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Working Group on Pollutant Release and Transfer Registers
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DIFFUSE SOURCES AND RELEASE ESTIMATION TECHNIQUES^{*/}

III. PRTR DATA

B. Diffuse sources

1. The PRTR Protocol defines “diffuse sources” as the “many smaller or scattered sources from which pollutants may be released to land, air or water, whose combined impact on those media may be significant and for which it is impractical to collect reports from each individual source” (Article 2.9). This definition is so broad that it covers essentially all sources of pollution that are not point sources.

Diffuse sources

- Reporting on diffuse sources is a core element of PRTRs under the Protocol (Article 4(b)).
- “Each Party shall present on its register, in an adequate spatial disaggregation, information on releases of pollutants from diffuse sources for which that Party determines that data are being collected by the relevant authorities and can be practicably included. Where the Party determines that no such data exist, it shall take measures to initiate reporting on releases of relevant pollutants from one or more diffuse sources in accordance with its national priorities” (art. 7, para. 7)
- “The information referred to in paragraph 7 shall include information on the type of
- methodology used to derive the information.” (art. 7, para. 8).

Box 1: Article 7, paragraphs 7 and 8

^{*/} This document was submitted late due to the need to hold in-depth consultations over the text with a number of leading experts on the topic of pollution registers.

2. Each Party is to ensure that data on diffuse sources can be searched by each diffuse source that has been included in the register.

3. The inclusion of diffuse sources is an important element of a PRTR, given that emissions data in many countries show these can constitute the most important sources of releases for key pollutants. For example, the 2000 Convention on Long-Range Transboundary Air Pollution (CLRTAP) air emission inventory¹ showed that across Europe, 25% of CO₂, 55% of NO_x, 58% of CO and 27% of NMVOC originate from transport. Agriculture emits 49% of all methane (CH₄) and 65% of nitrous oxide (N₂O). In the Netherlands, nearly all releases to soil of nitrogen, phosphorus and heavy metals are attributed to agriculture.² In addition, agriculture in the Netherlands is responsible for a large share of releases of phosphorus (45%) and nitrogen (65%) to surface waters, while transport is responsible for nearly all releases of organic pollutants, such as PAHs, to surface waters.

Obligation to report or take measures to initiate reporting of diffuse sources

Each Party shall present on its register, in an adequate spatial disaggregation, the information on releases of pollutants from diffuse sources for which that Party determines that data are being collected by the relevant authorities and can be practicably included. Where the Party determines that no such data exist, it shall take measures to initiate reporting on releases of relevant pollutants from one or more diffuse sources in accordance with its national priorities.

Box 2: Article 7, paragraph 7, Diffuse sources

4. A PRTR under the Protocol will, in future, not only contain a section documenting the releases and transfers of pollutants and waste from individual facilities but also a section dealing with releases and transfers from diffuse sources.

1. Definition of diffuse source categories

5. The United Nations Institute for Training and Research (UNITAR) Guidance on Estimating Non-point Source Emissions³ (1998) provides an overview and definitions of other (non-point or diffuse) sources from, e.g., domestic activities and consumer product use, transportation and traffic, agriculture and small- and medium-sized enterprises. Since many of the Parties to the Aarhus Convention already have signed other conventions and protocols, including the United Nations Framework Convention on Climate Change (UNFCCC) and United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution (LRTAP), the use of a standardized sectoral classification for sources is recommended. The Nomenclature For Reporting⁴ (NFR) is a reporting structure that is used for submitting data to UNECE and the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air pollutants in Europe (EMEP). The NFR is closely linked to the Common Reporting Format⁵ (CRF) used for submitting data to UNFCCC. With adoption of these source categories a close correspondence can be brought into the PRTR system with activities that many of the parties already apply. The PRTR Protocol excludes non-anthropogenic (natural) sources.

6. A list of diffuse sources according the NFR and CRF structure is presented in table 1 below.

Table 1: Diffuse source categories according NFR/CRF structure and proxy for determination of releases and transfers, using energy (Es), production (Pr) or population (Pp) statistics with extrapolation (X)

CRF/NFR Code	CRF/NFR category	Above threshold facilities might occur?	Proxy for diffuse source estimation
1	Energy		
1.A	fuel combustion activities (sectoral approach)		Es
1.A.1	energy industries	+	Es / X
1.A.2	manufacturing industries and construction	+	Es / X
1.A.3	transport		Es
1.A.4	other sectors		Es
1.A.4.a	commercial / institutional		Es
1.A.4.b	residential		Es
1.A.4.b.i	residential plants	+	Es / X
1.A.4.b.ii	household and gardening (mobile)		Es
1.A.4.c	agriculture / forestry / fishing		Es
1.A.4.c.i	stationary		Es
1.A.4.c.ii	off-road vehicles and other machinery		Es
1.A.4.c.iii	national fishing		Es
1.A.5	other		Es
1.B	fugitive emissions from fuels	+	Es / X
1.B.1	fugitive emissions from solid fuels	+	Es / X
1.B.2	oil and natural gas	+	Es / X
2	Industrial processes		
2.A	mineral products	+	Pr / pp /X
2.A.1	cement production	+	Pr / pp /X
2.A.2	lime production	+	Pr / pp /X
2.A.3	limestone and dolomite use	+	Pr / pp /X
2.A.4	soda ash production and use	+	Pr / pp /X
2.A.5	asphalt roofing		Pr / pp
2.A.6	road paving with asphalt		Pr / pp
2.A.7	other including non fuel mining and construction	+	Pr / pp /X
2.A.7.1	glass production	+	Pr / pp /X
2.B	chemical industry	+	Pr / pp /X
2.C	metal production	+	Pr / pp /X
2.D	other production	+	Pr / pp /X
2.E	production of halocarbons and SF6	+	Pr / pp /X
2.F	consumption of halocarbons and SF6	+	Pr / pp /X
2.G	other	+	Pr / pp /X
3	Solvent and other product use		
3.A	paint application		Pr / pp
3.B	degreasing and dry cleaning		Pr / pp
3.C	chemical products, manufacture and processing	+	Pr / pp /X
3.D	other including products containing heavy metals and persistent organic pollutants	+	Pr / pp /X
4	Agriculture		Pr / pp
4.A	enteric fermentation	+	Pr / pp /X
4.B	manure management	+	Pr / pp /X

CRF/NFR Code	CRF/NFR category	Above threshold facilities might occur?	Proxy for diffuse source estimation
4.C	rice cultivation		Pr / pp
4.D	agricultural soils		Pr / pp
4.E	prescribed burning of savannas		Pr / pp
4.F	field burning of agricultural wastes		Pr / pp
4.G	other		Pr / pp
5	Land-use change and forestry		Pp
6	Waste		Pp
6.A	solid waste disposal on land	+	Pr / pp /X
6.B	waste-water handling	+	Pr / pp /X
6.C	waste incineration	+	Pr / pp /X
6.D	other waste	+	Pr / pp /X
7	Other		Pr / pp

2. Determination of diffuse source data

7. The PRTR protocol defines diffuse sources as: “the many smaller or scattered sources from which pollutants may be released to land, air or water, whose combined impact on those media may be significant and for which it is impractical to collect reports from each individual source” (art. 1, para. 9).

8. Releases from diffuse sources occur in two different types: below-threshold facilities for activities listed in annex 1 to the Protocol and releases and transfers from activities not listed in the annex I.

(a) Below-threshold facilities

9. A facility performing annex I activities may fall below the capacity or employee threshold and for that reason be excluded from the obligation to report (art. 7, para. 1, subsection b). In some sectors, e.g., the chemical industry, all facilities are obliged to report. A statistical extrapolation should be used to estimate the releases and transfers of pollutants of below-threshold facilities. This extrapolation may use economic or statistical data on production volumes, number of employees or added value to determine the releases and transfers in below-threshold facilities under the assumption of equal production efficiency.

10. As a starting point for this estimation data from individual facilities is necessary. Also the activity data of both threshold- and below-threshold facilities is needed. Extrapolation based on this activity data can then be performed to collectively estimate the release and transfer of pollutants from below-threshold facilities, dependant on industrial source category:

Releases and transfers of pollutants from below-threshold facilities from annex I	=	Releases and transfer of pollutants from annex I facilities	x	(1-F)
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Box 3: Estimating below-threshold releases

11. Where, dependant of the basis used for extrapolation and in order of decreasing preference, F can be:

(a) (Total production of annex I category – production of annex I facilities)/ total production of Annex I category;

(b) (Total number of employees of annex I category – number of employees of annex I facilities) / Total number of employees of annex I category;

(c) (Total added value of annex I category – added value of annex I facilities) / Total added value of aAnnex I category.

12. With this method the individual reporting of above-threshold facilities for annex I activities can be used to generate emission factors or other statistically based calculation methods to estimate releases and transfers.

(b) Activities not listed in annex 1 of the Protocol

13. To estimate the contribution of other diffuse sources, appropriate emission factors which are linked to source parameters that are known or which can be easily obtained (“proxies”) can be constructed. These source parameters could be, for example, the average number of vehicle miles traveled in the case of road traffic, or the size and composition of cultivated area, the tonnage of pesticide or fertilizer use and the locations where these chemicals are applied, in the case of agriculture. In this manner a reasonable estimate of aggregate emissions arising from other diffuse sources of certain pollutants can be constructed starting from simple parameters that are readily measured or obtained for each source type.

14. In order to determine diffuse source data, the Parties will need to obtain data about such variables as population density, traffic intensity, employees per enterprise in various economic sectors, land use, manufacturing value added, emissions per vehicle-km traveled by vehicle type (on and off-road), number of farm animals etc. Then statistical estimates of releases of items on the PRTR list can be made by means of computer models. One result can be spatially resolved emissions maps; another can be total releases of pesticides by the agricultural community or total NO_x from transport activities.

3. Designating an authority for diffuse source reporting

15. Each Party must ensure that its competent authority collects, or shall designate one or more public authorities or competent bodies to collect, the information on releases of pollutants from diffuse sources specified in paragraphs 7 and 8, for inclusion in its register.

Box 4: Organisation of the Dutch PRTR

Organization of the Netherlands PRTR Emissie Registratie

The Emission Registration operates under the supervision of the Inspectorate for Environmental Protection of the Ministry of Housing, Spatial Planning and the Environment (VROM-Inspectie: VI) and is managed by the following organizations: Statistics Netherlands (CBS), the Ministry of Agriculture (LNV), through representation by the Expert's Centre of Agriculture, Nature conservation and Fishery (EC-LNV), the Ministry of Transport, Public Works and Water Management (V&W), through representation by the National Institute of Water Management and Waste Water Treatment (RIZA) and the National Institute for Public Health and the Environment (RIVM). These organizations are members of the Co-ordination Committee for the Monitoring of Target Sectors (CCDM), as are the policy directorates of VROM that pursue a target sectors policy. The CCDM oversees the entire process. Furthermore, these organizations are members of the Emission Monitor Working Group (WEM), which discusses progress and co-ordination with respect to reporting.

On executive level, the participating organizations are represented in task groups that collect and process data with the view to calculate, for instance, the emissions from a target sector in accordance with agreed methodologies as described in various methodological reports and meta-information sheets. The results of the task groups, together with the data of the individually registered companies, are processed by the Netherlands Organization for Applied Scientific Research TNO and stored in the central database of the Emission Registration (ER-C) in which the emissions are regionalized and supervised by the RIVM. Finally, TNO drafts the report that is approved by the organizations participating in the CCDM.

This arrangement reflects the aim of the Emission Registration to arrive at one uniform, well based, widely supported and accessible set of emission data. The emission data are used for various purposes of analysis and reporting and are for the greater part accessible in this web site. A written summary is made annually, in which a selection of emission data is reproduced that is used especially for monitoring progress with regard to government objectives to reduce emissions. See <http://www.emissieregistratie.nl>

C. Release estimation techniques

16. A review of documents available from various countries and organizations (World Health Organization) shows several basic estimation methods which are commonly “repackaged” by various organizations for their own use. Often the basic methods are supplemented with additional new data and methods; however, the basic concept remains the same.
17. The most common method of estimating emissions, especially from point sources, is the use of emission factors. The emissions are estimated based on the production or activity level of the source, from which an emission level is calculated using existing emission factors. This method is widespread because it is both cost effective and provides a relatively accurate estimate. The accuracy of the estimate can be increased as more agencies and organizations conduct measurements to validate the published emission factors.

1. Emission estimation guidance documents

18. The United States Environmental Protection Agency (USEPA) maintains an extensive database of emission factors. This database is widely distributed, and undergoes regular updates and refinements. Because of this USEPA emission factors can often be found at the root of other emission factor listings. The European Commission, with the CORINAIR project, has undertaken a considerable effort to develop emission factors which are based on emission measurements from European industries. There is frequent cross referencing between the two collections.⁶

19. The UNITAR Guidance on Estimating Non-point Source Emissions (1998) provides an introduction to non-point source emissions estimation and outlines key issues with regard to their inclusion in national or regional pollutant inventories. It aims to inform PRTR designers on what methods and data requirements are entailed for the inclusion of non-point source emissions in a national or regional PRTR system. The UNITAR Guidance also lists methods for estimating emissions from non-point and diffuse sources including: domestic activities and consumer product use; transportation and traffic; agriculture; small- and medium-sized enterprises; and natural sources. For each category, information is provided on the types of activities and pollutants typically involved, followed by an overview of the data needed and explanations of the available methods for estimating the emissions. Examples and simple calculations are provided throughout to illustrate the basic principles behind the estimation methods used and the types of data needed.

20. The UNFCCC has issued the (revised) 1996 IPCC Guidelines to provide assistance in the preparation of national greenhouse gas inventories.⁷ The Guidelines consists of a three-volume series:

(a) The Reporting Instructions (Volume 1) which provides directions for assembling, documenting and transmitting completed national inventory data consistently, regardless of the method used to produce the estimates. The instructions provide the primary means of ensuring that all reports are consistent and comparable.

(b) The Workbook (Volume 2) contains suggestions about planning and getting started on a national inventory and also contains instructions for calculating emissions of carbon dioxide (CO₂) and methane (CH₄), as well as some other trace gases, from six major emission source categories.

(c) The Reference Manual (Volume 3) provides a compendium of information on methods for estimation of emissions for a broader range of greenhouse gases and a complete list of source types for each. It also provides summaries of the scientific basis for the inventory methods recommended and gives references to literature.

D. Geospatial information and spatial disaggregation

21. Linking of PRTR data with geographical information enables the spatial representation of emission data and loads, either in administrative sectors (provinces, municipalities, water boards), in a grid structure or in a catchment area.

¹ EEA, technical report 91, Annual European Community CLRTAP emission inventory, Copenhagen 2002.

² CCDM, Emissiemonitor, jaarcijfers 2000 en ramingen 2001 voor emissies en afval, Den Haag, 2002

³ UNITAR Guidance on Estimating Non-point Source Emissions , 1998,
http://www.unitar.org/cwm/publications/prtr_tech_support_3.pdf

⁴ Guidelines for Estimating and Reporting Emission Data under the Convention on Long-range Transboundary Air Pollution. See <http://www.unece.org/env/documents/2003/eb/air/ece.eb.air.15.E.pdf>

⁵ Common Reporting Format (CRF). See
http://unfccc.int/nationalreports/annex_1_ghg_inventories/reporting_requirements/items/2759.php

⁶ EMEP/CORINAIR Emission Inventory Guidebook - 3rd edition (September 2004). See
<http://reports.eea.eu.int/EMEPCORINAIR4/en>.

⁷ See <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>