports, fact sheets and enforcement programs. These sites also provide information on additional Dutch provisions. Additionally, several competent authorities were consulted to gain insight on the practice of enforcement.

3 Results

3.1 Sources of emission

The emissions of compounds to water are the so-called source emissions. Only a part of these emissions reach the surface water directly. A large part originates from effluents, overflows and rainwater sewer systems and reaches the water via municipal sewer systems. Parts of the pollutants remain behind in the purification sludge after waste water treatment.
See Figure 1 for a schematic overview of the emissions to water and its relation to the actual load to surface water (text and figure copied from Koch et al., 2001).

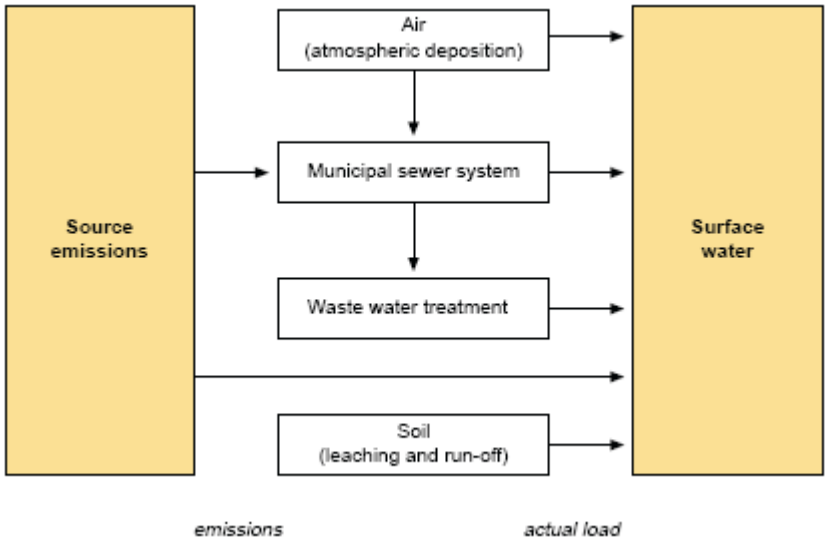

Figure 1. Figure 8 from Koch et al. (2001). Schematic overview of the emissions to water and its relation to the actual load to surface water

Data from the Dutch emission inventory authority for the year 2005 were used to analyze the relative contributions of various sources to the Dutch cadmium load (see figure 2). The pollution sources in this figure are restricted to Dutch pollution sources (load to surface water). For atmospheric deposition it could not be identified from the available data if the pollution was emitted nationally or abroad.

Transboundary pollution is a major source of cadmium in the Dutch surface waters. In the Netherlands, approximately 75% of the total cadmium load comes from abroad via international surface waters (Witmer et al., 2004).

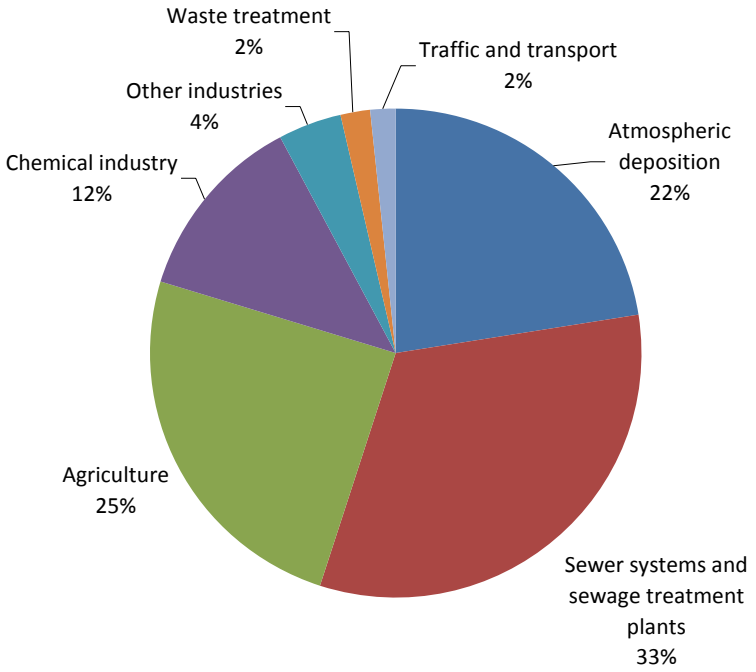

Figure 2. Cadmium load to surface water in the Netherlands, on basis of NMP Registration data, 2005

Main Dutch sources of cadmium load to surface water in 2005 were divided over several sectors: agriculture (25%), sewer systems and sewage treatment (33%), chemical industry (12%) and atmospheric deposition (22%). In Table 1, the pollution sources are further defined and quantified.

Agricultural sources of cadmium may be traced back to the use of phosphate containing fertilizers and cadmium in animal feed. On basis of the consulted information sources, sources of cadmium pollution ending up in the sewage plants are difficult to identify and quantify. These sources are expected to be of diverse nature, ranging from human excrement, washing of paved roads to discharges of all kinds of smaller industries.

Table 1 Dutch sources of cadmium load to surface water in kg cadmium (2005)

	kg cadmium annually
Atmospheric deposition	208
Sewer systems and water treatment plants	301.7
Effluents sewage treatment plants	252.2
Rainwater sewerage	41.9
Sewer overflows	6.5
Process emission by water treatment plants	1.2
Agriculture	228
Chemical industry	115
Other industries	39.4
Paper industry	6.6
Metal-electronics	7.4
Metal industry	24.6
Others	0.9
Waste treatment	18.6
Leachate from dumping grounds	16
Waste treatment industry	2.4
Traffic and transport	14.9
Maritime shipping- inland – zinc anodes	8.7
Fishing vessels – harbour – zinc anodes	0.8
Wear of tyres	2.8
Wear of roads	2.2
Wear of brakes	0.2
Oil spillage	0.2

Atmospheric deposition by Dutch sources could be further specified on basis of the Dutch emission inventory authority data as presented in Table 2. Main Dutch emission sources to the atmosphere are the chemical industry and the metal industry.

Air emission in the Netherlands originates mostly from industries producing inorganic basic chemicals and industries fabricating iron-, steel- and ferro-alloys and from oil refineries. This air emission cannot directly be translated to air deposition, taking into account factors such as transboundary pollution and different forms of emission. However, air concentrations of cadmium are far below the threshold level set in the 96/62/EC (Dutchak and Ilyin, 2005).

Natural sources of cadmium are not reported by the Dutch emission inventory authority data but account for a fairly highly proportion of the total load to surface water: 25-30% (Witmer et al., 2004; De Nijs et al., in press; Van den Roovaart and Wagemaker, 2006; Manders and Hoogerbrugge, 2007). In nature, cadmium occurs in zinc-, phosphate- and iron-ore and in fossil fuels.

Table 2 Dutch sources of emission to the atmosphere (2005)

	kg cadmium annually
Waste treatment	67.6
Waste incineration	64.7
Waste treatment processing	2.9
Chemical industry	802
Inorganic chemicals production	696
Paint, varnish, inc and mastic	56.9
Others, processing	48.7
Other industries	702
Metal industry: production of iron, steel and ferro-alloys	660
Metal industry: production of aluminium, lead, zinc and tin	35.1
Consumers - fireplaces	60.2
Energy sector	7.2
Agriculture	1.3
Refineries	0.1
Traffic and transport	43.6
Fumes of road traffic	36.7
Tyre wear	2.3
Road wear	2.3
Shipping	2.3

3.2 Cadmium levels in Dutch surface waters

EQSs for cadmium as proposed in the draft directive on EQS are presented in Table 3.

Table 3 EQS proposed in draft directive on EQS (µg/l)

	AA-EQS Inland surface waters	AA- EQS Other surface waters	MAC- EQS Inland surface waters and other surface waters
Cadmium and its compounds	≤ 0.08 (Class 1) 0.08 (Class 2) 0.09 (Class 3) 0.15 (Class 4) 0.25 (Class 5)	0.2	≤ 0.45 (Class 1) 0.45 (Class 2) 0.6 (Class 3) 0.9 (Class 4) 1.5 (Class 5)

Note from the EQS-directive: 'For Cadmium and its compounds (No. 6) the EQS values vary dependent upon the hardness of the water as specified in four class categories (Class 1: <40 mg $CaC0_3$/l, Class 2: 40 to <50 mg $CaCO_3$/l, Class 3: 50 to <100 mg $CaCO_3$/l, Class 4: 100 to <200 mg $CaC0_3$/1 and Class 5: ≥ 200 mg $CaCO_3$/1)

At present, the Dutch quality standard 'Maximum Permissible Concentration' for cadmium in surface waters is 0.4 µg/l soluble fraction of cadmium and 2 µg/l total fraction of cadmium. The natural background concentration in the Netherlands is set at 0.08 µg/l dissolved cadmium and 0.4 µg/l total cadmium, on basis of the upper limits of concentrations measured in relatively unpolluted areas (www.rivm.rvs.nl). The origin of the values can be found in Crommentuijn et al. (1997).

In Table 4, the factor of exceedance of the proposed Community AA-EQS for cadmium is reported, based on monitoring data derived from the Institute for Inland Water Management and Waste Water Treatment (Waterdienst-RWS) (De Nijs et al., in press). The presented monitoring data for cadmium in this report originate from the period 2005-2006 and cover a limited set of the national waters. Data of regional waters were lacking. Data are probably present at the individual waterboards, but were not available as reviewed national database. The annual average (AA) EQS for cadmium was exceeded on 38% of the monitoring points, throughout the Netherlands. High toxic pressure exists in the south of the Netherlands (Limburg) where cadmium is emitted by a few point sources and is imported via the Meuse. Along the Dutch rivers, a number of point sources are situated emitting considerable amounts of cadmium (refineries, chemical industry)(see www.emissieregistratie.nl).
Information on exceedance of the EQS in regional waters was not available from the consulted sources. Therefore, no conclusions can be drawn on frequency and cause of EQS-exceedance in regional waters.

Table 4 Exceedance of the Annual Average Environmental Quality Standard (AA) for WFD-Priority (Hazardous) Substances and of Maximum Permissible Concentration (MPC) for WFD-relevant substances. Data are copied from the report of De Nijs et al. (in press)

EQS	> 0.3 EQS[1]	> EQS[2]	> 3 EQS[3]	Number[4]	%[5]
AA	42	21	6	56	38
MAC	16	7	5	56	13

[1] Number of exceedances of 0.3 times the AA-EQS

[2] Number of times that the AA-EQS or the MPC is exceeded

[3] Number of times that 3 times the AA-EQS is exceeded

[4] Number of measurements above the limit of detection

[5] Percentage [%] of occurrences that the AA-EQS is exceeded

3.3 Implementation of European legislation selected on basis of major Dutch pollution sources

The following major Dutch pollution sources can be selected on basis of cadmium load quantities to surface water (see section 3.1):

- agriculture: fertilisers and animal feed
- sewer systems and water treatment plants: consumers and small industries
- chemical industry
- atmospheric deposition: chemical industry, especially processing of inorganic chemicals and the metal industry

For these sources, the relevant European legislation is selected and studied for implementation in Dutch legislation. Moreover, for the Community legislation described in the body of the text in Vos and De Poorter (2007) and for all legislation in the Appendix to Vos and De Poorter listed under ‘Water policy’, implementation is checked. In Appendix I to Vos and De Poorter (2007), the selected legislation is listed and summarised shortly. The search for additional Community legislation for the period 2007-2008 gave no results. In Appendix II, the references made in Dutch law to European law is visualised in a table. Below, only European legislation and implementation in Dutch law is evaluated where matters need elucidation. In the Discussion section, the relation between policy and emission sources is treated.

In the Netherlands, environmental legislation is built on the legislative framework 'Wet milieubeheer' (Enviromental Management Act). This basic law describes the legal instruments to protect the environment. The most important instruments are environmental plans, programmes, quality specifications, permissions, general regulations and enforcement. Details of this framework law are described in decrees ('Besluiten' or 'Algemene Maatregelen van Bestuur'). On their turn, details of these decrees can be filled in with regulations (Regelingen).

3.3.1 Water Framework Directive and daughters 2455/2001/EC and 2006/11/EC

For a summary of the WFD and its daughter directives in relation to cadmium is referred to Vos and De Poorter (2007). Implementation of the WFD and daughter directives is arranged in the statutory decree concerning quality demands on dangerous substances in surface waters 'Regeling milieukwaliteitseisen gevaarlijke stoffen in oppervlaktewateren' in which measure programmes aiming to reduce e.g. cadmium in surface waters are secured. In the decree concerning temporary permits for releases of dangerous substances 'Regeling tijdelijke vergunning voor lozing van zwartelijststoffen', the release of permits for cadmium emission to surface waters in accordance to several European laws (e.g. Cadmium Directive 83/513/EEC) is arranged. The quality standard established by the Cadmium Directive will be repealed when the draft proposal directive for the establishment of EQS comes into force.

3.3.2 Dangerous Substances Directive (76/464/EEC) and Cadmium directive (83/513/EEC)

The Dangerous Substances Directive (DSD, 76/464/EEC) aimed to safeguard water quality by eliminating 'List I' substances and by reducing pollution by 'List II' substances. The DSD is repealed by 2006/11/EC (see section 3.3.1). List I and II substances had to be regulated through a permit or an authorization system for discharges. Cadmium was listed in List I and Cadmium directive 83/513/EEC contains cadmium limit values for effluent specified by industry branch. Even though the DSD is no longer in force, the limit values and quality objectives established under the re Directives of Directive 76/464/EEC shall continue to apply, until these are established under daughter directive of the WFD on EQS.

The decree on evaluation of permits for discharges 'Besluit vierjaarlijks bezien van lozingenvergunningen' defines the discharges as arranged in the Act on pollution of surface waters 'Wet verontreiniging oppervlaktewateren' and the Environmental Management Act 'Wet Milieubeheer'. The statutory regulation on threshold values for cadmium in water discharges 'Regeling grenswaarden voor cadmium in afvalwater' establishes emission limits for certain categories of metal processing installations. The Annex I to 83/513/EEC and to 'Regeling grenswaarden voor cadmium in afvalwater' are completely similar.

3.3.3 Drinking Water Directive 98/83/EC

The Drinking Water Directive establishes a quality standard in water intended for human consumption for cadmium of 5.0 µg/l. The decree on pre-packaged water 'Warenwetbesluit Verpakte waters' requires mineral water to fulfil the demands of 98/83/EC. The decree on water supply systems 'Waterleidingbesluit' establishes a cadmium quality standard of 5 µg/l for water produced for human consumption.

3.3.4 Marketing and Use Directive 76/769/EEC

Under the Marketing and Use Directive (M&U directive), a framework for bans or restrictions is constructed for substances, preparations and products. The Annex contains the list of products covered

by the measures provided for in this Directive as well as the conditions governing their placing on the market.
For cadmium and its compounds restrictions are added under item 24 in Annex I, by means of Directive 91/338/EEC and 1999/51/EC. In the decree on general chemical product safety ('Warenwetbesluit algemene chemische produktveiligheid') and the decree completely focused on cadmium 'Cadmium besluit', the M&U-directive is implemented. This decree on product safety is focused on effects on human health. The marketing and use of the substances and preparations listed in the M&U-directive (76/769/EEC) when these substances and preparations may endanger human health. The Minister of Health, Welfare and Sports (VWS) may put up lists of substances and preparations which may not be applied in products, i.e. the so-called CMR-list. The 'Cadmium besluit' implements provisions noted under item 24 in the M&U-directive as well. The 'Cadmium besluit' adds toys to the regulated items under 76/769/EEC as well as a measuring method and a definition of cadmium containing product. These additional national provisions are considered to be minor in view of the emission sources of cadmium.
The M&U directive will be replaced by REACH in June 2009.

3.3.5 REACH Regulation 1907/2006 (EC)

REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) requires the registration of some 30,000 chemical substances over a period of 11 years. The registration process requires the manufacturers and importers to generate data for all chemicals substances produced or imported into the EU above one tonne per year. The registrants must identify appropriate risk management measures and communicate them to the users. REACH will allow the further evaluation of substances where there are grounds for concern and foresees an authorisation system for the use of substances of very high concern. This applies to substances that cause cancer, infertility, genetic mutations or birth defects, and to those which are persistent and accumulate in the environment. Cadmium has been classified as carcinogenic category 2 (under 67/548/EEC). Such classification can be reason to prioritize cadmium for authorization. Similarly to the M&U directive, REACH is considered to be a strong tool to control cadmium emission from production and products. However, the capacity threshold for installations falling under REACH limits the radiance of the regulation.

REACH is a regulation and therefore does not need implementation in Dutch legislation. Unlike directives, which are addressed to the Member States, and decisions, which are for specified recipients, regulations are addressed to everyone. A regulation is directly applicable, which means that it creates law which takes immediate effect in all the Member States in the same way as a national instrument, without any further action on the part of the national authorities.
In the act on the execution of REACH 'Uitvoeringswet EG-verordening registratie, evaluatie en autorisatie van chemische stoffen (REACH)' is stated in general terms that the REACH-Regulation is inserted in the 'Wet Milieubeheer'. In the Dutch decree 'Besluit instelling Bureau REACH', the Bureau REACH is established and is appointed the responsibilities resulting from the REACH Regulation.
Article 9.3 of the Dutch Environmental Management Act 'Wet Milieubeheer' appoints the Ministry of VROM (Ministry of Housing, Regional Development and the Environment) as competent authority and prohibits activities conflicting with REACH-provisions. Article 18.3 to 18.18 regulates the enforcement of the REACH-Regulation. Several public authorities are appointed for enforcement and to apply penalty payments.

3.3.6 Existing Substances Regulation 793/93/EEC

The Existing Substances Regulation (ESR) is a regulation as well and, therefore, does not need implementation in Dutch legislation. The measures cannot be enforced under ESR, but for instance can

take place under M&U, IPPC, or other legislation, such as WFD. The ESR will be repealed by REACH in June 2009.
Distribution of data, reporting, research and competent authorities are arranged in the decree on assessment and restriction of risks of existing substances 'Besluit beoordeling en beperking risico's bestaande stoffen' and the decree on reporting of new knowledge on dangerous substances 'Besluit melding nieuwe kennis milieugevaarlijke stoffen' which both will be repealed the first of June 2008.

For cadmium metal and cadmium oxide a Risk Assessment Report is available (European Chemical Bureau, 2007). For cadmium, also a risk reduction strategy is composed (Ecolas, 2006).

3.3.7 IPPC 96/61/EC and E-PRTR 166/2006 (EC)

Cadmium falls into the category 'metals and their compounds' of Annex III of the IPPC (Integrated Pollution Prevention Control): 'Indicative list of the main polluting substances to be taken into account if they are relevant for fixing emission limit values'. Annex II to 166/2006/EC (European Pollution Release Transfer Register; E-PRTR) lists threshold levels for reporting to the national authoraties of releases to air of 10 kg/year, to water of 5 kg/year and to land of 5 kg/year for cadmium and its compounds. The E-PRTR is established by Regulation 166/2006 (EC).

The IPPC is fully implemented in the Environmental Management Act 'Wet Milieubeheer' and in the Act on pollution of surface waters 'Wet verontreiniging oppervlaktewateren'. Since the E-PRTR is a regulation, it does not need implementation in national law. The decree on the execution of PRTR 'Uitvoeringsbesluit EG-verordening PRTR en PRTR-protocol' establishes a monitoring and registration system as described in the PRTR-Regulation.
The regulation 'Regeling aanwijzing BBT-documenten' pinpoints which BREF-documents (BAT Reference documents) should be considered when granting permits. Thus, businesses are obliged to apply Best Available Techniques (BAT) and competent authorities need to consider BREF-documents and other relevant documents when composing permits. The competent authorities may deviate from applying BREF when well founded. Deviations must be clarified in the permit.

The decree on waste incineration 'Besluit verbranden afvalstoffen' lays down several emission limits for dust and for cadmium (as sum of thallium and cadmium) for categories of incineration plants, which are not based on the IPPC or E-PRTR. According to a factsheet originating from 2001, the emission standards in the Waste Incineration Decree are amongst the most stringent in the world (VROM, 2001). These standards are comparable with the BAT associated emission levels in the BREF for Waste incineration.
In the statutory regulation on environmental quality demands on dangerous substances in surface waters 'Regeling milieukwaliteitseisen gevaarlijke stoffen in oppervlaktewateren', measure programmes are tuned with IPPC-requirements.

The NeR, the Netherlands Emission Guidelines for Air, is a national guideline, aimed at harmonizing the environmental permits in the Netherlands with respect to abatement of emissions to the air. It integrates demands of several European directives and regulation among which the IPPC. For this purpose the NeR gives emission standards that agree with the Best Available Techniques. The NeR does not cover all kinds of industrial installations. For certain types of installations specific environmental legislation is in force, e.g. for waste incinerators, power stations and combustion plants. General emission concentration standards are given for each substance or class of substances. In most cases a threshold value is given above which implementation of measures needs to be considered. This threshold value is called the mass flow limit. The concentrations given in the NeR are upper limits for the concentration in the waste gas flow of a specific relevant source.

3.3.8 Waste Directive 75/442/EEC and directive 2000/76/EC on waste incineration

The Waste Directive lays down general rules applying to waste management. Cadmium itself is not mentioned in the directive, but metals and metal compounds are, under point R 4 of Annex IIB: 'Recycling/reclamation of metals and metal compounds'. For the activities listed in Annex IIB, permits have to be obtained. Directive 2000/76/EC on the incineration of waste sets emission limit values, in particular for cadmium to air.

Several decrees refer to the Waste list in the Annex to the Waste Directive. For instance, the decree on waste dumps and waste dump prohibitions 'Besluit Stortplaatsen en Stortverboden afvalstoffen' forbids to dump waste listed in the Annex to the Waste directive in dumping grounds. The regulation concerning European waste products 'Regeling Europese afvalstoffenlijst' establishes the Annex to the Waste directive as list of waste falling under 'Wet Milieubeheer'.
The decree on incineration of waste 'Besluit verbranden afvalstoffen' lays down several target values to air for dust and for cadmium (as sum of thallium and cadmium) for categories of incineration plants as established in directive 2000/76/EC.

3.3.9 Directive 96/62/EC on ambient air and directive 2004/107/EC on e.g. cadmium

Council Directive 96/62/EC on ambient air quality assessment and management aims to establish objectives for ambient air quality (AAQ i.e. related to outdoor air excluding workplaces). Cadmium is mentioned in the list of atmospheric pollutants to be taken into account in the assessment and management of AAQ. Daughter directive 2004/107/EC sets target values for arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

In article 5.22 of 'Wet Milieubeheer' (Environmental Management Act), is recorded that the Netherlands Ministry of Housing, Spatial Planning and the Environment (VROM) has to establish lists as laid down in article 3 of directive 2004/107/EC. This article requires Member States to draw up a list of zones and agglomerations in which the levels of arsenic, cadmium, nickel, and benzo(a)pyrene are above their respective target values.

In the considerations of the Dutch regulation on assessment of air quality 'Regeling beoordeling luchtkwaliteit 2007' (paragraph XXII) is referred to Community directive 2004/107/EC as well. The statutory regulation lays down monitoring demands for dust and cadmium. 'Wet Milieubeheer' sets a target value for cadmium of 5 ng/m^3 for the total content in the PM_{10} fraction averaged over a calendar year, i.e. the same as established in directive 2004/107/EC.
Moreover, 'Wet Milieubeheer' lists target values for PM_{10} of 40 µg/m^3 as annual average and of 50 µg/m^3 as daily average which may not be exceeded more than 35 times each year.

April this year, a proposal for a directive on ambient air quality and cleaner air for Europe (COM/2005/0447 final) has been adopted. The directive will be published in the EU's Official Journal in May this year. The new directive merges directives 96/62/EC, 1999/30/EC, 2000/69/EC and 2002/3/EC to one single directive. When sufficient experience is gained with the implementation of directive 2004/107/EC, the directive reports that then consideration may be given to merge its provisions with the proposed directive as well. The new directive introduces new objectives for fine particles $PM_{2.5}$ but does not change existing air quality standards. It does, however, give Member States greater flexibility in meeting some of these standards in areas where they have difficulty complying.

3.3.10 Protocol on Heavy Metals of UNECE Convention

The Protocol on Heavy Metals to the UNECE Convention on Long-range Transboundary Air Pollution (LRTAP) recommends the adoption of measures to reduce heavy metals emitted by certain installations and has been implemented in Europe by Council Decision 2001/379/EC. For quite a number of source categories in the Protocol emission limit values for particulate matter are given instead of emission limit values for the individual metals. The Protocol does contain some emission limit values for lead and mercury, but not for cadmium.
The parties determined to implement the Convention on Long-range Transboundary Air Pollution have submitted to apply the Protocol.

3.3.11 Packaging and packaging waste Directive 94/62/EC and Decisions 1999/177/EC and 2001/171/EC

The packaging and packaging waste Directive 94/62/EC and Commission Decisions 1999/177/EC and 2001/171/EC set concentrations limits for the sum of four heavy metals, i.e. lead, cadmium, mercury and hexavalent chromium, in packaging.
Directive 94/62/EC and Decision 1999/177/EC are implemented in Dutch law by the decree on management of packaging, paper and carbon 'Besluit beheer verpakkingen, papier en karton'. Decision 2001/171/EC is not directly implemented in Dutch law but its requirements have their legal basis in directive 94/62/EC.

3.3.12 Directive 86/278/EEC on sewage sludge

The Sewage sludge Directive establishes limit value concentrations for cadmium in soil, in sludge for the agricultural use and for the maximum amounts of cadmium which may be add annually to the agricultural land.The Sewage sludge Directive is implemented in the Dutch regulation concerning the execution of the act on fertilizers 'Uitvoeringsregeling Meststoffenwet'. However, only sampling frequency of sewage sludge is copied from directive 86/278/EEC.
Values for concentrations of heavy metals in soil to which sludge is applied, concentrations of heavy metals in sludge and the maximum annual quantities of such heavy metals which may be introduced into soil intended for agriculture are given in Annexes I A, I B and I C to 86/278/EEC. Limit value in soils with pH of 6-7 is 1-3 mg cadmium/kg dw, in sludge used for agriculture 20 to 40 mg cadmium/kg dw and 0.15 kg cadmium/ha/year based on a 10-year average.
Annex Ab to 'Uitvoeringsregeling Meststoffenwet' sets maximum values for cadmium content in inorganic fertilizers. Maximum cadmium content in sewage sludge is set at 1.25 mg/kg dw and in compost at 1 mg/kg dw. Thus, quality limits for cadmium in sewage sludge are more stringent compared to European demands.

3.3.13 Directive 2000/53/EC on End of Life Vehicles

The directive on 'End of Life Vehicles' prohibits the use of heavy metals (e.g. cadmium) in materials and components of vehicles put on the market after July 2003. The End of Life Vehicles-directive is fully implemented in the decree on the control of car wrecks 'Besluit beheer autowrakken'.

3.3.14 Directives EEE (2002/95/EC) and WEEE (2002/96/EC)

Directive 2002/95/EC requires Member States to ensure that new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE). Directive 2002/96/EC aims at the prevention of the waste of EEE.
The decree on electric and electronic equipment 'Besluit beheer elektrische en elektronische apparatuur' implements directives EEE and WEEE literally into Dutch law.

3.3.15 Regulation 1881/2006 (EC) on contaminants in foodstuffs

Regulation 466/2001/EC lays down maximum levels for certain contaminants in foodstuffs. This piece of European law is a regulation and therefore does not need implementation into national law. The decree on the preparation and treatment of foodstuffs 'Warenwetbesluit Bereiding en behandeling van levensmiddelen' regulates maximum levels of cadmium in foodstuffs according to the annex to the Community regulation. However, the specific provisions for certain foodstuffs laid down in certain articles of Regulation 1881/2006 (EC) are not referred to.

3.3.16 Regulation (EC) No 1013/2006 on shipments of waste

Regulation 1013/2006 (EC) prohibits exports from the Community of certain wastes, among which is certain types of waste containing cadmium. This regulation does not need implementation in national law but is directly applicable in EU-countries. In the Environmental Management Act 'Wet Milieubeheer' is reported that waste management programs need to consider demands of Regulation 1013/2006 (EC) and the regulation's demands are copied. Moreover, in 'Wet Milieubeheer' competent authorities are appointed. In the Dutch act on pollution of surface waters 'Wet verontreiniging oppervlaktewateren' it is prohibited to act in violation of Regulation 1013/2006 (EC) as well.

3.3.17 Drinking Water Directive 75/440/EEC

The Drinking Water Directive lays down quality limits for water intended for the abstraction of drinking water, i.e. 1 or 5 µg/L, depending on the water treatment.
The decree on quality demand and monitoring of water 'Besluit kwaliteitseisen en monitoring water' refers to the Drinking Water Directive in its considerations. A quality standard of 1.5 µg/l is set for water intended for the abstraction of drinking water in the 'Besluit kwaliteitseisen en monitoring water'. A mandatory limit of ≤ 5 µg/l is set in the Drinking Water Directive with a guide value of 1 µg/l. 'Besluit kwaliteitseisen en monitoring water' fulfils the mandatory limit and thus, the Drinking Water Directive is sufficiently implemented.

3.3.18 Shellfish Water Directive 2006/113/EC

In Shellfish Water Directive 2006/113/EC, it is demanded that the concentration of cadmium is so limited that it does not give harmful effects on the shellfish and their larvae. A minimum half yearly monitoring frequency is prescribed. The Shellfish Water Directive demand is copied into the decree on quality demand and monitoring of water 'Besluit kwaliteitseisen en monitoring water'. However, in the considerations to 'Besluit kwaliteitseisen en monitoring water' only directive 79/923/EEC is referred to and not to directive 2006/113/EC. However, for cadmium the demands were identical in both directives. Therefore, it is concluded that demands for cadmium set in shellfish Water Directive 2006/113/EC has been fully implemented in Dutch law.

3.3.19 Groundwater Directive 80/68/EC

In the Groundwater Directive 80/68/EC, cadmium is appointed as one of the substances for which Member States must prohibit the direct and avoid the indirect introduction to the groundwater. On 22 December 2013, directive 80/68/EC will be no longer into force. Directive 2006/118/EC takes over the 80/68/EC provisions. Cadmium is in the minimum list of pollutants of directive 2006/118/EC for which Member States have to consider establishing threshold values. In the Netherlands, a threshold level for cadmium in groundwater is proposed of 0.35 µg/l which will be laid down in a statutory regulation. At present, this regulation ('Doelstellingen') is being established into Dutch law.

3.3.20 Decision 85/613/EEC on programmes and measures to mercury and cadmium discharges in order to prevent marine pollution from land-based sources

Decision 85/613/EC requires prior authorization of every discharge of cadmium into the maritime area or into watercourses that affect the maritime area. The Council Decision accepts programmes and measures under existing Community legislation. Thus, the decision does not call for action from the Member States.

3.3.21 Directive 2006/11/EC on discharges of certain dangerous substances

Directive 2006/11/EC requires elimination of cadmium discharges. Rules for handing out authorisations are laid down. In the Environmental Management Act 'Wet Milieubeheer' it is demanded to act into accordance with directive 2006/11/EC when establishing emission limits. In the statutory regulation concerning environmental quality demands on dangerous substances in surface waters 'Regeling milieukwaliteitseisen gevaarlijke stoffen oppervlaktewateren' elimination of the so-called black list substances is demanded. Cadmium is on this black list. Thus, directive 2006/11/EC is implemented.

3.3.22 Decision 82/460/EEC on a supplement to Annex IV to the Convention on the protection of the Rhine against chemical pollution

Council Decision 82/460/EEC adopts action plans for the protection of the Rhine. The Decision 82/460/EEC supplements an existing Convention. This decision does not call for implementation in national law.

3.3.23 Council Decision 85/336/EEC as supplement in respect to cadmium to the Convention for the Rhine against chemical pollution

Council Decision 85/336/EEC adopts a proposal from the International Commission for the Protection of the Rhine against Chemical Pollution. This decision supplements the same existing Convention. Thus, this decision does not call for implementation as well.

3.3.24 Directive 1999/30/EC concerning limit values e.g. particulate matter in ambient air

Directive 1999/30/EC establishes limit values and alert thresholds for concentrations of sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air and it demands assessment of these substances. Directive 84/779/EEC is repealed by directive 1999/30/EC. The Environmental Management Act 'Wet Milieubeheer' implements the same limit values for PM_{10}-levels in ambient air as prescribed by directive 1999/30/EC (Annex II to 'Wet Milieubeheer').

3.3.25 Directive 84/360/EEC on air pollution from industrial plants

Directive 84/360/EEC requires that industrial plants do not cause significant air pollution by emission of e.g. heavy metals and dust. At present, this directive is no longer into force. Its requirements are taken over by the IPPC.

3.3.26 Directive 2001/80/EC on emissions into air by large combustion plants

Article 2 of the decree on emission limits for combustion plants 'Besluit emissie-eisen stookinstallaties milieubeheer A' and Annex VII of directive 2001/80/EC are not completely similar. Differences are subtle. At present the Ministry of VROM is adjusting 'Besluit emissie-eisen stookinstallaties milieubeheer A' to solve the dissimilarities. In the one case directive 2001/80/EC is less strict and in the other case stricter compared to the 'Besluit' according to the experts at the Ministry of VROM.

3.3.27 Directive 2006/66/EC on batteries and accumulators

Directive 91/157/EEC on batteries and accumulators is repealed by directive 2006/66/EC. Directive 2006/66/EC was not found in Dutch law but directive 91/157/EEC was. According to directive 2006/66/EC marketing of portable batteries or accumulators containing more than 0.002% cadmium by weight is prohibited. The decree management of batteries 'Besluit beheer batterijen' lays down the requirement that batteries containing concentrations exceeding 0.025 % cadmium by weight needs to be labelled following provisions laid down in the regulation labelling of batteries and accumulators containing mercury, cadmium or lead 'Nadere regels aanduiding van batterijen en accu's die kwik, cadmium of lood bevatten'. The prohibition laid down in 2006/66/EC is not implemented yet. However, provisions have to be implemented at the 26th of September this year.

3.3.28 Regulation 2381/94 (EC) on organic production of agricultural products

A Regulation does not need implementation in national law. No reference is made to 2381/94 (EC) in Dutch law but Regulation 2092/91 (EC) which is amended by Regulation 2381/94 (EC) is referred to in the decree on agricultural quality 'Landbouwkwaliteitsbesluit' which directly refers to Regulation 20921/91 (EC) for the rules to be followed during organic production of agricultural products.

3.3.29 Directive 2002/32/EC on undesirable substances in animal feed

Directive 1999/29/EC lays down maximum levels of cadmium in animal nutrition and is repealed by directive 2002/32/EC. Directive 2002/32/EC is implemented in regulation concerning cattle fodder 'Regeling diervoeders' in which is referred to directive 2002/32/EC for the identification of undesirable levels of substances in animal feed. In the act on cattle fodder 'Kaderwet diervoeders' is regulated that levels of substances identified in directive 2002/32/EC are not allowed to be produced and marketed.

3.3.30 Directive 91/689/EEC on hazardous waste

In several decrees the list of hazardous waste established in directive 91/689/EEC is implemented. The decree on waste dumps and waste dump prohibitions 'Besluit stortplaatsen en stortverboden' prohibits the dump of hazardous waste as described in directive 91/689/EEC in dumping sites listed in 'Inrichtingen- en vergunningbesluit Milieubeheer'. In the regulation on European list waste products 'Regeling Europese afvalstoffenlijst', the hazardous waste list of 91/689/EEC is appointed as Dutch hazardous waste as well.

3.3.31 Directive 1999/31/EC on landfill of waste

In the decree on waste dumps and waste dump prohibitions 'Besluit stortplaatsen en stortverboden afvalstoffen', cadmium is one of the substances subjected to monitoring and reporting requirements. Provisions of 1999/31/EC on landfill of waste concerning cadmium are rather broad, i.e. heavy metals should be monitored in leakage or groundwater, thus, requirements of 1999/31/EC are fulfilled in Dutch law.

3.3.32 Decision 2007/742/EC on the Community eco-label to heat pumps

This Community law is the only piece of legislation found in the search starting from 2007 in Eur-Lex. Among the ecological criteria for the award of the Community eco-label, electrically driven, gas driven or gas absorption heat pumps may not contain cadmium. The decision reports which demands to the eco-label will be maintained and does not need implementation in national law.

3.3.33 Regulation 2003/2003(EC) on fertilizers

In Regulation (EC) No 2003/2003 relating to fertilisers the following is noted in consideration no. 15:

‘Fertilisers can be contaminated by substances that can potentially pose a risk to human and animal health and the environment. Further to the opinion of the Scientific Committee on Toxicity, Ecotoxicity and the Environment (SCTEE), the Commission intends to address the issue of unintentional cadmium content in mineral fertilisers and will, where appropriate, draw up a proposal for a Regulation, which it intends to present to the European Parliament and the Council. Where appropriate, a similar review will be undertaken for other contaminants.’
This consideration mentions intentions, but not actual action. In the future, the Commission most probably will address the issue of unintentional cadmium content in mineral fertilizers and will draw up a proposal for a Regulation. Therefore, Regulation 2003/2003 (EC) is relevant for the establishment of future legislative means, but not for usage to reduce cadmium emission at this moment.

Below is presented the written question by Samuli Pohjamo of the European Parliament and the response of Mr Liikanen on behalf of the Commission:

WRITTEN QUESTION E-2164/03
by Samuli Pohjamo (ELDR) to the Commission
(30 June 2003)
Subject: Cadmium in fertilisers
The cadmium content of fertilisers is limited more strictly in the Nordic countries and Austria than in other EU countries. Cadmium is known to be harmful to the environment, and the EU should consequently endeavour to reduce the cadmium content of fertilisers.
The phosphates imported into the EU, mainly from Morocco, contain a significant amount of cadmium. Alternatives could be found and, moreover, are available in the EU itself. The substantial phosphate deposit in Sokli, in northern Finland, is free of cadmium.
Is the Commission proposing to tighten the cadmium limits in the EU as a whole so as to make them at least as strict as in the Nordic countries and Austria? Can it provide any form of encouragement to ensure that the phosphates to be used in the EU would come from the EU area, since this would create new jobs and new economic activity in the EU?
Answer given by Mr Liikanen on behalf of the Commission
(4 August 2003)
The Commission is aware that cadmium is harmful to human health and to the environment, and that cadmium contained in phosphate fertilisers now represents one of the main inputs of cadmium to the environment.
The Commission is therefore preparing a proposal for a Regulation on cadmium in fertilisers that will address this problem by setting upper limits for the cadmium content of phosphate fertilisers, thereby ensuring the free circulation of phosphate fertilisers in the Internal Market. The upper limits for cadmium in the proposal will be set at a level sufficient to prevent further accumulation of cadmium in agricultural soil and to ensure that possible uptake into foods would not compromise food safety standards.
It is planned to present the proposal for adoption by the Commission before the end of 2003. The proposal will set standards based on science, and, in accordance with World Trade Organisation (WTO) rules, will permit the use of phosphate which can meet these standards, whatever the country of origin.

In the Netherlands, Regulation 2003/2003 (EC) is established in the decree on the execution of the Dutch act on fertilizers ‘Uitvoeringsbesluit meststoffenwet’.

3.3.34 Directive 76/116/EEC on fertilizers

This directive on fertilizers lays down quality requirements for fertilizers to be labeled EC-fertilizer. Among these requirements none are about cadmium content.

Without prejudice to the provisions of other Community Directives, Member States may not on grounds of composition, identification, labeling or packaging, prohibit, restrict or hinder the marketing of fertilizers marked 'EC fertilizer' which comply with the provisions of this Directive and the Annexes thereto. In article 7 is noted that the Commission shall review the need for establishing provisions at Community level concerning the cadmium content of fertilizers by 31 December 2001.

3.4 Derogations

During the search on derogations, only one case related to cadmium was detected. Commission Decision 2005/880/EC granted a derogation requested by the Netherlands pursuant to Council Directive 91/676/EEC for the purpose of allowing a higher amount of livestock manure than that provided for in Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources. The requested derogation concerns the intention of the Netherlands to allow the application of 250 kg nitrogen per hectare per year from livestock manure in farms with at least 70 % grassland. Approximately 25 000 farms in the Netherlands and approximately 900 000 hectares are concerned by that request for derogation.
The technical and scientific documents presented show that the proposed amount of 250 kg per hectare per year nitrogen from cattle manure in farms with at least 70 % grassland is justified on the basis of objective criteria such as long growing season and crops with high nitrogen uptake.
Conditions include the establishment of fertilizer plans on a farm by farm basis, the recording of fertilizer practices through fertilizer accounts, periodic soil analysis, green cover in winter after maize, specific provisions on grass ploughing, no manure application before grass ploughing and adjustment of fertilization to take into account the contribution of leguminous crops. These provisions are aimed at ensuring fertilization based on crop needs and reduction and prevention of nitrogen losses to water.
Commission Decision 2005/880/EC concerns cadmium emission indirectly, since manure contains cadmium, at levels depending on feed, cattle and environmental circumstances.

3.4.1 Additional national provisions

In general, the search on additional national provisions on cadmium showed that generally Dutch legislation is not more stringent compared to European law. However, Dutch legislation contains a more detailed description on how to handle cadmium. Apart from the legislation with implemented European regulations, several resolutions and regulations set maximal values for cadmium, for example resolutions on toys, flavors and resolutions on soil sanitation and the application of soil. Other regulations prescribe the use of standard techniques to analyze cadmium contents.

Legislation on fertilizers in the Netherlands is stricter than the EU-legislation. Although the European Regulation 2003/2003(EC) does not limit cadmium levels in fertilizers, the decree on the execution of the Dutch act on fertilizers 'Uitvoeringsbesluit Meststoffenwet' sets limits on cadmium in fertilizers such as sewage sludge and compost. The limits for cadmium in sewage sludge are more stringent than those required in the Directive 86/278/EEC on sewage sludge. Furthermore, the statutory regulation on the execution of the Dutch act on fertilizers 'Uitvoeringsregeling Meststoffenwet' sets limits to cadmium levels in anorganic fertilizer, which is not arranged in Directive 76/116/EEC.

Cadmium is considered a dangerous contaminant and is therefore listed in the regulation on substances of concern 'Lijst regeling aandachtsstoffen wet milieugevaarlijke stoffen'. Furthermore, cadmium-fluoride and cadmium-sulphide are listed as Dutch Priority Substances, which are substances which characteristics or concentrations in the environment give rise to 'very high concern' in the Netherlands. For the Dutch Priority Substances, reduction or elimination of emission is aimed for. Emissions of

these substances need to be reported in the so-called annual environmental report (Milieujaarverslag) by all installations, also the ones not covered by the IPPC. Cadmium is pinpointed as a substance for which elimination of emission to air is strived for (‘minimalisatieverplichting, MVP).

In addition to legislation, subsidy programmes may contribute to reduction of emission of cadmium. The Ministry of Economic Affairs runs several subsidy programmes on development of innovative techniques. Also, companies can apply for the VAMIL subsidy, which arranges investment deductions for the application of environmental friendly technologies. Similarly, the Ministry of Agriculture, Nature and Food Quality provides the regulation on subsidies by the Ministry of Agriculture, Nature Management and Fisheries ‘Regeling LNV-subsidies’, which offers investment deductions to activities supporting or improving nature quality.

Apart from legislation, in the Netherlands marketing boards issue quality marks. For example, the marketing board on animal food (Productschap Diervoeders) facilitates producers and consumers by prescribing European and national standards for certification of animal food. Sometimes, quality marks may even apply higher standards than legally obliged.

3.5 Failures of compliance

The search on the website of the Court of Justice of the European Communities (www.curia.europe.eu) resulted in only a minor number of failures of compliance by the Netherlands related to cadmium-emission since June 17th 1997. These cases are described in short below.

Case C-322/00 of the Commission of the European Communities versus Kingdom of the Netherlands concerns failure of the Netherlands to fulfil its obligations to Directive 91/676/EEC (Protection of waters against pollution caused by nitrates from agricultural sources) involved the Dutch MINAS-system.). The MINAS system laid down so-called loss standards. The phosphate and nitrogen input on a farm must not exceed the output of those minerals from the farm, plus a permitted loss. The Commission complained that the system laid down by the ‘Meststoffenwet’ is not based on a balance and that it permits nitrogen losses into the environment. According to the Commission, the Netherlands legislation did not include utilisation standards, but loss standards. The Commission considered this incompatible with the Directive. At present, the MINAS system is no longer operative. The ‘Meststoffenwet’ is amended and in line with European demands.

Case C-314/99 of the Kingdom of the Netherlands versus Commission of the European Communities (Dangerous substances — Marketing and use — Directives 76/769/EEC, 91/338/EEC and 1999/51/EC — Derogation — Adaptation to technical progress — Legal basis — Limitations on the use of cadmium in Austria and Sweden) concerns point 3 of the Annex to Directive 1999/51, which adds the following Section to Point 24 of Annex I to Directive 76/769/EEC:
'4. Austria and Sweden, which already apply restrictions to cadmium going further than those prescribed in Sections 1, 2 and 3 may continue to apply these restrictions until 31 December 2002. The Commission will review the provisions on cadmium in Annex I to Directive 76/769/EEC before this date in [the] light of the results of risk assessment for cadmium and of development of knowledge and techniques in respect of substitutes for cadmium.’
The new Section 4 had the effect of extending the validity of the derogations granted to Austria and Sweden in the Act of Accession until the end of 2002, thus enabling those States to continue to apply restrictions on the use of cadmium going further than those laid down in Point 24, Sections 1 to 3.

The Netherlands put forward four pleas in law. Firstly was complained that the Commission exceeded its powers by adopting that provision on the basis of Article 2a of Directive 76/769/EEC. Secondly, the contested provision was argued to be in contrast with the substantive provisions of Directive 76/769/EEC, since it implies that Point 24 of Annex I to the Directive entails an exhaustive harmonisation of the uses to which cadmium may be put. Thirdly, it was considered to violate the principle of legal certainty. Fourthly, the new section was found to fail to fulfil the requirements of reasoning, contrary to Article 253 EC. The court case was won by the Netherlands on all four points.

The European Commission has initiated a study on the application of BAT in IPPC-permits throughout the European Union. In the Netherlands, 80% of the permits fulfilled BAT-requirements. The remaining 20% of permits lacked argumentation of the permit requirements. Therefore, the Netherlands received a first formal notice, demanding data on the installations not fulfilling BAT-requirements.

3.6 Enforcement

The Dutch Environmental Management Act ‘Wet milieubeheer’ acknowledges different levels of competent authorities: the Provincial Executives and the College van B&W of the municipalities. The competent authorities grant permissions to (polluting) companies and organisations and are responsible for the enforcement of the ‘Wet milieubeheer’ and its related resolutions and regulations. The competent authority depends on the size and type of installation and activity. The provinces are competent authorities for large-scaled polluting industries and companies, the municipalities are competent authorities for ‘smaller’ companies and installations. The Ministry of VROM is competent authority for armed forces and is responsible for complying with the ‘Wet milieubeheer’ in general. The VROM-Inspectorate checks local governments and provinces on the execution of their grant of permits and enforcement.

In addition to the ‘Wet milieubeheer’, other laws are part of the Dutch environmental legislation: i.e. the act on dangerous substances ‘Wet milieugevaarlijke stoffen’, the act on soil protection ‘Wet bodembescherming’, the act concerning air pollution ‘Wet inzake luchtverontreiniging’, the act on pollution of surface waters ‘Wet verontreiniging oppervlaktewateren’ and the Fertilizer Act ‘Meststoffenwet’. The Ministry of Housing, Spatial Planning and the Environment (VROM) and its inspectorate, the provinces and the municipalities are in charge of the ‘Wet inzake luchtverontreiniging’, ‘Wet milieugevaarlijke stoffen’ and ‘Wet bodembescherming’.

The ‘Wet verontreiniging oppervlaktewateren’ regulates local industrial discharges on the surface water. Like the ‘Wet milieubeheer’, the ‘Wet verontreiniging oppervlaktewater’ forms a framework for more detailed rules put in resolutions and regulations. The Ministry of Transport, Public Works and Water Management (V&W) and the Water Boards (waterschappen) are competent authorities. The Water Boards grant permission for discharges on the regional surface water. The Directorate-General for Public Works and Water Management (Rijkswaterstaat) is the executive competent authority for national waterways. The Transport, Public Works and Water Management Inspectorate (V&W Inspectie) supervises the competent authorities.

The Fertilizer Act ‘Meststoffenwet’ is supported by the regulation on the execution of the Fertilizer Act ‘Uitvoeringsbesluit meststoffenwet’ and the Regulation on the use of fertilizers ‘Uitvoeringsregeling gebruik meststoffen’. This legislation lays down rules for the production and use of fertilizer. The Ministry of Agriculture, Nature and Food Quality (LNV) is the competent authority. On her behalf,

enforcement on the use of fertilizers (and animal feed), is executed by the Department for the execution of regulations 'Dienst Regelingen' and the General Inspectorate (Algemene Inspectiedienst, AID).

In practice, enforcement of the Environmental Management Act in companies and plants generally takes place in the form of administrative inspections. For example, plants have to keep copies of periodic inspections of large emitting installations and filters and sometimes logbooks on periodic measurement of emission values of specific chemicals. During inspection visits these logbooks are checked. Additionally, it is examined if the characteristics of the installations are in compliance with quality marks. Individual inspection reports describe the violations of the particular rules and substances. However, Inspectorates hardly ever summarise their inspections on typical violations or at the level of chemical substances.

Enforcement by the Water Boards also consists of visits at location and administrative inspections. Large companies with high risk of contaminating surface water, for example the aviation company KLM, are obliged by permit to sample their waste water daily. KLM is one of the large companies that is still allowed to use cadmium. The permit of KLM prescribes employment of the best available techniques to reduce the use of cadmium and to clean waste water. Furthermore, it prescribes maximum values of cadmium concentrations in waste water, but. it does not prescribe 0-emission. Sometimes the Water Boards sample the quality of waste water at location. For agriculture applies the decree on discharges by cattle farms and outdoor culturing 'Lozingenbesluit veehouderij en open teelt'. This resolution prohibits direct discharge of fertilizer or percolated rainwater on the surface water. Inspectors of the Water Boards visit rural areas regularly to check on this regulation.

According to the legislation on fertilizers, new since 2006, farmers have to keep an administration of the amounts of fertilizer they transport to, use at and transport from their farm. Although the decree on the execution of the Fertilizers Act 'Uitvoeringsbesluit meststoffenwet' mentions maximal values for heavy metals in fertilizer (Bijlage II, table 1, 'Uitvoeringsbesluit meststoffenwet'), these administrations focus on calculated amounts of nitrogen and phosphate. Companies using considerable amounts of fertilizer like factory farmers have to send these administrations to the Ministry of Agriculture, Nature and Food Quality (Department for the execution of regulations 'Dienst regelingen'). The Ministry of Agriculture, Nature and Food Quality checks the administration to see if the farmer used the legitimate amounts of fertilizer for his crops.

Fertilizer for transport has to be sampled on phosphate and nitrogen. All transport has to be documented and sent to Ministry of Agriculture, Nature and Food Quality ('Dienst Regelingen'). Since 1 January 2008, sludge and compost must be analysed for nitrogen, phosphate and heavy metals. Again all information on the transport has to be registered at 'Dienst Regelingen'. Consequently, 'Dienst regelingen' is able to perform so called desk inspections. In case of irregularities, the General Inspectorate AID pays visits on location. The AID also carries out inspections at random. During inspections of the AID attention is paid to the technique of fertilizing; e.g. are fertilizers injected deeply enough and are fertilizer free zones next to waterways respected.

The annual report 2006 from the VROM Inspectorate summarises the numbers of inspections and violations of different acts. However, from the annual reports of VROM no conclusions can be drawn at the level of specific activities or specific chemicals.
The annual report 2006 of the V&W-Inspectorate states that Water Boards are well capable of supervising their own quality of discharges that come from the sewage plants. Enforcement of discharges on surface water was not always accurate. Furthermore, it was mentioned that the Directorate-General for Public Works and Water Management ('Rijkswaterstaat') did not execute its

programme on reduction of diffuse water pollution. From this annual report no conclusions can be drawn at the level of specific chemicals.
The annual report 2006 from the AID mentions that change of legislation on fertilizer also changed the way of enforcement. In 2006, much more attention was paid to road inspections than before. Furthermore, change of the administration system lead to an enormous increase in visits at location.

For 2008, a programme is planned on the inspection of REACH. The VROM Inspectorate visits, together with two other national inspectorates (Arbeidsinspectie en voedsel en warenautoriteit) plants and companies that produce, import, distribute or use chemicals or chemical preparations such as solvents and paints.
Another spearhead in 2008 is the implementation of the IPPC-regulation. In the supervision on the municipalities the VROM Inspectorate checks if the permits of specific companies are renewed and comply with IPPC at 40 municipalities.
Inspectorates and competent authorities improve their enforcement by working according to the national program 'Programmatisch handhaven'. The main focuses of this program are to cope with limited capacity and to reduce the time companies have to spend on inspection visits. Therefore, inspectorates from various ministries will continue to integrate inspection visits in 2008.

Recently, the Dutch National Audit Office ('Algemene Rekenkamer') investigated the enforcement system of European Regulations in the Netherlands (Tweede Kamer, 2008). The report makes some firm conclusions. Establishment of enforcement is generally arranged too late, there is a persistent shortage in enforcement (on regulations) and the quality of reporting of enforcement is not transparent.

The involved Ministries replied that the inspectorates deal with their limited capacity by focussing their inspections at the most risk-full activities and companies. Reports on the performances of inspectorates may be more transparent. However, it is not possible to report on the level of individual regulations, because enforcement of a specific regulation takes place in the context of the particular policy area. The recommendations made by the Dutch National Audit Office agree with the national program 'Programmatisch handhaven'.

4 Discussion

The underlying study aimed to gain insight in the implementation of European legislation identified in a former study by Vos and De Poorter (2007) in Dutch law, in additional national measures and in enforcement, all in relation with cadmium. All European provisions were traced back in Dutch law and a number of additional national provisions were identified. Community and Dutch law are discussed below per emission source contributing in major proportion to cadmium load in Dutch surface waters. Major Dutch sources of cadmium load to surface water are agriculture, sewer systems and water treatment plants, the chemical industry and atmospheric deposition. Emission to air in the Netherlands originates mostly from the chemical industry and the metal industry.

Agriculture

Agricultural sources constitute a fairly big portion of the cadmium load to surface waters within the whole EU. Emission in agriculture is mainly caused by the use of phosphate fertilizers and manure and by cadmium containing animal feed. Application rate of fertilizers depends on factors such as agricultural surface area compared to country's total surface, soil characteristics and type of agricultural activities. In the Netherlands, the highest nitrogen input from manure per hectare takes place (Figure 3, data from Eurostat, 1995).

The rules governing the composition of fertilizers covered by Regulation 2003/2003 (EC) do not provide for a limit value for the cadmium content of EC-designated fertilizers. The Commission has expressed its intentions to draw up a proposal concerning cadmium content in mineral fertilizers, but a new directive regulating cadmium content of fertilizers has not appeared yet. Several Member States have established national provisions concerning cadmium content in EC-fertilizers and/or non EC-fertilizers. However, the call for EU-wide regulation of cadmium content of fertilizers is strong and diversity in national provisions is considered to be undesirable. A future Regulation on cadmium in fertilizers will be a practical tool to limit the release of cadmium by fertilizers.
In 2000, a study was published on a possible EU-wide charge on cadmium in phosphate fertilizers (Oosterhuis et al., 2000). Several scenarios of charge on cadmium resulted in limited financial impact on agriculture. Farmers were estimated to face overall cost increases of less than 1%. The study indicated that a cadmium charge ideally would have a regionally differentiated rate, because of the variety in soil quality, sensitivity and background cadmium concentrations in the EU.

The cadmium content of phosphate fertilisers can be reduced by using low-cadmium phosphate rock or by decadmiation of either phosphate rock or phosphoric acid. Using low-cadmium rock has been the dominant strategy in countries where cadmium reduction policies are being pursued. Decadmiation is currently too expensive and low-cost technologies are not yet fully developed. In some cases technical restrictions impede the use of either magmatic rock or decadmiation (Oosterhuis et al., 2000).
Manure contains cadmium as well. Cadmium content of manure depends on cadmium content of cattle-fodder, which is regulated through EU-legislation. As long as cattle-fodder contains any cadmium, manure will as well.

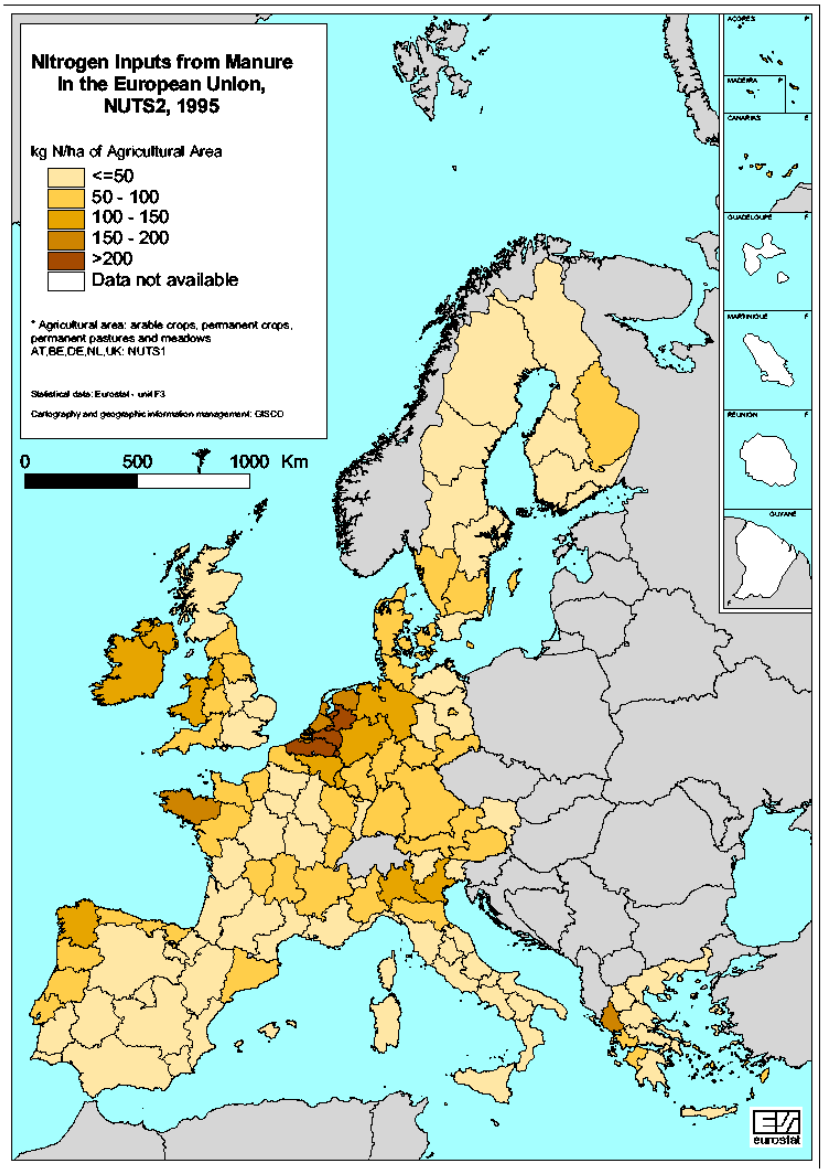

Figure 3. Nitrogen inputs from manure in 1995. Figure copied from
http://ec.europa.eu/agriculture/envir/report/en/

Although the European Regulation 2003/2003(EC) does not limit cadmium levels in fertilizer, the Dutch decree on the execution of the Fertilizers Act 'Uitvoeringsbesluit Meststoffenwet' sets limits on cadmium in fertilizers such as sewage sludge and compost. Since 1 January 2008, producers of sewage sludge and compost are obliged to have their products analyzed on heavy metals. The 'Uitvoeringsbesluit Meststoffenwet' also mentions maximum values for heavy metals in animal manure. However, no regulation refers to these maximum values and thus, there is no implementation of these maximum values at present. It can be argued that it is a political choice not to oblige these maximum values, because no animal manure can meet these restrictions on heavy metals. As a result all animal manure should be treated as waste and that would be an extremely costly problem for farmers.

The intermediate aim to remain below the EQS for cadmium in all Dutch surface waters was not evaluated in the present study, because no easy-accessible data of cadmium levels in regional waters were available. Thus, it is unknown if agricultural sources cause events of EQS-exceedance. Since agriculture constitutes a major cadmium source in the Netherlands, cadmium release in the regional waters calls for further investigation.

Industry

Both the Cadmium Directive (83/513/EEC) and the IPPC dictate emission limits for e.g. cadmium. The WFD, however, demands cessation of the Priority Hazardous Substances, among which is cadmium. An emission limit seems to be in contradiction with the WFD-demand for complete elimination. Moreover, the IPPC does not cover all industries, but leaves out certain categories of installations with smaller capacities. For the chemical industry installations of all capacities are regulated by the IPPC. For further discussion on this matter the reader is referred to the discussion chapters in Vos and De Poorter (2007) and Vos et al. (2008) on cadmium and polycyclic aromatic hydrocarbons, respectively.

A Commission staff working document assessed the impact of the proposed EQS directive in EU Member States (SEC(2006)947). In section 6.2.1 on economic impacts on the main industrial sectors, the concerns of some industries about the high costs of achieving cessation of emissions are discussed. The concerns of the industries were confirmed by the study carried out for the working document. The industries proposed applying the concept of 'negligible load', arguing that compliance could be 'ensured by accessible, economically sound technologies feasible on an industrial scale'. 'While the Commission proposal {proposed EQS directive, ed.} does not include this specific terminology, the approach followed by the WFD and the proposed Directive will be similar to the methodology proposed by industry, thereby considerably reducing the estimated costs' (quoted from staff working document SEC(2006)947).
The quote sets the cessation demand for priority hazardous substances in a total different perspective. However, the quote is not laid down in legislative tools and therefore, no rights can be derived from it.

The industry contributes a fairly large portion to cadmium load in Dutch surface waters. In some cases, these point sources are likely to contribute to exceedance of the EQS. These specific point sources need to be identified and investigated in order to assess if Best Available Techniques (BAT) are applied and if permit requirements are sufficient and applied. In an investigation initiated by the European Commission, the application of BAT in IPPC-permits throughout the European Union was inventoried. In the Netherlands, 80% of the permits fulfilled BAT-requirements. The remaining 20% of permits lacked argumentation of the permit requirements. At present, the Netherlands are in the process to gather data on the installations not fulfilling BAT-requirements.

Waste water treatment and sewer systems

In the same Commission staff working document (SEC(2006)947), emission of heavy metals by waste water treatment plants is explicitly mentioned, i.e. in section 6.2.2. In case of cadmium in the Netherlands, waste water treatment plants and by sewer systems are expected to constitute the major emission sources. However, the original sources delivering cadmium to these waste water systems are difficult to trace back. The staff-working document stresses the importance of improving knowledge and data on the sources and pathways of priority substances into municipal wastewater in order to identify targeted and efficient control options. The present study emphasizes the need to gain more knowledge on pathways into wastewater, since waste water systems releases cadmium in significant amounts. It is expected that the need for more knowledge on this matter accounts for the whole of the European Union. It is self-evident that cessation of emission is unattainable without this knowledge. At

present, a research group funded by the European Commission is aiming to identify sources of WFD Priority Substances in urban areas and to develop strategies for limiting the release of Priority Substances (www.scorepp.eu). Currently, however, no information from the project is available yet.
From the present study could not be extracted if the EQS is exceeded due to contribution by waste water treatment and sewer systems in the Netherlands, although sewer treatment plants are not expected to emit considerable amounts of cadmium (between 0-2 kg annually, www.emissieregistratie.nl).

Feasibility of the Environmental Quality Standard

For cadmium, cessation of discharges is demanded. However, intermediate objective is to remain under the Environmental Quality Standard (EQS) for cadmium. Cadmium concentrations in the large rivers exceeded the EQS throughout the Netherlands. From data of De Nijs et al. (in press) it appeared that exceedance of the AA-EQS was due to both inland point sources and transport of cadmium via the rivers from abroad. 75% of cadmium load in the Netherlands is imported via the large rivers, thus, maximally 25% can be influenced by the Dutch authorities. At some monitoring points in the large rivers the EQS is expected to be exceeded by contribution of Dutch point sources. More in-depth investigation is needed in order to identify cadmium sources per WFD-monitoring point contributing to the exceedance of the EQS.
Moreover, no information on regional emission and monitoring data in regional waters was available for the current study. Further investigation is needed to identify which sources contribute to the cadmium load in these regional waters.

Non-compliance with WFD-demands

In section 5.2.2 of the Commission staff-working document, cases of non-compliance with EQS values are treated. For priority hazardous substances, the additional demand of ceasing or phasing out and cessation of emissions, losses and discharges apply. For convenience, it is assumed that the quote from the Commission staff working document below, concerning the WFD-exemptions, also applies to the cessation demand:

> These exemptions {exceedance of EQS, red.} would be applied on a case-by-case basis using concrete data on the specific pollution problem which is available only at Member State level. Furthermore, Member State authorities are obliged to publish their measures, the related costs, and the application for an exemption so that the public and interest groups can comment. Therefore, it is not possible to assess these questions in more detail here.

Thus, practice has to learn what is infeasible or disproportionately expensive. Infeasibility is described in general terms in a Common Implementation Strategy by the Water Directors, but Member States may be greatly aided with concrete guidance on these terms ‘infeasible’ or ‘disproportionately expensive’.

Enforcement

The Dutch enforcement inspectorates cover the Dutch environmental legislation, including the legislation on cadmium and the relevant European Regulations. Information about enforcement specifically concerning cadmium is not available in reports of the inspectorates.
Enforcement covering all environmental legislation does not imply that emission limits are never exceeded and that regulations are always followed. Enforcement is mostly a snap-shot of a situation and does not ensure that technical failures have occurred in the past or will not occur in the future. Evaluation of the local inspectorates shows that surveillance and enforcement is not always accurate. During the last years, efforts have been made to professionalize enforcement. In addition to enforcement, sector organisations stimulate widespread use of quality marks issued by the marketing

boards. Because these quality marks meet the minimal legal requirements, in general producers in the Netherlands easily oblige to European and Dutch legislation.
In 2001, Recommendation 2001/331/EC was adopted, recognising that there was a wide disparity between inspection systems. The Recommendation contains non-binding criteria for the planning, carrying out, following up and reporting on environmental inspections. Its objective is to strengthen compliance with Community environmental law and to contribute to its more consistent implementation and enforcement in all Member States. It was noticed that the minimum criteria for environmental inspections have not resulted in harmonisation of enforcement practices throughout the European Union. In Communication COM/2007/0707, implementation of Recommendation 2001/331/EC was evaluated. On basis of the evaluation, the Commission recommends to broaden the inspection criteria to other fields than only industrial installations, e.g. Natura 2000-areas, waste shipments and REACH. Moreover, the Commission considers to clarify the terms 'inspection', 'control' and 'audit', since these terms are applied differently within the different Member States. The evaluation revealed that criteria for planning, carrying out, following up and reporting on inspections are applied differently among Member States. Therefore, these criteria should be specified in more detail. In addition to the general criteria for environmental inspections set out in the Recommendation, the Commission considers to include specific legally binding requirements for the inspection of certain installations or activities in sectored pieces of legislation.

Conclusions

- A major part of cadmium load taking place in the Netherlands is 'diffuse', i.e. originates from the use of fertilizers or manure and from sources delivering to waste water treatment plants. At present, with the current knowledge and techniques, it is infeasible or disproportionally costly to eliminate diffuse pollution completely.
- Inland elimination of industrial emission will demand advanced techniques. However, from the data available at present, it appears that a number of point sources in the Netherlands contribute to EQS-exceedance in the international rivers. The proportion of inland emitted cadmium to imported cadmium per monitoring point is currently unknown. Overall, 75% of cadmium in the Dutch surface waters enters the Netherlands via the international rivers.
- Several Member States have established national provisions concerning cadmium content in EC-fertilizers and/or non EC-fertilizers. Diversity in national provisions is considered to be undesirable and Community law on cadmium in fertilizers is considered to be desirable.
- European legislation is implemented in Dutch law and additional measures are in place. Among these additional measures are subsidy programmes and marketing boards.
- Enforcement covers the Dutch legislation on cadmium. However, enforcement is a snap-shot of a situation and is not always carried out accurately. The past few years, efforts have been made to improve enforcement in several manners.
- The Netherlands cannot comply with the WFD-demand of cessation of discharges unless it makes use of the exemptions formulated in article 4 of the WFD.

Recommendations

- Analysis of emission sources and monitoring data per region or monitoring point instead of at national level.
- Analysis of the sources contributing to cadmium supply to sewer systems.
- Development of guidance on the application of the term 'disproportional costs'.
- Development of an EU-wide charge on cadmium in fertilizers.

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Appendix I. Community legislation relevant for control of cadmium emission: short notes

Search results of Vos and De Poorter (2007)
VdP: Summarised in Vos and De Poorter (2007)

			Short notes/explanation
		GENERAL LEGISLATION	
VdP	76/769/EEC cq. M&U	Council Directive of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations	Annex I, issue 24: restricts the use of Cadmium as pigment, stabiliser and for electroplating with certain exemptions
VdP	793/93 (EEC) cq. ESR	Council Regulation (EEC) No 793/93 of 23 March 1993 on the evaluation and control of the risks of existing substances, referred to as Existing Substances Regulation	Cadmium is identified as Priority Existing Substance. A Risk Assessment Report (RAR) is created for cadmium oxide and cadmium metal.
VdP	96/61/EC cq. IPPC	Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control	Cadmium is categorised as main polluting substance to be taken into account if relevant for fixing emission limit values
VdP	2000/479/EC cq. EPER	Commission Decision 2000/479/EC of 17 July 2000 on the implementation of a European pollutant emission register (EPER) according to Article 15 of Council Directive 96/61/EC	Sets threshold values for reporting emissions.
VdP	166/2006 (EC) cq. E-PRTR	Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC	Sets threshold values for reporting emissions.
VdP	1907/2006 (EC) cq. REACH	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC	Takes over restrictions set in 76/769/EEC. Registration, Evaluation, Authorisation and Restriction of Chemicals.

			Short notes/explanation
	67/548/EEC	Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances	Cadmium substances are classified in Annex I e.g. as toxic to aquatic organisms, possible risk for impaired fertility.
		GENERAL POLICY: resolutions, protocols and declarations	
VdP	1988Y0204(3)	Council Resolution of 25 January 1988 on a Community action programme to combat environmental pollution by cadmium (88/C 30/01)	General resolution. The Council asks the Commision to develop specific measures as identified in the action programme.
VdP	2001A0517(01)	Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Heavy Metals	The Protocol on heavy metals to the UNECE Convention on long-range transboundary air pollution recommends the adoption of measures to reduce heavy metals emitted by certain installations.
		WATER	
	75/440/EEC	Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for the abstraction of drinking water in the Member States	Cadmium limits are under the characteristics of surface water intended for the abstraction of drinking water, i.e. 0.001 or 0.005 mg/L, depending on the water treatment.
VdP	80/68/EEC	Council Directive 80/68/EEC of 17 December 1979 on the protection of groundwater against pollution caused by certain dangerous substances	Comprises cadmium compounds for which MS must prohibit the direct and avoid the indirect introduction to the groundwater. No explicit standards are given.
VdP	83/513/EEC cadmium directive	Council Directive 83/513/EEC of 26 September 1983 on limit values and quality objectives for cadmium discharges (daughter of 76/464/EEC)	Requires Member States to set up an (prior) authorisation system for discharges of cadmium. Contains emission limits and monitoring requirements for effluent.
	85/613/EEC	Council Decision of 20 December 1985 concerning the adoption, on behalf of the Community, of programmes and measures relating to mercury and cadmium discharges under the convention for the prevention of marine pollution from land-based sources	Every discharge of cadmium into the maritime area or into watercourses that affect the maritime area requires prior authorization. Such authorizations have to contain emission standards for the discharge. The actual limit values can not be extracted from the Decision due to the html-version. Quality objectives for estuarine waters 5 µg/L; waters affected by discharges 2,5 µg/L; estuary waters up to the freshwater limit 1 µg/L and territorial waters plus waters, other than estuary waters, on the landward side of the base lines from which the breadth of the territorial sea is measured and extending in the case of watercourses up to the freshwater limit 0.5

			Short notes/explanation
			µg/L.
VdP	98/83/EC	Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption	Standards for water intended for human consumption, limit value for cadmium is 5 µg Cd/L
VdP	2000/60/EC	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy	Demands quality standard setting for relevant substances and demands taking measures in case of threat to the aquatic system
VdP	2006/11/EC	Directive 2006/11/EC of the European Parliament and of the Council of 15 February 2006 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community	Cadmium is one of the substances listed for which discharges should be eliminated. Rules for handing out authorisations are laid down.
VdP	2006/113/EC	Directive 2006/113/EC of the European Parliament and of the Council of 12 December 2006 on the quality required of shellfish waters	Cadmium is listed in Annex I as one of the substances that should be monitored and for which a standard has to be set. Members States have to establish measures to meet the standards.
		SPECIFIC WATER BODIES	
	82/460/EEC	Council Decision of 24 June 1982 on a supplement to Annex IV to the Convention on the protection of the Rhine against chemical pollution	Adoption of action plans for the protection of the Rhine. Limit values are proposed but from Eur-Lex only the html-version of the Decision can be obtained, which does not present the actual limit values. Therefore, it is unclear if this Decision concerns cadmium or not.
	85/336/EEC	Council Decision of 27 June 1985 concerning a supplement in respect of cadmium to Annex IV to the Convention for the protection of the Rhine against chemical pollution	Adoption of the proposal from the International Commission for the Protection of the Rhine against Chemical Pollution, intended to supplement in respect of cadmium Annex IV to the Convention for the protection of the Rhine against chemical pollution. A long list of limit values for cadmium discharges is given, which is not readable due to html-form.
	1995A0805(01)	Convention on the protection and use of transboundary watercourses and international lakes - Declaration by the Community pursuant to Article 25 (4) of the Convention (1995)	Refers to Council Directive 83/513/EEC (cadmium directive) which should be followed to protect transboundary watercourses
	78/659/EEC	Council Directive 78/659/EEC of 18 July 1978 on the quality of fresh water for fish on the quality of fresh waters needing protection or improvement in order to support fish life	No specific cadmium standard given, but no harmfull effects should occur

			Short notes/explanation
		AIR POLICY	
	84/360/EEC	Council Directive 84/360/EEC of 28 June 1984 on the combating of air pollution from industrial plants	The following plants require authorisation (among others): "Plants for the production and melting of non-ferrous metals having installations with a total capacity of over 1 tonne for heavy metals or 0,5 tonne for light metals". Heavy metals and their compounds are in the list of most important polluting substances.
VdP	96/62/EC	Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management	Cadmium should be considered during air quality assessment and management and the Commission should propose quality standards before the start of 2000. According to the draft RAR an air quality standard of 5 ng/m3 has been proposed
	1999/30/EC	Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air	Establishes limit values and alert thresholds for concentrations of sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air and demands to assess concentrations of these substances. Likely to have impact on heavy metal emissions through limit values for dust emissions
VdP	2004/107/EC	Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air	Sets target values for monitoring.
		MAXIMUM ADMISSIBLE CONTENT IN FERTILIZERS	
	76/116/EEC	Council Directive 76/116/EEC of 18 December 1975 on the approximation of the laws of the Member States relating to fertilizers	Lays down quality requirements for fertilizers to be labelled EC-fertilizer. Requirements are not specifically directed to prevent pollution. Cadmium is mentioned in the framework of marketing limitations within Austria, Finland and Sweden.
	2003/2003 (EC)	Regulation (EC) No 2003/2003 relating to fertilisers	Does not lay down cadmium limits.
	2092/91 (EC)	Council Regulation (EEC) No 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs	Sets limit values for metals in composted or fermented household waste: 0.7 mg Cd/kg dw, for soft ground rock phosphate and aluminium calcium phosphate: 90 mg Cd/kg P_2O_5.
		PRODUCTS	

			Short notes/explanation
VdP	91/338/EEC	Council Directive 91/338/EEC of 18 June 1991 amending for the 10th time Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations	Adds issue 24 to Annex I of 76/769/EEC: restricts the use of cadmium as pigment, stabiliser and for electroplating with certain exemptions.
VdP	2000/53/EC	Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles - Commission Statements: "directive on end of life-vehicles"	Use of heavy metals (lead, mercury, cadmium and hexavalent chromium) in materials and components of vehicles put on the market are prohibited, with exemptions (e.g. cadmium in batteries for electrical vehicles) foreseen in Annex II.
VdP	2002/95/EC	Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment	Requires the substitution of various heavy metals (incl. Cadmium) and other chemicals in new EEE put on the market from 1 July 2006
	2005/90/EC	Directive 2005/90/EC of the European Parliament and of the Council of 18 January 2006 amending, for the 29th time, Council Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations (substances classified as carcinogenic, mutagenic or toxic to reproduction — c/m/r)	Cadmium is appointed as carcinogenic, mutagenic and reproductive toxic.
VdP	2005/618/EC	Commission Decision of 18 August 2005 amending Directive 2002/95/EC of the European Parliament and of the Council for the purpose of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment	Sets a maximum concentration value of 0,01 % by weight in homogeneous materials for cadmium
VdP	2005/747/EC	Commission Decision of 21 October 2005 amending for the purposes of adapting to technical progress the Annex to Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment	Adds exemptions to 2002/95/EC-requirements: “Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC” and “Lead and cadmium in optical and filter glass.”
		ECOLOGICAL CRITERIA FOR THE AWARD OF THE COMMUNITY ECO-LABEL	
	2001/688/EC	Commission Decision of 28 August 2001 establishing ecological criteria	Requirements to soil improvers and growing media to be awarded with an EC Eco-

			Short notes/explanation
		for the award of the Community eco-label to soil improvers and growing media	label: < 1 mg/kg dw
	2002/739/EC	Commission Decision of 3 September 2002 establishing revised ecological criteria for the award of the Community eco-label to indoor paints and varnishes and amending Decision 1999/10/EC	Establishing the ecological criteria for the award of the Community eco-label to indoor paints and varnices: cadmium is not allowed to be used as an ingredient of these products, although it is accepted that ingredients may contain traces of heavy metals
	2006/799/EC	Commission Decision of 3 November 2006 establishing revised ecological criteria and the related assessment and verification requirements for the award of the Community eco-label to soil improvers	Concentration of cadmium is not allowed to exceed 1 mg/kg dw in order to be rewarded the EC-label
	2007/64/EC	Commission Decision of 15 December 2006 establishing revised ecological criteria and the related assessment and verification requirements for the 2007/64 award of the Community eco-label to growing media	In the organic growing medium constituents, the content of cadmium is lower than 1 mg/kg dw in order to obtain the EC eco-label
		ANIMAL NUTRITION , FOODSTUFF AND FEEDING STUFF	
	2381/91 (EC)	Commission Regulation (EC) No 2381/94 of 30 September 1994 amending Annex II to Council Regulation (EEC) No 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs	Lays down limitation for e.g. in composted or fermented household waste (for cadmium 0.7 mg/kg dry matter), in soft ground rock phosphate (for cadmium 90 mg/kg P2O5) and in aluminium calcium phosphate (for cadmium 90 mg/kg P2O5)
	1999/29/EC	Council Directive 1999/29/EC of 22 April 1999 on the undesirable substances and products in animal nutrition	Maximum levels of cadmium in animal nutrition are laid down.
VdP	2002/32/EC	Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed	Limitation of cadmium content in animal feed
	2002H214	Commission Recommendation of 12 March 2002 on the coordinated inspection programmes in the field of animal nutrition for the year 2002 in accordance with Council Directive 95/53/EC	Recommendation that cadmium should be included in monitoring programmes for animal nutrition
VdP	2005/87/EC	Commission Directive 2005/87/EC of 5 December 2005 amending Annex I to Directive 2002/32/EC of the European Parliament and of the	Limitation of cadmium content in animal feed

			Short notes/explanation
		Council on undesirable substances in animal feed as regards lead, fluorine and cadmium	
		WASTE	
VdP	75/442/EEC	Council Directive 75/442/EEC of 15 July 1975 on waste	Various waste streams relevant for WFD substances are particularly mentioned in the list of (hazardous) waste that falls under the Directives and where measures have to be taken to ensure that waste is disposed of without harming the environment. General directive. Under Annex IIB is listed "Recycling/reclamation of metals and metal compounds" as an activity for which a permit is required.
	91/689/EEC	Council Directive 91/689/EEC of 12 December 1991 on hazardous waste	Various waste streams relevant for WFD substances are particularly mentioned in the list of (hazardous) waste that falls under the Directives and where measures have to be taken to ensure that waste is disposed of without harming the environment. Cadmium is one of the substances listed in Annex II: Constituents of the wastes in Annex I.B which render them hazardous when they have the properties decribed in Annex III (*). Annex III lists properties found to be hazardous.
	1999/31/EC	Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste	Concerns landfill of waste with general provisions with regard to the control of discharges. Heavy metals are recommended as parameters to be analysed in groundwater.
	2000/532/EC	Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (notified under document number C(2000) 1147)	Various waste streams relevant for WFD substances are particularly mentioned in the list of (hazardous) waste that falls under the Directives 75/442/EEC and 89/369/EEC and where measures have to be taken to ensure that waste is disposed of without harming the environment
	2001/118/EC	Commission Decision of 16 January 2001 amending Decision 2000/532/EC as regards the list of wastes	Various waste streams relevant for WFD substances are particularly mentioned in the list of (hazardous) waste that falls under the Directives 75/442/EEC and 89/369/EEC and where measures have to be taken to ensure that waste is disposed of without harming the environment
	2003/33/EC	Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article	This Decision establishes the criteria and procedures for the acceptance of waste at landfills. Cadmium is mentioned particularly (together with mercury) for which

			Short notes/explanation
		16 of and Annex II to Directive 1999/31/EC	additional measures may be necessary, but which have to be notified to the Commission. Leaching limit values and limit values for several categories of waste are reported, also for cadmium.

Appendix II. Reference to EU-legislation related to cadmium in Dutch law

	2000/60/EC	2006/11/EC	2455/2001/EC	76/464/EEC	83/513/EEC	98/83/EC	76/769/EEC	1907/2006	793/93/EEC	96/61/EC	166/2006(EC)	75/442/EEC	2000/76/EC	96/62/EC	2004/107/EC	94/62/EC	1999/177/EC	2001/171/EC	86/278/EEC
Wetten																			
Wet milieubeheer (Wm)	x	x	x					x	x	x	x	x		x	x				
Wet verontreiniging oppervlaktewateren (Wvo)	x	x	x							x	x								
Wijzigingswet Wet milieubeheer (luchtkwaliteitseisen)										x				x	x				
Wet verontreiniging zeewater																			
Wijzigingswet Meststoffenwet	x																		
Uitvoeringswet EG-verordening registratie, evaluatie en autorisatie van chemische stoffen (REACH)								x	x										
Uitvoeringswet EG-verordening PRTR en PRTR-Protocol										x	x								
Wijzigingswet grondwaterwet, etc. (infiltraties)																			
Kaderwet diervoeders																			
Besluiten																			
Cadmium besluit							x									x			
Besluit algemene regels voor inrichtingen milieubeheer	x																		
Besluit beheer Batterijen																			
Waterleidingbesluit						x													
Besluit kwaliteitseisen en monitoring water																			
Besluit beheer autowrakken																			
Warenwetbesluit Bereiding en behandeling van levensmiddelen						x													
Besluit beheer elektrische en elektronische apparatuur																			
Besluit beheer verpakkingen en papier en karton																x	x		
Uitvoeringsbesluit meststoffenwet																			
Besluit vierjaarlijks bezien van lozingsvergunningen				x	x														
Warenwetbesluit Verpakte waters						x													
Besluit verbranden afvalstoffen										x			x						

	2000/60/EC	2006/11/EC	2455/2001/EC	76/464/EEC	83/513/EEC	98/83/EC	76/769/EEC	1907/2006	793/93/EEC	96/61/EC	166/2006(EC)	75/442/EEC	2000/76/EC	96/62/EC	2004/107/EC	94/62/EC	1999/177/EC	2001/171/EC	86/278/EEC
Besluit gewasbeschermingsmiddelen en biociden	x																		
Besluit lozing afvalwater huishoudens	x																		
Besluit vaststelling grenzen stroomgebieddistricten	x																		
Besluit glastuinbouw				x															
Warenwetbesluit Bereiding en behandeling van levensmiddelen						x													
Besluit instelling Bureau REACH								x	x										
Besluit beoordeling en beperking risico's bestaande stoffen									x										
Besluit melding nieuwe kennis milieugevaarlijke stoffen									x										
Lozingenbesluit open teel en veehouderij										x									
Uitvoeringsbesluit EG-verordening PRTR en PRTR-Protocol											x								
Besluit inzamelen afvalstoffen												x							
Besluit stortplaatsen en stortverboden afvalstoffen												x							
Inrichtingen- en vergunningenbesluit milieubeheer												x	x						
POP-Besluit Wms																		x	
Wijzigingsbesluit besluit beheer autowrakken, enz.																			
Besluit beheer autobanden																			
Stortbesluit bodembescherming																			
Besluit emissie-eisen stookinstallaties milieubeheer A																			
Landbouwkwaliteitsbesluit 2007																			
Wijzigingsbesluit Inrichtingen- en vergunningenbesluit milieubeheer, enz. (storten van afvalstoffen)																			
Warenwetbesluit algemene chemische produktveiligheid							x												
Wijzigingsbesluit Waterleidingbesluit en Besluit hygiëne en veiligheid badinrichtingen en zwemgelegenheden (preventie van legionella in leidingwater)						x													
Regelingen																			

	2000/60/EC	2006/11/EC	2455/2001/EC	76/464/EEC	83/513/EEC	98/83/EC	76/769/EEC	1907/2006	793/93/EEC	96/61/EC	166/2006(EC)	75/442/EEC	2000/76/EC	96/62/EC	2004/107/EC	94/62/EC	1999/177/EC	2001/171/EC	86/278/EEC
Regeling beoordeling luchtkwaliteit 2007														x	x				
Regeling grenswaarden voor cadmium in afvalwater					x														
Nadere regels aanduiding van batterijen en accu's die kwik, cadmium of lood bevatten																			
Regeling milieukwaliteitseisen gevaarlijke stoffen oppervlaktewateren	x	x		x	x					x			x						
Regeling lozingen afvalwater van rookgasreiniging													x						
Regeling aanwijzing BBT-documenten										x									
Regeling integrale tekst Afvalstoffenlijst																			
Regeling stortplaatsen voor baggerspecie op land												x							
Regeling tijdelijke vergunning voor lozing van zwartelijststoffen		x		x	x														
Uitvoeringsregeling EG-verordening PRTR en PRTR-protocol											x								
Uitvoeringsregeling gebruik meststoffen																			x
Regeling diervoeders						x													
Regeling Europese afvalstoffenlijst						x						x							
Uitvoeringsregeling meststoffenwet																			x
Warenwetregeling verontreinigingen in levensmiddelen																			
Regeling EG-verordening overbrenging van afvalstoffen																			
Regeling meetmethoden emissie-eisen stookinstallaties milieubeheer A 2005																			
Regeling afvalstoffenlijst																			
Regeling scheiden en gescheiden houden van gevaarlijke afvalstoffen																			

	2000/53/EC	2002/95/EC	2002/96/EC	1881/2006/EC	2002/32/EC	1013/2006	75/440/EEC	79/923/EEC	80/68/EC	2006/11/EC	1999/30/EC	2001/80/EC	91/157/EEC	2092/91(EC)	2002/32/EC	91/689/EEC	1999/31/EC	2003/2003
Wetten																		
Wet milieubeheer (Wm)						x				x	x					x		

	2000/53/EC	2002/95/EC	2002/96/EC	1881/2006/EC	2002/32/EC	1013/2006	75/440/EEC	79/923/EEC	80/68/EC	2006/11/EC	1999/30/EC	2001/80/EC	91/157/EEC	2092/91(EC)	2002/32/EC	91/689/EEC	1999/31/EC	2003/2003
Wet verontreiniging oppervlaktewateren (Wvo)						x										x		
Wijzigingswet Wet milieubeheer (luchtkwaliteitseisen)																		
Wet verontreiniging zeewater						x												
Wijzigingswet Meststoffenwet																		
Uitvoeringswet EG-verordening PRTR en PRTR-Protocol																		
Wijzigingswet grondwaterwet, etc. (infiltraties)									x									
Kaderwet diervoeders															x			
Besluiten																		
Cadmium besluit																		
Besluit algemene regels voor inrichtingen milieubeheer	x									x								
Besluit beheer Batterijen													x					
Waterleidingbesluit																		
Besluit kwaliteitseisen en monitoring water							x	x										
Besluit beheer autowrakken	x											x						
Warenwetbesluit Bereiding en behandeling van levensmiddelen				x														
Besluit beheer elektrische en elektronische apparatuur		x	x															
Besluit beheer verpakkingen en papier en karton																		
Uitvoeringsbesluit meststoffenwet																		x
Besluit vierjaarlijks bezien van lozingsvergunningen																		
Warenwetbesluit Verpakte waters																		
Besluit verbranden afvalstoffen																x		
Besluit gewasbeschermingsmiddelen en biociden																		
Besluit lozing afvalwater huishoudens									x	x								
Besluit vaststelling grenzen stroomgebieddistricten																		
Besluit glastuinbouw																		

	2000/53/EC	2002/95/EC	2002/96/EC	1881/2006/EC	2002/32/EC	1013/2006	75/440/EEC	79/923/EEC	80/68/EC	2006/11/EC	1999/30/EC	2001/80/EC	91/157/EEC	2092/91(EC)	2002/32/EC	91/689/EEC	1999/31/EC	2003/2003
Warenwetbesluit Bereiding en behandeling van levensmiddelen																		
Besluit instelling Bureau REACH																		
Besluit beoordeling en beperking risico's bestaande stoffen																		
Besluit melding nieuwe kennis milieugevaarlijke stoffen																		
Lozingenbesluit open teel en veehouderij																		
Uitvoeringsbesluit EG-verordening PRTR en PRTR-Protocol																		
Besluit inzamelen afvalstoffen																x		
Besluit stortplaatsen en stortverboden afvalstoffen																x	x	
Inrichtingen- en vergunningenbesluit milieubeheer																x		
POP-Besluit Wms																		
Wijzigingsbesluit besluit beheer autowrakken, enz.	x																	
Besluit beheer autobanden	x																	
Stortbesluit bodembescherming									x								x	
Besluit emissie-eisen stookinstallaties milieubeheer A												x						
Landbouwkwaliteitsbesluit 2007														x				
Wijzigingsbesluit Waterleidingbesluit en Besluit hygiëne en veiligheid badinrichtingen en zwemgelegenheden (preventie van legionella in leidingwater)																		
Warenwetbesluit algemene chemische produktveiligheid																		
Regelingen																		
Regeling beoordeling luchtkwaliteit 2007											x							
Regeling grenswaarden voor cadmium in afvalwater																		
Nadere regels aanduiding van batterijen en accu's die kwik, cadmium of lood bevatten													x					
Regeling milieukwaliteitseisen gevaarlijke stoffen oppervlaktewateren										x								
Regeling lozingen afvalwater van rookgasreiniging																		
Regeling aanwijzing BBT-documenten																x	x	
Regeling integrale tekst Afvalstoffenlijst																x		

	2000/53/EC	2002/95/EC	2002/96/EC	1881/2006/EC	2002/32/EC	1013/2006	75/440/EEC	79/923/EEC	80/68/EC	2006/11/EC	1999/30/EC	2001/80/EC	91/157/EEC	2092/91(EC)	2002/32/EC	91/689/EEC	1999/31/EC	2003/2003
Regeling stortplaatsen voor baggerspecie op land																x	x	
Regeling tijdelijke vergunning voor lozing van zwartelijststoffen																		
Uitvoeringsregeling EG-verordening PRTR en PRTR-protocol																x		
Uitvoeringsregeling gebruik meststoffen																		
Regeling diervoeders					x										x			
Regeling Europese afvalstoffenlijst																x		
Uitvoeringsregeling meststoffenwet																		
Warenwetregeling verontreinigingen in levensmiddelen				x														
Regeling EG-verordening overbrenging van afvalstoffen						x												
Regeling meetmethoden emissie-eisen stookinstallaties milieubeheer A 2005												x						
Regeling afvalstoffenlijst																x		
Regeling scheiden en gescheiden houden van gevaarlijke afvalstoffen																x		

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