Guidance Document for Implementation of the UNECE Protocol on Pollutant Release and Transfer Registers

Complete final draft for Virtual Classroom

TNO-MEP and Milieu

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1. Introduction

This guide is first of all designed to assist Parties to the UNECE Protocol on Pollutant Release and Transfer Registers (PRTR Protocol) interpret and fulfill their obligations. It also aims to assist officials in countries considering accession to the Protocol evaluate and prepare for these obligations, as well as to aid potential users understand and take advantage of PRTR systems.

The PRTR Protocol was adopted at an extra-ordinary meeting of the Parties to the Aarhus Convention on 21 May 2003, in the framework of the fifth 'Environment for Europe' Ministerial Conference held in Kiev. It was signed by 36 countries and the European Community.

The Protocol is the first legally binding international instrument on pollutant release and transfer registers. Its objective is to enhance public access to information on the environment, to facilitate public participation, and to contribute to pollution prevention and reduction (see Article 1, below).

All states can participate in the Protocol, including those that have not ratified the Aarhus Convention and those that are not members of the Economic Commission for Europe. Thus, it is by design an 'open' global protocol.

It addresses countries that can have very different economic situations. Parties and potential parties will have very different starting points for developing their PRTR systems, in terms of their administrative structures, the availability and quality of information on emissions as well as the information requirements of different stakeholders. The PRTR Protocol aims at minimum requirements that can be achieved across different countries. At the same time, the Protocol views PRTRs as dynamic systems to be steadily improved, both on a national basis and in terms of international cooperation.

Article 1
OBJECTIVE

The objective of this Protocol is to enhance public access to information through the establishment of coherent, integrated, nationwide pollutant release and transfer registers (PRTRs) in accordance with the provisions of this Protocol, which could facilitate public participation in environmental decision-making as well as contribute to the prevention and reduction of pollution of the environment.

1.1 Origins and Evolution of the PRTR Mechanism

The idea of establishing a Pollutant Release and Transfer Register (PRTR) first emerged in the USA, following the tragic accident in Bhopal (India) in 1984. Shortly thereafter, the US Congress approved the Emergency Planning and Community Right to Know Act establishing a register called the Toxic Release Inventory (TRI), which tracks releases to all media (air, water and land) and off-site transfers of more than 600 chemicals. Other countries, including Australia and Canada, followed in developing national PRTR systems.

The US TRI provided unprecedented public information on pollution releases. It also created a powerful incentive for reporting facilities to take voluntary measures to reduce pollution. Although a PRTR does not directly regulate emissions, it creates pressure on companies to avoid being identified as major polluters and provides incentive for facilities to invest to reduce emissions. Public access to information is thus a central PRTR characteristic, and indeed contributes to the prevention and reduction of environmental pollution.

The 1992 UN Conference on Environment and Development in Rio de Janeiro recognized the importance of public access to information on environmental pollution, including emissions inventories, in the text of Agenda 21. First, Principle 10 states that "each individual shall have appropriate access to information concerning the environment that is held by public authorities, and the opportunity to participate in decision- making processes" and that "countries shall encourage public awareness and participation by making information widely available".

Second, Chapter 19 of Agenda 21 recommends that governments collect sufficient data about various environmental media while providing public access to the information. Governments, with the cooperation of industry and the public, are to implement and improve databases about chemicals, including inventories of emissions. Chapter 19 further states that the broadest possible awareness of chemical risks is a prerequisite for chemical safety.

After Rio, the OECD made the first steps to ensure the realization of this objective. In 1993, the Member States of the OECD and the UN gave a mandate to the Secretary General to prepare a guidance manual for national governments interested in a Pollutant Release and Transfer Register (PRTR), which was published in 1996.[1] A task force was created within the OECD to deal with the most difficult aspects of the creation of PRTR systems. In line with the recommendation of the Rio summit, the OECD undertook this work within the framework of the Inter-Organisation Programme for Sound Management of Chemicals (IOMC).

The OECD guidance document defines a Pollutant Release and Transfer Register (PRTR) as a catalogue or register of potentially harmful pollutant releases or transfers to the environment from a variety of sources. A PRTR includes information on releases to air, water and soil as well as transfers of pollutants/wastes to treatment and disposal sites. The register can include data on specific substances as well as broad categories of pollution. PRTRs are thus inventories of pollution from industrial sites and other sources. The development and implementation of a national PRTR system represents a means for governments to track the generation and release as well as the fate of various pollutants over time.[2]

Following Rio, other countries established national PRTR systems. In addition, UNITAR carried out pilot projects and capacity building activities in several countries, including Mexico and Egypt.

In the context of the Environment for Europe process, and to further implement Agenda 21, in 1996 the UNECE began to work on a Convention on Access to Information, Public Participation

[1] OECD, Pollutant Release and Transfer Registers (PRTRs): Tool for Environmental Policy and Sustainable Development. Guidance Manual for Governments, Paris, 1996. (Available at: http://www.unitar.org/cwm/prtr/cat3_list.html#OECD)

[2] OECD 1996.

in Decision-making and Access to Justice in Environmental Matters (later called Aarhus Convention after the place of signature). PRTRs are a tool for public access to environmental information, and thus are closely tied to the Convention's goals. The Convention includes broad, flexible language calling on Parties to establish nationwide, publicly-accessible "pollution inventories or registers" covering inputs, releases and transfers of substances and products (see the text of Article 5.9 in the box below).

The Convention was signed by 39 Member States of the Economic Commission for Europe and by the European Community in June 1998. It entered into force in October 2001.

Article 5.9 (Aarhus Convention)
Each Party shall take steps to establish progressively, taking into account international processes where appropriate, a coherent, nationwide system of pollution inventories or registers on a structured, computerized and publicly accessible database compiled through standardized reporting. Such a system may include inputs, releases and transfers of a specified range of substances and products, including water, energy and resource use, from a specified range of activities to environmental media and to on-site and offsite treatment and disposal sites.

Aarhus Convention

At the first Meeting of the Signatories of the Aarhus Convention, a Task Force was created with the mandate of preparing recommendations for future work on a PRTR. At the Second Meeting, the Task Force presented its findings and proposed the creation of an open-ended intergovernmental working group on PRTR.

Parallel to the international discussions about the creation of a Protocol on PRTRs, the EU adopted its own system, the European Pollutant Emission Register (EPER). The EPER was created in the context of the Integrated Pollution Prevention and Control Directive (IPPC Directive), one of the cornerstones of the European environmental legislation which establishes an EU wide integrated permitting system. EPER and the PRTR Protocol share many elements, reflecting their concurrent development. For example, the activities listed in Annex I of the PRTR Protocol are largely based on Annex I of the IPPC Directive and include energy industries, metal industries, mineral industries, chemical industries, waste management and a number of "other" industries.

The PRTR Protocol and EPER also have several important differences: EPER covers fewer pollutants and fewer polluting activities; moreover, it does not include provisions for off-site transfers of waste, for releases to land, and for estimates of diffuse pollution. As the European Community has signed the UN-ECE PRTR Protocol, EPER will be upgraded to a European PRTR (E-PRTR) that will meet the provisions of the Protocol.

1.2 Objectives and Core Elements of PRTRs

The Protocol's objective is to enhance public access to information and to facilitate public participation as well as to encourage pollution reduction (Article 1). Thus PRTRs are intended first to serve the general public. The Preamble to the Protocol notes, however, that PRTRs can also assist governments in tracking pollution trends, setting priorities and monitoring compliance

with international commitments, and they can benefit industry through improved environmental management.

Indeed, there are many potential users of PRTRs. These include, first of all, the general public and citizens' organizations interested in obtaining information on local, regional or national pollution. Health professionals can use the information in public health decisions. PRTRs can be a valuable tool for environmental education. Environmental authorities can employ PRTRs to review both the permit compliance of local facilities as well as national progress towards international commitments. For polluting facilities, both the exercise of estimating pollution levels as well as their publication can encourage efforts to improve efficiency and reduce pollution levels.

The Protocol itself requires Parties to establish nationwide systems that report and collect pollution information, and it identifies a series of core elements for PRTRs (see box). As the first goal of the Protocol is to enhance public information, PRTR information should be available via direct electronic access, such as an open web site. Parties must provide "other effective means" for members of the public who do not have electronic access. PRTRs should provide information for individual facilities, on diffuse pollution and on aggregate pollution levels. The Protocol allows limited provision for polluters to request that their data remain confidential.

Article 4
CORE ELEMENTS OF A POLLUTANT RELEASE AND TRANSFER REGISTER SYSTEM

In accordance with this Protocol, each Party shall establish and maintain a publicly accessible national pollutant release and transfer register that:
(a) Is facility-specific with respect to reporting on point sources;
(b) Accommodates reporting on diffuse sources;
(c) Is pollutant-specific or waste-specific, as appropriate;
(d) Is multimedia, distinguishing among releases to air, land and water;
(e) Includes information on transfers;
(f) Is based on mandatory reporting on a periodic basis;
(g) Includes standardized and timely data, a limited number of standardized reporting thresholds and limited provisions, if any, for confidentiality;
(h) Is coherent and designed to be user-friendly and publicly accessible, including in electronic form;
(i) Allows for public participation in its development and modification; and
(j) Is a structured, computerized database or several linked databases maintained by the competent authority.

The Protocol calls for public participation in the development and modification of PRTRs. The negotiations for the Protocol itself provide an example, as they involved technical experts from governments, environmental NGOs, international organizations, and industry. Participation of all interested parties was considered crucial in order to guarantee the transparency and acceptance of the Protocol.

Broad international cooperation will also be an important element for its implementation, in areas such as sharing information in border areas as well as providing technical assistance to Parties that are developing countries and countries with economies in transition. Moreover, the Protocol is designed as a dynamic instrument that can be revised based on users' needs as well as new technical developments.

Part I of this guidance document continues with Section 2, which presents the key issues that Parties should address in the institutional and legislative implementation of the Protocol. Section

3 reviews the scope of the Protocol, focusing on the specific types of activities and substances covered, including the options between different methods for determining facility and waste thresholds.

Part II covers data issues: Section 4 reviews the types of data covered, and Section 5 describes the systems needed to handle data flows.

Part III then reviews the Protocol's data dissemination requirements (Section 6), and capacity building and public awareness, including areas for international cooperation (Section 7).

The Annexes provide background information, including a glossary, a table of analytical methods, indicative lists of pollutants and the references used in preparing this document.

2. Institutional and legal implementation, including public participation and access

Implementation of the obligations of the Protocol will entail a number of decisions concerning PRTR design, structure and operations. These will range from choosing among various technical options for the design of the PRTR to determining the institutional framework required for ensuring a coordinated system of information flow to a central, publicly accessibly register.

Article 3.1

Each Party shall take the necessary legislative, regulatory and other measures, and appropriate enforcement measures, to implement the provisions of this Protocol.

A legal framework will also be needed, to set forth the rights and responsibilities of various key players, e.g., the obligation of pollutant-emitting facilities to report and the right of the general public to participate in decisions concerning the PRTR. This chapter focuses on some of the institutional and legal issues that will need to be considered in setting up a national PRTRs. After reviewing some of the general issues, it looks more specifically at the institutional and legal structures needed to ensure a coordinated system of data collection and dissemination, and public participation/access.

2.1 Development of a PRTR

In developing a national PRTR, Parties are advised to tap the expertise of technical specialists in industrial pollution control, monitoring and analysis, as well as legal, institutional and information technology (IT) experts. Chapter 3 on Scope and Chapter 4 on PRTR data discuss some of the technical issues that will need to be considered. In addition, it will be important to consult broadly with the various stakeholders concerned, including the reporting facilities and the public.

While each country's strategy and specific activities should reflect national conditions, UNITAR's proposed six-step process for PRTR development, based on experience in several OECD, developing and transition countries, bears consideration (see Box 2.1 on the next page).

In particular, this approach includes a pilot PRTR trial on a sub-national basis to identify key difficulties and test implementation. Mexico started its PRTR development with pilot exercises, and pilot PRTRs have been launched in at least five regions of the Russian Federation.

Another approach is to start with a simplified system, in terms of pollutants and facilities covered, and then improve this over time. Still other countries have started with voluntary systems before taking the step to make reporting mandatory and comprehensive. The important step in any case is to begin the process.

Box 2.1 Proposed Steps for Developing a National PRTR

1. A National Workshop to Identify PRTR Goals
A well-prepared national workshop, with participation from a broad range of experts and stakeholders, can identify the main goals and key issues for national PRTR development. Participation can include: key officials at both national and sub-national authorities; representatives of major polluting facilities; experts from research institutes and universities; and representatives of key user groups, including public health groups, environmental NGOs as well as journalists. (The Protocol includes, as a core element of PRTRs, public participation in their development and modification.)

2. A Feasibility Study to Assess Existing Capacity for a PRTR
The workshop's conclusions will provide the starting point for an in-depth study of capacity needs. The study should ensure that the goals identified are realistic. Study preparation should involve consultation with the key stakeholders involved in the workshop.

3. Design of the Main PRTR Characteristics
The feasibility study can be followed by the detailed design of technical, legal and institutional approaches for the PRTR.

4. A Pilot Trial
A trial, possibly in a specific region of the country, can test the proposed PRTR system and the mechanisms contemplated for reporting from key polluting facilities. The pilot area should include a representative sample of industrial sectors. Facilities might participate on a voluntary basis, reducing the legal preparations needed. The pilot project can test various PRTR issues, including data methods and their accuracy as well as mechanisms for communicating information between local and national levels. This pilot stage can also test methods for presenting PRTR data to the public and to interested stakeholders. The pilot trial should include capacity building as well as efforts to raise public awareness.

5. Development of the National Proposal
The lessons learned in the pilot trial can then be used to develop a full proposal, including necessary legal instruments. It may be useful to compare this experience with lessons learned in other countries as well. The proposal should include a detailed review of capacity building needs, as well as specific plans for raising public awareness.

6. A National PRTR Workshop
The workshop, with broad participation (including at political level), will review the PRTR proposal and launch a final proposal for a national PRTR.

Based on UNITAR, 1997

It can be good practice to set up a national coordinating body to agree on inter-ministerial, multi-stakeholder issues related to PRTRs creation and development. For example, in order to adapt and further develop its PRTR, the Netherlands has set up a special coordination group to reach agreement on new definitions, methods and emission factors.

2.2 The institutional framework

Setting up a national PRTR will require deciding on the most appropriate institutional structure for collecting and registering the data on pollutant releases and transfers, and ensuring that this data is publicly accessible.

The starting point should be to review the obligations of the PRTR Protocol and to determine whether existing institutions and systems are adequate for carrying out the various tasks and obligations. This should involve a review of existing systems to monitor and register on polluting emissions, including how information on pollutant releases currently flows among the various institutions.

Some Parties may already have extensive systems in place for collecting and registering data on emissions, *e.g.*, through operating permits or monitoring systems, while other Parties may be in the process of developing or reforming such structures. For example, some new EU Member States, as well as Balkan and EECCA countries, are still restructuring their systems for

controlling emissions from polluting facilities.

In carrying out the review, it is important to consider what is working well and also potential problem areas. Obstacles that may make it difficult to develop well-functioning PRTRs include: the lack of proper legal and institutional frameworks, as well as the existence of numerous non-compatible data collection obligations and thus different non-compatible databases maintained by a variety of state organisations.

In most countries, the Ministry of Environment will hold overall responsibility for setting up the relevant structure. However, a number of other Ministries are likely to also be involved in the collection and management of relevant data, i.e., ministries of agriculture, energy, health or transport. In such cases, structures for inter-ministerial coordination will be needed to determine whether the data currently collected meets the PRTR Protocol requirements, or whether adaptations are needed.

Even where the data on emissions is collected largely by environmental authorities, there may be a number of different institutions involved. For example, collection of data on emissions to water might be the responsibility of river basin management institutions, while collection of data on emissions to air might be carried out by environmental offices of local authorities.

In most EECCA countries, environmental monitoring is carried out by a range of ministries, state institutes, and academic research centres. Efforts to improve monitoring have focused on strengthening coordination and cooperation among these bodies and on establishing unified monitoring systems. For example, Ukraine created the Interdepartmental Commission on Environmental Monitoring Issues in 2001, to establishing common standards and procedures for monitoring activities and to ensure data exchange. These efforts to develop nationally unified monitoring systems could provide a starting point for assembling PRTR data in those countries (UNECE, 2003).

The checklists on this and following pages identify a number of elements for a PRTR for which institutional structures are needed. These elements are either explicitly set forth in the PRTR Protocol, or implicit in its requirements. The checklists are aimed at providing a quick guide for the institutional review.

Checklist of elements for which institutional structures are needed (1)

- € Institution to manage the national PRTR system (Art. 2.5)
- € Structure for interagency coordination
- € Appropriate systems for enforcement (Art. 3.1)

Collection, validation & management of data

- € Collection of data submitted by owners or operators of reporting facilities (Art. 7.2 & 7.5)
- € Assessment of the quality of the data collected in terms of completeness, consistency and credibility (Art. 10.2)
- € Collection of information on releases of pollutants from diffuse sources (Art. 7.4)
- € Development and management of a register comprising a structured, computerized database able to maintain data for ten reporting years (Art. 4(j) & Art. 5(3))

Some Parties may decide to create a single institution responsible for the collection, validation and dissemination of PRTR data. In other cases, it may be possible to maintain existing institutional structures for e.g. monitoring or enforcement, and to instead redefine certain tasks as

well as unify the methodologies used for collecting and validating the data, in order to achieve one national register.

Validation of the data submitted for the PRTR poses a different type of challenge than the creation and maintenance of a national PRTR. While the latter task will necessarily entail some degree of centralised collection and management of data, validation of data may be more easily achievable if responsibility is delegated to local or regional authorities or to the regional or local offices of national authorities, since they will be closer to the operators and are more likely to have an overview of their activities. It may be particularly useful to link the validation of the data to other controls of facilities, e.g., via regular or extraordinary environmental inspections.

Another option might be to split the responsibilities for the validation of data among different institutions according to the type of emissions, as in Spain, which has delegated validation of data concerning water emissions to its river basin authorities, because of their in-house scientific knowledge and control duties. However, in systems where these institutions are centralised, it might be wise to ensure that validation is still carried out at regional or local level.

Each country will need to decide the best way to enforce the reporting obligations, including the requirement for owners and operators to assure the quality of the information they report. This could be done via existing systems of controlling polluting facilities, e.g., environmental inspectorates, or other administrative systems for enforcing environmental obligations.

Implementation in decentralised systems of governance. Some Parties may have regional or other decentralised structures. These may be accompanied by long-established systems of environmental management based on regionally determined requirements for monitoring and collection of environmental data. This can complicate the process of setting up a national PRTR (which of course presupposes harmonised data).

Germany, for example, has a decentralised system of environmental management based on its regions (Länder). The legal and institutional structures for collection of data vary, according to the environmental medium. Obligations to report data on emissions to water are set by regional governments, and data is managed at regional level. Obligations to report emissions to air are set via national legislation, but again data collection and validation are managed at regional level. A common Länder data set on air and water emissions is compiled at Länder level. Although legal competence is divided between regional and national levels, in practice only one institution – the Environment Agency (UBA) -- is the national contact point and responsible for compiling the complete data set for Germany. Quality assessment is performed at all levels of the data flow and the results are communicated back to the operator along the data chain.

In decentralised systems, achievement of a national register will require harmonisation of data from various regions. This will involve harmonisation of the quantification methods for each type of emissions across each region, to enable comparison of the collected data at national level. Methods for the quantification of diffuse pollution should also be homogenous at national level even if the data are elaborated at regional level.

Centralised data collection and management will require transmission of the data collected at regional level to one or more national institutions with responsibility for the registration and compilation of the data. This can be facilitated by enabling the regional institution to register the

data in the PRTR directly by electronic means. Note that Article 4(j) of the Protocol suggests the possibility of a structured, computerized database or, alternatively, several linked databases maintained by a number of competent authorities, e.g., for different regions, if a federal system. Whether data collection, management and transfers are done in a centralised or decentralised manner, these tasks will be greatly simplified if all facilities and authorities involved use integrated compatible electronic systems.

Awareness-raising, access to information, & public participation. The PRTR Protocol also requires setting up the institutional structures for raising awareness, and for providing information to the public along with opportunities for public participation, as per the checklists below.

Implementation of these obligations might require administrative structures different from those needed for establishing and managing the PRTR itself. Some of the responsibilities may be similar to tasks already carried out by officials in national, regional or local environmental administrations, e.g., public relations and environmental education.

Checklist of elements for which institutional structures are needed (2)

Awareness-raising & capacity-building
- € Capacity-building of owners and operators, to ensure quality data
- € Promotion of public awareness of the national PRTR and provision of assistance and guidance in using the information contained therein (Art. 15.1)
- € Capacity-building and guidance to responsible authorities for carrying out their duties under the Protocol (Art. 15.2)

Access to information; confidentiality; access to justice
- € Structures for provision of information to the public on request, in cases where the information is not easily accessed by the public (Art. 11.2), optionally, charging a reasonable amount for this service (Art. 11.4)
- € Facilitation of electronic access to the register in publicly accessible locations (Art. 11.5)
- € Processing of requests for keeping certain information confidential, including taking decisions on when the information falls within the exclusions (Art. 12.1)
- € Processing of requests to disclose information that is considered confidential, including provision of generic chemical information and the reason the other information has been withheld (Art. 12.3)

Public participation
- € Provision of opportunities for public participation in the development of the national PRTR (Art. 13.1)
- € Provision of information to the public when a decision is taken to establish or significantly change the register (Art. 13.3)

In order to ensure that these obligations under the PRTR Protocol are in fact carried out, it could be useful to develop a plan that specifies each action and assigns responsibilities to specific units and officials.

2.3 The Regulatory Framework for Data Collection & Dissemination

Each Party setting up its national PRTR will need to establish a legal framework that clearly establishes the authorities and obligations of the bodies responsible for the PRTR as well as the obligations of the reporting facilities. Some countries will already have well-developed legal structures for collection of data on emissions from point and diffuse sources. Other countries, e.g. the Western Balkan countries, may still be in the process of establishing the necessary legal and institutional structures for collecting and managing emissions data.

Again, the starting point for each Party should be a systematic assessment and review of existing legislation, and identification of how its legal system will need to be brought into line with the obligations of the Protocol. The checklists below list most of the elements that will need to be in national legislation or secondary regulations. The first checklist shows some of the general provisions required to ensure a workable national PRTR.

Checklist of Legislative Elements on Data Collection & Dissemination

General provisions

- € Authority (or obligation) to establish and maintain a public register (Art. 1)
- € Designation of competent authority for managing the PRTR (Art. 2.5) & for enforcement (Art. 3.1)
- € Definitions, e.g., facility, pollutant, release, off-site transfer (Art. 2)
- € Designation of which point source facilities will be subject to mandatory reporting on a periodic basis (or, alternatively, authority to request the information from facilities needed for the PRTR)
- € What information needs to be reported and in what format (Art 7.5 and 7.6)
- € Reporting cycle and deadlines for reporting (Art. 8)
- € Provisions making it an offence to submit information known to be false, including sanctions

Obligations for owners & operators

- € To collect data & keep records for five years (Art. 9.1)
- € To report best available information, use of internationally approved methodologies where appropriate (Art. 9.2)
- € To assure the quality of information reported (Art. 10.1)

Obligations for competent authorities

- € Obligation to provide direct electronic access to the register through public telecom networks and in publicly accessible locations (Art. 11.1 & 11.5)
- € Obligations to carry out quality assessments of the data in the register & to ensure that the data is complete, consistent & credible (Art. 10.2)
- € Provisions on what information on the register may be kept confidential, as well as the procedure (criteria) for taking the determination and for providing information on what data has been withheld and why (Art. 12.1 – 12.3)
- € Measures to ensure that employees or members of the public who report a violation by a facility are not penalized, persecuted or harassed (Art. 3.3)
- € Technical measures for collection of information on diffuse pollution (Arts. 7.4 & 7.7)

The national legal framework will need to define the obligations of the administrative authorities who will be collecting, validating and managing the register, as well as dealing with accessibility to the data and confidentiality issues. In most cases a new legal instrument will be needed to ensure a comprehensive and workable system. In other cases it may be possible to amend existing legislation to cover the PRTR Protocol requirements. This option is particularly important to consider where structures are already in place for gathering and managing information on polluting emissions.

The UK legislation that sets up its national PRTR provides for great flexibility by delegating broad powers to the central environmental authority to make regulations for establishing public registers of information gathered (1990 Environmental Protection Act). The powers also cover making regulations to compel “persons of any specified description (whether or not they are holders of permits) to be required” to compile information on emissions, energy consumption, and waste and the destinations of such waste, and to provide this information in the manner specified (1999 Pollution Prevention and Control Act). The enabling powers are comprehensive and allow UK environmental authorities to develop the national PRTR further without having to enact new legislation.

The Czech Republic similarly established its Integrated Pollution Register via provisions in the

2002 Act on Integrated Pollution Prevention and Control that oblige the Ministry of the Environment to establish and maintain such a register as well as the users of registered substances to report certain data to the Ministry. The Act also authorises the Ministry to lay down implementing regulations stating the manner of determining and assessing the reported substances and the manner of keeping the integrated pollution register "so as to ensure the uniformity of the information system in the area of environment".

In those countries with existing systems, the two most common structures in use for collecting the data needed to establish central emissions registers are: (1) information requirements set in environmental permits and (2) compulsory self-monitoring and reporting

Procedures for reporting based on environmental permits. Many countries, especially in Western Europe, already have well-developed systems for permitting of large industrial installations, including mandatory self-monitoring and reporting of polluting emissions. To avoid duplication of effort, they have linked the collection of data required for their national PRTRs to requirements already in place in their permitting system. While this may on the one hand avoid double reporting, it can also be limiting in that changes to the national PRTR to reflect any changes made in the PRTR Protocol could subsequently require amendments to the national permitting system.

For example, the European Union and its Member States based their first generation PRTR (the European Pollutant Emission Register) on the integrated permitting system under the IPPC Directive. Facilities covered under Annex I of the IPPC Directive are obliged to report on their emissions of the substances covered under Annex A1 of the EPER decision. EPER does not cover all of the elements set forth in the PRTR Protocol, so in order to enable the EU to ratify the PRTR Protocol, an upgrading of EPER will be needed.

Article 3.5
To reduce duplicative reporting, pollutant release and transfer register systems may be integrated to the degree practicable with existing information sources such as reporting mechanisms under licences or operating permits.

Procedures for reporting based on compulsory reporting obligations.

Another possibility is to base the data collection for the PRTR on a legal framework establishing specific obligations to report the relevant data. This framework could be linked to local or regional environmental monitoring systems. Australia's legislation for setting up a National Pollutant Inventory is a useful example of the second approach of setting up compulsory reporting obligations3.

Countries contemplating accession to the PRTR Protocol but facing significant difficulties in establishing effective pollution monitoring and reporting may wish to consider a simple "pre-PRTR" system, such as the performance rating and disclosure systems in use in developing

[3] See Australia's national database of pollutant emissions http://www.npi.gov.au.

countries such as Indonesia and reviewed on a pilot basis in Ukraine. Such a system could then be gradually improved and extended, in order to progressively meet the PRTR Protocol requirements over time.

Extending the PRTR Protocol requirements. The PRTR Protocol sets minimum requirements. Parties developing PRTRs in compliance with the Protocol obligations should keep in mind that they may go further than the PRTR requirements, if appropriate in the light of national priorities and concerns. For example, if a local industrial facility emits significant amounts of a substance not yet covered under the PRTR Protocol, it may be important to include that substance in the reporting requirements. A country may also wish to increase the accessibility of the information maintained on the PRTR, e.g., by restricting the types of information that can be kept confidential for commercial reasons.

Moreover, countries may wish to add other elements to their national PRTRs, such as reporting obligations for SMEs. Bearing in mind the possibility of future developments of the PRTR Protocol and the need for flexibility, it could be interesting to introduce some of these additional elements on a voluntary or pilot basis. The Netherlands, for example, provides for individual provinces to require companies that are under the reporting thresholds to report information on their emissions, if these emissions are significant at local level.

Finally, countries will have to consider how to include data on diffuse sources of pollutants in their national PRTRs, where the data is already being collected by relevant authorities and can be practicably included. Indeed, under the PRTR Protocol, they are obliged to take measures to initiate such reporting, if they determine that no such data on diffuse sources exist.

Enforcement. The "appropriate enforcement measures" to implement the Protocol provisions referred to in Article 3.1 will apply to operators as well as officials responsible for the registration acting in bad faith, fraudulently or negligently. Parties could consider whether the enforcement measures should include sanctions and whether those could be administrative and/or penal. The introduction of both types of sanctions creates a gradual system in the use of sanctions. For a repeated violation of the reporting obligation or the submission of false data, the operator could be submitted to a criminal sanction. For the mere delay in delivering the information, an administrative sanction could suffice.

In addition, the Protocol requires Parties to take measures to protect employees of a facility and members of the public who report a violation by a facility of the national laws implementing the Protocol (Art. 3.3). One way to do this would be to oblige competent authorities to ensure anonymity of persons reporting violations, and to back this up with penalties. The US, for example, has set in place stiff penalties for penalisation, persecution or harassment in cases where the identity of the person has become known.

2.4 The Regulatory Framework for Public Participation and Access

Much of the regulatory framework which is required to comply with the PRTR Protocol relating

to access to information, public participation and access to justice will already be in place in countries that are Parties to the Aarhus Convention, although some adjustments may be required, due to the specificities of the PRTR Protocol.

The PRTR Protocol is linked to the Aarhus Convention through specific articles dealing with public participation, access to information and access to justice. The insertion of these articles on the three pillars in the PRTR Protocol is important in that the PRTR Protocol is open to non-Parties to the Aarhus Convention. The legislative framework for each of these pillars is addressed below.

Public participation Public participation is among the core elements of the PRTR system. Experience among countries with a long tradition on PRTR systems shows that public involvement is very important for success in establishing a PRTR. Public involvement helps to raise public awareness, including how to use the PRTR. Since the PRTR is intended to be a tool for citizens, citizens should be involved in its design and set-up.

The general obligation with respect to public participation is as follows:

Article 4

"In accordance with this Protocol, each Party shall establish and maintain a publicly accessible national pollutant release and transfer register that: (…) **(i)** allows for public participation in its development and modification;"

Parties to the Aarhus Convention should have legislation at national level providing a general right to participate in decisions having an impact on the environment (under Article 8 of the Aarhus Convention). If the Party to the Protocol is not a Party to the Aarhus Convention and does not have such legislation, it will need to create a legal framework for the three pillars under the PRTR Protocol. The elements required by the PRTR Protocol are set forth below:

Check list of elements of national legislation on public participation

To ensure that the public is given appropriate opportunities for participating (Article 13.1);
To ensure that the public has access to information on the proposed measures in a timely manner (Article 13.3);
To ensure that the public can submit comments, information, analyses or opinions (Article 13.2)
To take due account of the public input (article 13.4).

These are legal rights to participate granted to the general public. It is therefore not sufficient to implement the requirements by practice or by developing codes of conduct. A legal instrument is needed to secure these rights. If legislation is already in place, it may need to be adapted or further developed through communications, decisions or other secondary regulations sufficiently disseminated and made publicly available. This is also applicable to the Parties to the Aarhus Convention, because, due to the specificities of a PRTR, they may wish to provide specific rules for public participation in the establishment or modification of a PRTR, such as a coordinating body or longer deadlines.

The PRTR Protocol refers to two instances when public participation is relevant: (1) during the establishment of the PRTR, and (2) in the modification of the PRTR. In either instances, opportunities for public participation should be provided at an early stage when it can affect the decision making process.

- **Public Participation in establishing a PRTR**

A participatory process for establishing or developing a PRTR will be essential for the future success of the system. Involvement of all stakeholders, i.e., reporting facilities, NGOs and civic organisations, workers in the facilities, health officials, pollution control officials, authorities responsible at local level, academia, is important. Those countries having to develop their PRTRs from the beginning will specially benefit from the experiences of other countries.

Involving stakeholders. The involvement of stakeholders could be possible by the creation of a national coordinating body (see section 2.1), which will facilitate the carrying out of consultations at the very first stage. This initial working group or body where different stakeholders are involved can be useful to discuss the different options to develop PRTRs. The conclusions of this working group can become the proposal to be submitted to a broader consultation. This broader consultation process, e.g., internet consultation, could have longer deadlines for the public to react in order to ensure the general public's participation in the establishment of the PRTR.

Informing the public. To ensure that the public is given sufficient opportunity to participate, some Parties may wish to set in place detailed rules. These rules can, for instance, specify how to inform the public, how the opportunity for consultation should be publicised, e.g., mass media or media at regional level, official journals or other appropriate means; via posting on information panels in city halls or on other relevant buildings; or by mailing out explanatory brochures concerning the proposed PRTR and how to participate.

Ensuring public participation. The rules for public participation should also establish reasonable deadlines for the public to present its comments and opinions, e.g., one or two months. It is good practice in a specific consultation to note the deadline in terms of a clear date, e.g., 17 November, rather than as a period of time.

The rules for public participation should ensure that comments can be sent by both electronic and non-electronic means. In any case, it will be important to clearly identify the competent authority in charge of receiving these comments. This could include representatives at regional or local level that would in turn transmit the comments to the competent authority establishing or modifying the PRTR.

Taking into account the public's input. The PRTR Protocol specifies that the comments are to be taken into account by the authority taking the decision. Parties should therefore also set procedures for reporting how the public input has been considered in the final decision, e.g., how many comments were received, how these comments were addressed, why certain proposals were not retained and why others were finally adopted.

UK-DEFRA's consultation process (under the Code of Practice for consultation developed by the Prime Minister's Cabinet Office) is not specific for PRTRs but is an example of good practice. Criterion 4 is dedicated to feedback regarding the responses received and how the consultation process influenced the policy and it is subdivided in 7 points where this criterion is further explained. This criterion is part of the consultation process.

The consultation is published on the website (e.g., DEFRA and EPA) and includes *inter alia* the invitation letter sent to stakeholders, the draft proposal, and links to guidance documents. The consultation is very wide and covers many different stakeholders. A minimum of 12 weeks is allowed. Announcements including advertisements are clear, concise and widely accessible.

- **Public Participation in modification of the PRTR**

It would seem desirable to ensure public participation when any type of change is done to the PRTR system. However, it is not clear from Article 13 whether public participation is also mandatory during modification of the PRTR Protocol, since Art. 13.1 refers only to development of the PRTR and Art. 13.3 requires only that the Party ensure access to information relating to decisions to significantly change the PRTR system. Nonetheless, this article should be interpreted in relation to the more general Article 4(i), which deals with the core elements of a PRTR Protocol and which states that public participation should be allowed in the development (meaning establishment) and modification (in the case of significant changes of the PRTR).

Significant changes to the PRTR system might probably include adoption of a different approach for setting thresholds or for reporting of off-site transfers (waste-specific v. pollutant specific). For the sake of legal certainty, it could be desirable to reach an agreement on what could be considered a substantial change at PRTR Working Group level. If not possible, each Party should decide in their relevant legislation what is going to be considered as a significant change, so that the public is informed and can be aware of the procedure for consultations.

A Party may decide to call on the abovementioned national coordinating body each time that a significant change is planned for the PRTR. For other changes, the Party may decide just to post the proposal on websites and other relevant places (e.g., official journals) and apply the normal procedure for consultation.

It could also be possible that Parties decide to allow the public to propose changes to the PRTR. In many cases, these proposals from the public can help to improve the system and to identify different users' needs. These proposals could be sent to the website or also by post to the identified competent authority for PRTRs.

Public Participation and PRTRs

TRI stakeholder dialogue: When changes in the TRI are going to take place, USEPA opens a stakeholder dialogue, consisting of different phases where interested stakeholder can participate. It includes background documents and on line dialogue or "virtual public meeting". The existence of this process is announced on the TRI portal website but it is also published in the Federal Register and at EDOCKET. The proposal includes a summary, background information, an explanatory memorandum, the deadline to send comment (specific date) and instructions on how to send comments, including addresses and allowing for electronic submission e.g., via email or to eRulemaking Portal, as well as mail and hand delivery. There is also a national TRI conference organised every year to discuss TRI issues

Access to information and access to justice

Concerning the legal framework on access to information, the most important aspect is that Parties should have in place relevant legislation dealing with dissemination of and access to information on environmental matters and specific provisions dealing with grounds for confidentiality.

As for the case of public participation, Parties to the Aarhus Convention would in many cases have in place the general rules for access to information, dissemination and access to justice.

Checklist of legislative elements on access to information & access to justice
to ensure that data is easily publicly accessible without having to state an interest through electronic means (Article 11.1)
to ensure data is accessible upon request within one month by other effective means and to facilitate electronic access in public locations (when data is not easily publicly access by electronic means) (Article 11.2&5)
to ensure that access is free of charge or that charges do not exceed a reasonable amount (Article 11.3&4)
to ensure access to justice, including procedures and appeals (Article 14)

The legislation dealing with access to information can be a framework instrument dealing with access to information and access to justice in general or a specific instrument created to deal with the establishment of a PRTR. In any case, this legislation should ensure that the PRTR data is easily publicly accessible by electronic access, such as through telecommunications networks. If it is not easily publicly accessible by electronic means, then the legislation should specify how the PRTR will be made publicly accessible by other effective means including upon request or by facilitating electronic access in public locations.

Parties should first analyse existing legislation on access to information to assess whether it needs to be amended to align with the PRTR Protocol requirements. For Parties to the Aarhus Convention, particular attention should be paid to the grounds for confidentiality, as these are more limited than the grounds of the Aarhus Convention and amendments to national legislation may be required (for a more detailed explanation please see section 6.2).

Concerning access to justice, Article 14 of the PRTR Protocol basically reproduces Article 9.1 first indent of the Aarhus Convention. The PRTR Protocol does not override the Aarhus Convention provisions, which are broader and cover more cases than the PRTR Protocol. Parties to the Aarhus Convention should therefore take this aspect into account as legal implementation may already be in place. Non-parties to the Aarhus Convention will however have to create the legal framework required by this Article. The guidance documents elaborated in the context of the Aarhus Convention could serve countries with creation of the necessary legal framework for ensuring access to justice.

2.5 Implementation by regional economic integration organisations

The PRTR Protocol allows regional economic integration organisation, such as the European Community, to be Parties (Article 24), and refers to regional economic integration organisation in four more articles:

- Article 8(3) Reporting Cycle (for more details see Chapter 5)
- Article 17(4) allowing regional economic integration organisations which are not Party to participate as observers in the sessions of the Meeting of the Parties
- Article 18(2): Right to vote in matters within its competence (number of votes equal to number of Member States which are Parties)
- Article 26(3) and (4): instruments for accession

The most important issue for regional economic integration organisations is to define the distribution of competences and performance of obligations between the organisation and its Member States in issues covered by the Protocol. In fact, the regional economic integration organisation has to declare in its document of accession the extent of their competence with respect to the matters governed by this Protocol and also inform the Depositary of any substantial modification to the extent of their competence (Article 26.4).

This is very important because the regional economic integration organisation can exercise its international responsibility if one of its Member States is not complying with the Protocol in matters where the regional economic integration organisation has declared its competence. In most environmental cases, these declarations are broad, because environment competences are normally shared between the regional economic integration organisation and its Member States and not easy to delineate. This distribution of competence will depend upon the specific rules governing the regional economic integration organisation.

Implementation of the PRTR Protocol by a regional economic integration organisation can have many advantages in bringing about convergence in the efforts from Member States and in saving costs on the establishment of a PRTR (see section 7 for more details). However, Member States are nonetheless still obliged to implement the Protocol at national level.

Regional economic integration organisations acceding to the PRTR Protocol: The case of the European Community

The European Community is the only regional economic integration organisation that has signed the PRTR Protocol. According to the EC Treaty (Article 175.1) the EC is competent to enter into international agreements and to implement the obligations resulting therefrom. According to good practice adopted by the EC, the Community cannot adhere to a Convention if EC law is not in line with the requirements of the international instrument at the time of accession. Since EPER does not cover all the requirements of the PRTR Protocol, this must be changed if the EC is to accede to the PRTR Protocol.

The European Commission has consequently prepared a proposal for a Regulation concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689 and 96/61 (COM(2004)634final of 07.10.2004). This instrument upgrades EPER and clearly distributes responsibilities and competences between the EC and the Member States in the establishment and functioning of the future E-PRTR.

This distribution of responsibilities follows the principles of subsidiarity and proportionality. Member States are obliged, when becoming Parties to the Protocol, to implement national PRTRs. Respecting the principle of subsidiarity, the Commission proposal leaves the design of such national PRTRs entirely to Member States. Considerations of compliance with the Protocol and of practicability are expected to be strong incentives for Member States to ensure full compatibility of their national PRTRs with the European PRTR.

3. Scope of the Protocol

The PRTR Protocol covers 64 activities and 86 substances and categories of substances. Although it follows closely the European Union's system under the Directive for Integrated Pollution Prevention and Control (IPPC), the Protocol goes beyond it in terms of the number of both activities and substances covered. This chapter reviews the scope of the Protocol in terms of activities, substances and types of releases. Chapter 4 then describes in further detail the reporting of releases and transfer.

It should be noted that Article 6 of the Protocol, on the Scope of the Register, provides that the Meeting of the Parties can review reporting requirements on the basis of the experience gained in implementation and revise the lists of activities, pollutants and thresholds in its annexes.

3.1 Activities

The PRTR Protocol covers 64 activities grouped by sectors (energy, metal production and processing, mineral industry, chemical industry, waste and waste water management, paper/wood processing industries, intensive livestock and aquaculture, animal and vegetable products and others). Table 3.1 below lists key activities that are covered by the Protocol.

Annex I to the PRTR Protocol lists the activities covered. The list is based largely on Annex I of the IPPC Directive and incorporates its capacity thresholds.[4] However, Annex I to the PRTR Protocol contains some additional activities, including mining, municipal waste water treatment, aquaculture and shipbuilding.

Table 3.1 **Key Activities Included Under Annex I**

Oil and gas refineries	Paper and board plants
Power stations	Wood preservation plants
Metal and steel works	Intensive pig and sow rearing
Underground and opencast mining	Intensive aquaculture facilities
Cement and lime clinker	Slaughterhouses
Asbestos works	Some food and beverage processing
Glass and ceramic works	Textile treatment
Chemicals production	Tanneries
Fertilizer production	Surface treatment facilities using
Pesticides production	organic solvents
Pharmaceuticals production	Carbon and electrographite production
Explosives and pyrotechnics	Large shipyards
Incinerators and landfills	Oil and gas refineries
Large municipal waste-water treatment plants	

[4] The IPPC Directive is also the basis of Annex I to the Aarhus Convention.

The IPPC Directive's list was used for the Protocol, first of all for the practical reason that many UNECE countries are or were to become members of the European Union, and thus already had systems in place to control polluting emissions from the facilities carrying out these activities. A second reason is that these activities, inclusive of the additions made for the Protocol, are responsible for about 90% of industrial pollution. Thus information on releases from the facilities carrying out Annex I activities should provide a country's citizens with a good overall picture of the level of pollution from its industrial installations. Other activities can be added at national level if the Party considers it appropriate. Information on diffuse sources, also required under the Protocol, completes the information on releases (pollution) for a targeted area.

In deciding which facilities carrying out activities listed in Annex I of the PRTR Protocol will be subject to reporting requirements, it will be necessary to choose between the EU and the USA/Canada systems for establishing reporting thresholds. Both systems are aimed at focusing reporting requirements on the larger facilities that are responsible for most polluting emissions, but each system uses a different reporting threshold for determining which facilities must report. The EU uses reporting thresholds based on the capacity of the facility (Annex I, column 1 of the PRTR Protocol) and emissions (Annex II, column 1). The USA and Canada, on the other hand, use reporting thresholds based on number of employees (Annex I, column 2) and manufacture, process or use (MPU) thresholds (Annex II, column 3). Both systems have advantages and disadvantages. Under the MPU system, facilities that meet the threshold will have to report even the smallest releases, whereas under the capacity threshold system releases will have to be reported only when they are above a specific threshold for a specific substance. However, in many cases there is no release threshold. Similarly, facilities that do not meet the MPU threshold do not have to report any releases. In practice, the results from selecting either of the systems are quite similar and there are no large differences. (For further details, please see Chapter 4.)

3.2 Substances

Annex II to the PRTR Protocol lists 86 polluting substances and categories of substances. Lists of substances regulated by a number of existing international instruments were used to develop Annex II, including:

- the IPPC/EPER list of substances,
- the EU Water Framework Directive list of priority substances,
- the principal substances regulated under the Climate Change Convention (UNFCCC), and
- substances regulated under the POPs and PICs Conventions, OSPAR, MARPOL and the CLRTAP.[5]

[5] For more information on the source of substances incorporated in the Protocol, including identification of the legal instrument from which the list was derived, consult: http://www.unece.org/env/documents/2001/cep/wg.5/ac.2/cep.wg.5.ac.2.2001.7.e.pdfCEP/WG.5/AC2/2001/7

These lists were considered to cover key pollutants. The negotiators also aimed to avoid overlaps and duplication of reporting among these instruments. In the end, 86 substances and categories of substances were agreed upon, including greenhouse gases, ozone depleting substances, heavy metals, pesticides, acidification precursors and persistent organic pollutants (see Table 3.2).

The emphasis of the Protocol is on the amount of pollution. The Protocol tries to find a balance between the reporting burden and the relevance of the information provided. Instead of covering a broad number of pollutants, the Protocol chose to concentrate on releases of a limited number of specific pollutants and pollutant categories in order to present an overall picture of the amount of pollution. This is one of the differences between the PRTR and the US TRI system, which is mainly based on chemical safety concerns and which specifies hundreds of individual pollutants.

The PRTR Protocol instead identifies a number of important groups of substances such as COD, AOX, phenols, PM10, dioxins, PAHs, cyanides, fluorides, NMVOCs, PFCs, and HCFCs, as well as key individual pollutants. These groups cover potentially thousands of single substances.

Table 3.2 Substances Listed in Annex I to the PRTR Protocol

Methane	Hexachlorocyclohexane
Carbon monoxide	Lindane
Carbon dioxide	Mirex PCDD +PCDF (dioxins +furans)
Hydrofluorocarbons	Pentachlorobenzene
Nitrous oxide	Pentachlorophenol
Ammonia	Polychlorinated biphenyls (PCBs)
Non-methane volatile	Simazine
organic compounds	Tetrachloroethylene
Nitrogen oxides	Tetrachloromethane
Perfluorocarbons	Trichlorobenzenes
Sulphur hexafluoride	1,1,1-trichloroethane
Sulphur oxides	1,1,2,2-tetrachloroethane
Total nitrogen	Trichloroethylene
Total phosphorus	Trichloromethane
Hydrochlorofluorocarbons	Toxaphene
Chlorofluorocarbons	Vinyl chloride
Halons	Anthracene
Arsenic and compounds	Benzene
Cadmium and compounds	Brominated
Chromium and compounds	diphenylethers
Copper and compounds	Nonylphenol ethoxylates and related substances
Mercury and compounds	Ethyl benzene
Nickel and compounds	Ethylene oxide
Lead and compounds	Isoproturon
Zinc and compounds	Naphthalene
Alachlor	Organot in compounds (as total Sn)
Aldrin	Di-(2-ethyl hexyl) phthalate
Atrazine	Phenols (as total C)
Chlordane	Polycyclic aromatic hydrocarbons (PAHs)
Chlordecone	Toluene
Chlorfenvinphos	Tributyltin and compounds
Chloro-alkanes, C10-C13	Triphenyltin and compounds
Chlorpyrifos	Total organic carbon (TOC)
DDT	Trifluralin
1,2-dichloroethane	Xylenes
Dichloromethane	Chlorides (as total Cl)
Dieldrin	Chlorine and inorganic
Diuron	compounds (as HCl)
Endosulphan	Asbestos
Endrin	Cyanides (as total CN)
Halogenated organic compounds (as AOX12)	Fluorides (as total F)
Heptachlor	Fluorine and inorganic compounds (as HF)
Hexachlorobenzene	Hydrogen cyanide

Hexachlorobutadiene 1,2,3,4,5,6-	Particulate matter (PM10 and related substances

Many of the substances included in Annex I are severely restricted, banned or in the process of being phased out under existing international agreements. It was agreed that they should be included in the PRTR Protocol for the sake of completeness, even though in most cases their use and thus their reporting will be limited.

Parties may include additional substances in their national PRTRs if considered appropriate.

3.3 Releases

Article 1.7

Releases means any introduction of pollutants into the environment as a result of any human activity, whether deliberate or accidental, routine or not routine, including spilling, emitting, discharging, injecting, disposing or dumping, or through sewer systems without final waste-water treatment.

The term "releases" used in the PRTR Protocol covers a number of terms used in different countries to refer to the introduction of pollutants into the environment, such as:

- emissions (often used to refer to the introduction of pollutants into the environment from point sources);
- immissions (used in some countries to refer to the introduction of pollutants into the environment from diffuse sources); and
- discharges (used to refer to the introduction of pollutants into water).

The PRTR Protocol definition is broad in that it covers both routine releases and non-routine ones, such as accidental releases. The definition itself has three main elements.

(1) *introduction of pollutants*: The Protocol does not link the definition of releases to the specific pollutants listed in Annex I, thereby providing a dynamic approach that does not limit which pollutants can be included in PRTRs;

(2) *into the environment*: The PRTR Protocol refers to the environment in general but nonetheless takes a media-specific approach in requiring reporting of releases to air, water and land.

(3) *as a result of a human activity*: only releases that are directly (point sources) or indirectly (diffuse sources, including agriculture and traffic) the result of a human activity have to be reported. Releases that are the result of natural phenomena, such as a volcanic eruption, do not have to be reported. Accidental releases from facilities due to a natural phenomenon, such as flooding, should be reported as the pollutants arise from human activity.

Accidental releases (Article 7.6)

Article 7.6

The information referred to in paragraph 5(c) to (e) shall include information on releases and transfers resulting from routine and from extraordinary events.

The PRTR Protocol refers to releases that are both "routine and non-routine" and either "deliberate or accidental" (Article 3). Article 7.6 emphasizes the obligation for operators to report releases in all cases. It refers to non-routine and accidental releases as "extraordinary events". For example, releases resulting from an accidental explosion should be reported. In conclusion, operators have to report all releases.

It should be noted that there is no obligation to indicate in the report whether releases or a portion thereof are due to an accident or other extraordinary event. The general public, health authorities and environmental NGOs will likely be interested in including this information in the PRTR. Parties may want to consider whether to request this detail and to provide the information in PRTR web sites and publications.

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." (Article 7.7)
- "The information referred to in paragraph 7 shall include information on the type of methodology used to derive the information" (Article 7.8).

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.

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

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 CLRTAP air emission inventory[6] showed that across Europe, 25% of CO_2, 55% of NO_x, 58% of CO and 27% of NMVOC originate from transport. Agriculture emits 49% of all methane (CH_4) and 65% of nitrous oxide (N_2O). In the Netherlands, nearly all releases to soil of nitrogen, phosphorus and heavy metals are attributed to agriculture.[7] 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.

[6] EEA, technical report 91, Annual European Community CLRTAP emission inventory, Copenhagen 2002.

[7] CCDM, Emissiemonitor, jaarcijfers 2000 en ramingen 2001 voor emissies en afval, Den Haag, 2002.

For further details on how to include data from diffuse sources in a PRTR, please see Chapter 4, section 2.

3.4 Off-site transfers

Article 1.8

Off-site transfer means the movement beyond the boundaries of the facility of either pollutants or waste destined for disposal or recovery and of pollutants in waste water destined for waste-water treatment

At the first meeting of the Working Group on PRTR, it was agreed that the PRTR Protocol should cover both releases and transfers and that an appropriate definition of transfers, separated and distinguished from the definition of the term "releases", was needed. Whereas the concept of "releases" is generally understood to cover situations where pollutants are emitted or introduced into the environment from a facility or other sources, the concept of "transfers" applies instead to movement of pollutants within or between facilities.

The PRTR Protocol in its current version covers only "off-site" transfers.

The facility is the point of reference when deciding whether the movement has to be reported for being an "off-site transfer", and the boundaries of a facility have to be clearly defined. The PRTR Protocol definition of facility is therefore essential: it can include one or more "installations" on the same or adjoining "sites" (see Annex 1). Thus, movements of pollutants/waste between two installations of the same facility on the same site or adjoining sites will be an on-site transfer, and therefore not covered by the reporting obligations. For example, if one installation disposes of waste in another installation, such as an incinerator that is part of the same facility, then the disposal of waste need not be reported, as it is considered to be an "on-site transfer". However, releases of emissions from the incineration process will need to be reported as releases to air and any solid or liquid waste remaining from combustion and air pollution control sent off-site for disposal will need to be reported.

The pollutant-specific and the waste-specific approaches

Under the Protocol, each Party has to choose between the pollutant-specific ("US") approach and the waste-specific ("EU") approach for the reporting of off-site transfers of waste.

If the pollutant specific approach is chosen, each facility in the country will need to report the quantities of specific pollutants transferred off site. The applicable thresholds are those set forth in Annex II column 2 to the PRTR Protocol (Article 7.1 (a) (ii)). This will require the facility to indicate the amount of each pollutant contained in the waste, distinguishing between the amounts destined for recovery and the amounts destined for disposal (Annex III of the Protocol identifies the specific operations for recovery and for disposal), as well as the name and address of the facility receiving the transfer (Article 7.5(d)(i)).

If the waste specific approach is chosen, then each facility has to indicate the amount of waste transferred (without specifying the pollutants), whether the transferred waste is "hazardous" or "other" waste, and whether it is destined for recovery or disposal. The applicable thresholds are

set in Article 7.1 (a)(iii). If the transferred waste is hazardous, within the meaning of the Protocol, the applicable threshold is 2 tonnes per year. If it is other waste (waste that is not hazardous), the applicable threshold is 2,000 tonnes per year. Chapter 4 provides further detail on the determination of hazardous versus other waste.

Under the waste-specific approach, the facility will also have to report its off-site transfer in terms of amounts destined for recovery and for disposal. In addition, for movement of hazardous waste to another country (transboundary movement of hazardous waste), the facility will have to indicate the name and address of the recovery or disposal operator and the actual recovery or disposal site receiving the transfer (Article 7.5 (d)(ii)).

Comparing the Pollutant- and Waste-Specific Approaches

Each approach has its advantages and disadvantages. In the European Union, reporting obligations for transfers of waste refer to the amount of waste disposed of or recovered, differentiating between hazardous or non hazardous waste. [8] The Basel Convention on transboundary movements of waste also follows this approach. Thus, adopting the waste-specific approach will in many cases be less onerous for companies, as they should already have in place systems to carry out the reporting. This approach will enhance convergence with EU systems. While less detail will be reported, in many cases the identification of wastes transferred as hazardous indicates at least the dangerous nature of the pollutants contained.

The disadvantage of the waste-specific approach is that it does not provide the same pollutant-specific detail as the reporting on releases and therefore does not facilitate an integrated approach to the facility's reporting. Citizens and other PRTR users will not have information on the specific pollutants contained in the waste (e.g., if the waste is hazardous because it contains x tonnes of heavy metals or y tonnes of PCBs). Furthermore, since pollutant concentrations in the waste stream may vary, reporting only the total amounts of waste could lead to a misleading impression of the total quantity of the pollutant transferred.

The pollutant-specific approach can provide better information about the content of the waste and a more accurate vision of facility activities and their environmental impacts. However, this approach has the disadvantage of potentially increasing the reporting burden and therefore the costs for facilities. Furthermore, it is not always easy to identify the pollutant content of facility waste.

Off-site transfers of waste water

The Protocol sets forth a specific regime for waste water. Transfers of waste water will always be reported following the pollutant-specific approach (Article 7.1 (a)(iv) and 7.5 (e)). The applicable thresholds are set in Annex II, column 1b. In the case of facilities that release waste water directly to a water body, whether first treated at a facility waste water plant or not, the release will be reported as a release to water, using the pollutant-specific approach.

[8] The EU legislation setting out this approach includes the Waste Framework Directive and the Waste Statistics Directive.

Releases to land or off-site transfers?

Certain disposal and recovery operations can be considered releases to land instead of off-site transfers of waste. In fact, the term "disposal" appears in both "release" and "off-site transfers" definitions. The reference to disposal via transfer covers the situations where the pollutant is transferred to an intermediary body which then carries out the disposal, whereas when the facility directly disposes of waste to the environment, this would be counted as a release.

This difference will be important for Parties adopting the waste-specific approach for reporting of off-site transfers of waste, since the resulting releases to land must be reported following the pollutant specific approach, with reporting thresholds that are different from those for off-site transfers.

In the case of underground injection of wastes, the PRTR Protocol clarifies in Article 7(5c) that these are always to be reported as a release to land, using, therefore, the pollutant-specific approach.

The issue is important also because there could be a double counting in some cases and for certain activities, as pollutants transferred might later become releases which have an impact on the environment and health. This is the case for landfills. Landfills are included in Annex I to the Protocol, and thus they must report their pollution releases. It is possible to interpret the Protocol to require that the operator of a landfill report, as a release to land, waste received and then deposited in the landfill. However, this would lead to a duplication of reporting, as the facilities transferring waste to the landfill would already have to report the movement as an off-site transfer. In the absence of an agreement among the Parties for this type of activities, each Party should clarify this issue at national level to avoid overlap and duplicate reporting.[9]

3.5 Working towards convergence

Article 17.3 of the PRTR Protocol calls for convergence between the pollutant- and waste-specific types of PRTR. During negotiations, different countries indicated their interest in ensuring that reporting of off-site transfers include both the amount of waste transferred, indicating whether hazardous or non hazardous and whether for recovery or disposal, as well as the amount of each specific pollutant. As mentioned above, the PRTR Protocol reached convergence in the reporting of waste water and underground injection.

A Party may want to reach convergence between the two systems for certain cases where the pollutant specific approach is feasible for reporting off-site transfers of waste. This could be, as was already mentioned during the negotiations, the adoption, together with the waste specific approach, of a pollutant specific approach for those substances for which quantification in waste streams is feasible and important because of their persistence or relevance. These could include

[9] The landfill operator should in any case report any air emissions or leachate to surface waters, as well as any off-site transfers of waste water that result from landfill activities.

heavy metals as well as substances that are banned or severely restricted and in the process of being phased out or strictly controlled, such as PCB/PCTs and other POPs.

Part II Data collection

4. PRTR data

Article 5, design and structure

1. Each Party shall ensure that the data held on the register referred to in article 4 are presented in both aggregated and non-aggregated forms, so that releases and transfers can be searched and identified according to:
   (a) Facility and its geographical location;
   (b) Activity;
   (c) Owner or operator, and, as appropriate, company;
   (d) Pollutant or waste, as appropriate;
   (e) Each of the environmental media into which the pollutant is released; and
   (f) As specified in article 7, paragraph 5, the destination of the transfer and, where appropriate, the disposal or recovery operation for waste.
2. Each Party shall also ensure that the data can be searched and identified according to those diffuse sources which have been included in the register.
3. Each Party shall design its register taking into account the possibility of its future expansion and ensuring that the reporting data from at least the ten previous reporting years are publicly accessible.
4. The register shall be designed for maximum ease of public access through electronic means, such as the Internet. The design shall allow that, under normal operating conditions, the information on the register is continuously and immediately available through electronic means.
5. Each Party should provide links in its register to its relevant existing, publicly accessible databases on subject matters related to environmental protection.
6. Each Party shall provide links in its register to the pollutant release and transfer registers of other Parties to the Protocol and, where feasible, to those of other countries.

PRTRs implementing the UNECE PRTR Protocol will contain in the long run two types of data: facility level data and data for so-called diffuse sources. The data for these different types of sources must be integrated into an overall picture of the releases and transfers. This structure is shown in figure 4.1.

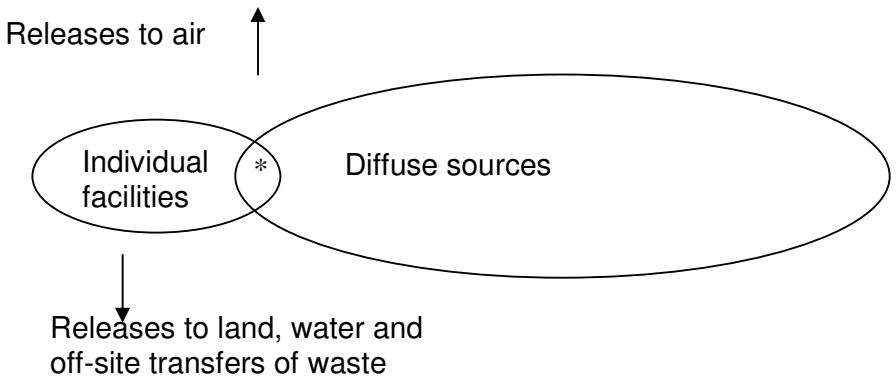

Figure 4.1 Structure of releases and transfers on facility level and diffuse sources (are below threshold facilities)*

The core of the system is data collected at the level of individual facilities, that have in operation one or more activities as listed in Annex I of the PRTR Protocol, taking into account the threshold values for installed capacity or the number of employees of the facility.

The PRTR Protocol also requires diffuse sources to be reported. Examples of these sources are road transport, shipping, aviation, agriculture, small and medium size enterprises (some of these might be listed in Annex I, but are below the capacity thresholds), fuel distribution and domestic heating..

Thresholds are being applied in two different levels of data generation. Once for identification of the individual facilities obliged to report to the PRTR and once again to determine which pollutants to report.

4.1 Facility level data

The facility is the reporting unit for the UNECE PRTR Protocol. The efforts to be undertaken by Parties in order to identify the facilities with Annex I activities and to meet the reporting obligations in the framework of the PRTR Protocol are:

Art . 7, par. 1
Each Party shall either:
(a) Require the owner or the operator of each individual facility within its jurisdiction that undertakes one or more of the activities specified in annex I above the applicable capacity threshold specified in annex I, column 1, and:
(i) Releases any pollutant specified in annex II in quantities exceeding the applicable thresholds specified in annex II, column 1;
(ii) Transfers off-site any pollutant specified in annex II in quantities exceeding the applicable threshold specified in annex II, column 2, where the Party has opted for pollutant –specific reporting of transfers pursuant to paragraph 5 (d);
(iii) Transfers off-site hazardous waste exceeding 2 tons per year or other waste exceeding 2,000 tons per year, where the Party has opted for waste -specific reporting of transfers pursuant to paragraph 5 (d); or
(iv) Transfers off-site any pollutant specified in annex II in waste water destined for waste-water treatment in quantities exceeding the applicable threshold specified in annex II, column 1b;
to undertake the obligation imposed on that owner or operator pursuant to paragraph 2; or
(b) Require the owner or the operator of each individual facility within its jurisdiction that undertakes one or more of the activities specified in annex I at or above the employee threshold specified in annex I, column 2, and manufactures, processes or uses any pollutant specified in annex II in quantities exceeding the applicable threshold specified in annex

4.1.1 Defining facilities

4.1.1.1 What are facilities?

The PRTR Protocol (art 2, par. 4) defines a facility as: “one or more installations on the same site, or on adjoining sites, that are owned or operated by the same natural or legal person”.

Operators with a permit for Annex I activities are usually already obliged to report the releases and transfers of pollutants to the competent authorities. If an operator has various activities in

one or more installations on a given site this cluster is in the PRTR Protocol defined as one facility. In many countries the environmental permitting is based on the owner as a natural or legal person. A facility can include however both Annex I activities and non-Annex I activities. Only the Annex I related releases and transfers of pollutants are obligatory for reporting in the framework of the UNECE PRTR Protocol. The reporting obligation concerns all sources of a facility including non-point or diffuse sources.

The facility is the reporting unit for the PRTR Protocol, similar to the reporting approach in the national inventories of industrial emissions in the European EPER and the United States and Canada. The advantage of this choice is that industry is allowed to report the total emission of each pollutant released by a facility and exceeding its threshold value, and hence, the reporting burden will be minimized by omitting detailed data per activity. To simplify the reporting obligations, it is only required to report the total of the industrial emissions of the facility, which can consist of a number of installations, for all pollutants for which the threshold values are exceeded.

If a facility operates several installations falling under the same Annex I activity on the same site, the production capacities / number of employees and of the individual installations should be summed at the Annex I activity level. The sum of the capacities / number of employees is then compared with the minimum production capacity for the specific Annex I activity as listed in Annex I of the PRTR Protocol.

In general, national experts and competent authorities will be able to identify the reporting unit. Multi-operator situations may occur where several operators share certain activities or installations at the same industrial location (site), Such a jointly operated complex may include a common wastewater treatment plant (WWTP) or a common energy production facility.

Example : industrial refining site and reporting units

An industrial site for oil refining is being operated by two companies, company A and B. Company A owns a facility with several refining installations such as a catalytic cracker for the actual refining of crude oil where company B takes care of the further downstream processing. The installations of both facilities are interconnected and dependent of each other for throughput and storage. See figure 4.2

According the PRTR protocol both companies (different owners) are considered as separate facilities and for each facility it is required to determine whether it is required to report according Annex I. Company A as a facility according to activity 1a (mineral oil and gas refineries) and company B being characterised as chemical industry.

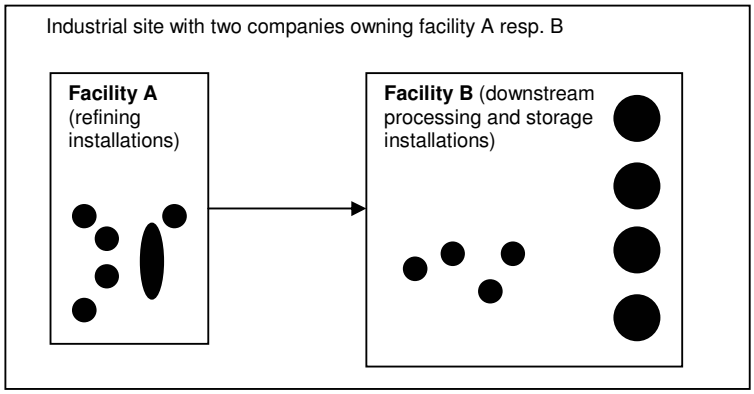

Figure 4.2; Two facilities with different installations on one site

4.1.1.2 Identifying the main activity of a facility

In case a facility operates more than one Annex I activity it is required to determine the main Annex I activity of the facility. The Party could determine the main Annex I activity as follows:

1. In general the main Annex I activity is identified as the main economic activity of the facility. Doing this, national experts and competent authorities can determine in most cases the main Annex I activities of a facility. In some cases where the determination is difficult and consensus amongst experts is lacking, Parties can also follow the alternative procedure under 2

2. Exceptionally the main Annex I activity can be identified as the most polluting activity of a facility, consulting national experts or competent authorities.

4.1.2 Choosing a threshold system for selection of facilities

Annex I of the PRTR Protocol lists the activities that are covered by the Protocol. The PRTR

Protocol (article 7) allows for two alternative sets of selection criteria: capacity and pollutant release thresholds on the one hand or number of employees and pollutant manufacture, use or process thresholds on the other. Parties shall choose between these two and shall avoid mixing the different thresholds systematics. Experiences with current PRTR's learn that the two alternative approaches of selecting facilities for reporting do not cause large differences in the selection. The number and character of facilities in both types of PRTR selections is similar and the expectation is that with either approach the majority of releases and transfers of pollutants will be reported.

A Party can thus select facilities from the activities from Annex I using two approaches:

1. by using the capacity thresholds for the given activity (column 1, see section 4.1.2.2)

2. by using the employee thresholds for the given activity (column 2, see section 4.1.2.3)

In using the thresholds for selection of facilities a Party needs to assess whether the thresholds are not too high to cover the priority pollution sources in the country. A Party may consider lowering the thresholds if needed.

4.1.2.1 Identification of facilities

A Party may have information on operators of facilities, based on an economic classification and could start the identification and selection of the facilities based on this information. Table 4.1 reproduces Annex I and indicates in which economic sectors each of the Annex I activities of the PRTR Protocol could occur.

Parties have information available enabling them to assign ISIC codes[10] to the economic sectors. The ISIC code is a standard classification of economic activities arranged so that facilities (entities) can be classified according to the activity they carry out.

If Parties wish to establish a link between on the one hand the source categories of Annex I activities with corresponding NFR or CRF codes and on the other hand the economic sectors and sub-sectors with ISIC codes of 4 digits or more, they can consult national statistical agencies and national experts.

[10] ISIC 3.1, see http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=17

Table 4.1 Source categories of Annex I activities in economic sectors according to Annex I of the UN –ECE PRTR Protocol. Where possible the ISIC code is referenced.

No.	ISIC 3.1	Activity	Capacity threshold (column 1)	Employee threshold (column 2)
1	E	Energy sector		
(a)	D232	Mineral oil and gas refineries *	*	10 employees
(b)	E402	Installations for gasification and liquefaction	*	
(c)	E401	Thermal power stations and other combustion installations	With a heat input of50 megawatts (MW)	
(d)	D2310	Coke ovens	*	
(e)	C101	Coal rolling mills	With a capacity of 1 ton per hour	
(f)	C101	Installations for the manufacture of coal products and solid smokeless fuel	*	
2.		Production and processing of metals		
(a)	D721	Metal ore (including sulphide ore) roasting or sintering installations	*	10 employees
(b)	D723	Installations for the production of pig iron or steel (primary or secondary melting) including continuous casting	With a capacity of 2.5 tons per hour	
(c)	D28	Installations for the processing of ferrous metals: (i) Hot-rolling mills (ii) Smitheries with hammers (iii) Application of protective fused metal coats	With a capacity of 20 tons of crude steel per hour With an energy of 50 kilojoules per hammer, where the calorific power used exceeds 20 MW With an input of 2 tons of crude steel per hour	
(d)	D2731	Ferrous metal foundries	With a production capacity of 20 tons per day	
(e)	D2732	Installations: (i) For the production of non -ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes (ii) For the smelting, including the alloying, of non - ferrous metals, including recovered products (refining, foundry casting, etc.)	* With a melting capacity of 4 tons per day for lead and cadmium or 20 tons per day for all other metals	
(f)	various ISIC codes	Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process	Where the volume of the treatment vats equals 30 m3	
3.		Mineral industry		
(a)	C	Underground mining and related operations	*	
(b)	D141	Opencast mining	Where the surface of the area being mined equals 25 hectares	
(c)	D269	Installations for the production of: Cement clinker in rotary kilns Lime in rotary kilns Cement clinker or lime in other furnaces	With a production capacity of 500 tons per day With a production capacity exceeding 50 tons per day With a production capacity of 50 tons per day	
(d)	D269	Installations for the production of asbestos and the manufacture of asbestos -based products	*	
(e)	D261	Installations for the manufacture of glass, including glass fibre	With a melting capacity of 20 tons per day	
(f)	D269	Installations for melting mineral substances, including the production of mineral fibres	With a melting capacity of 20 tons per day	
(g)	D269	Installations for the manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain	With a production capacity of 75 tons per day, or with a kiln capacity of 4 m3 and with a setting density per kiln of 300 kg/m3	

No.	ISIC 3.1	Activity	Capacity threshold (column 1)	Employee threshold (column 2)
4.	D24	Chemical industry		
(a)	B241	Chemical installations for the production on an industrial scale of basic organic chemicals, such as: (i) Simple hydrocarbons (linear or cyclic, saturated or unsaturated, aliphatic or aromatic) (ii) Oxygen-containing hydrocarbons such as alcohols, aldehydes, ketones, carboxylic acids, esters, acetates, ethers, peroxides, epoxy resins (iii) Sulphurous hydrocarbons (iv) Nitrogenous hydrocarbons such as amines, amides, nitrous compounds, nitro compounds or nitrate compounds, nitrile s, cyanates, isocyanates (v) Phosphorus -containing hydrocarbons (vi) Halogenic hydrocarbons (vii) Organometallic compounds (viii) Basic plastic materials (polymers, synthetic fibres and cellulose-based fibres) (ix) Synthetic rubbers (x) Dyes and pigments (xi) Surface-active agents and surfactants	*	10 employees
(b)	B241	Chemical installations for the production on an industrial scale of basic inorganic chemicals, such as: (i) Gases, such as ammonia, chlorine or hydrogen chloride, fluorine or hydrogen fluoride, carbon oxides, sulphur compounds, nitrogen oxides, hydrogen, sulphur dioxide, carbonyl chloride (ii) Acids, such as chromic acid, hydrofluoric acid, phosphoric acid, nitric acid, hydrochloric acid, sulphuric acid, oleum, sulphurous acids (iii) Bases, such as ammonium hydroxide, potassium hydroxide, sodium hydroxide (iv) Salts, such as ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate (v) Non-metals, metal oxides or other inorganic compounds such as calc ium carbide, silicon, silicon carbide	*	
(c)	B2412	Chemical installations for the production on an industrial scale of phosphorous -, nitrogen- or potassiumbased fertilizers (simple or compound fertilizers)	*	
(d)	B2421	Chemical installations for the production on an industrial scale of basic plant health products and of biocides	*	
(e)	B2423	Installations using a chemical or biological process for the production on an industrial scale of basic pharmaceutical products	*	
(f)	B2429	Installations for the production on an industrial scale of explosives and pyrotechnic products	*	
5.		Waste and waste-water management		
(a)	O90	Installations for the incineration, pyrolysis, recovery, chemical treatment or landfilling of hazardous waste	Receiving 10 tons per day	10 employees
(b)	O90	Installations for the incineration of municipal waste	With a capacity of 3 tons per hour	
(c)	O90	Installations for the disposal of non -hazardous waste	With a capacity of 50 tons per day	
(d)	O90	Landfills (excluding landfills of inert waste)	Receiving 10 tons per day or with a total capacity of 25,000 tons	
(e)		Installations for the disposal or recycling of animal carcasses and animal waste	With a treatment capacity of 10 tons per day	
(f)	O90	Municipal waste -water treatment plants	With a capacity of 100,000 population equivalents	
(g)	O90	Independently operated industrial waste -water treatment plants which serve one or more activities of this annex	With a capacity of 10,000 m3 per day	

No.	ISIC 3.1	Activity	Capacity threshold (column 1)	Employee threshold (column 2)
6.	D210	Paper and wood production and processing		
(a)	D2101	Industrial plants for the production of pulp from timber or similar fibrous materials	*	10 employees
(b)	D2102 /D2103	Industrial plants for the production of paper and board and other primary wood products (such as chipboard, fibreboard and plywood)	With a production capacity of 20 tons per day	
(c)	D202	Industrial plants for the preservation of wood and wood products with chemicals	With a production capacity of 50 m3 per day	
7.	A012	Intensive livestock production and aquaculture		
(a)	A0122	Installations for the intensive rearing of poultry or pigs	(i) With 40,000 places for poultry (ii) With 2,000 places for production pigs (over 30 kg) (iii) With 750 places for sows	10 employees
(b)	B0502	Intensive aquaculture	1,000 tons of fish and shellfish per year	
8.	D15	Animal and vegetable products from the food and beverage sector		
(a)	D151	Slaughterhouses	With a carcass production capacity of 50 tons per day	10 employees
(b)	D151	Treatment and processing intended for the production of food and beverage products from: Animal raw materials (other than milk) Vegetable raw materials	With a finished product production capacity of 75 tons per day With a finished product production capacity of 300 tons per day (average value on a quarterly basis)	
(c)	D152	Treatment and processing of milk	With a capacity to receive 200 tons of milk per day (average value on an annual basis)	
9.		Other activities		
(a)	D171	Plants for the pretreatment (operations such as washing, bleaching, mercerization) or dyeing of fibres or textiles	With a treatment capacity of 10 tons per day	10 employees
(b)	D19	Plants for the tanning of hides and skins	With a treatment capacity of 12 tons of finished product per day	
(c)	various ISIC codes	Installations for the surface treatment of substances, objects or products using organic solvents, in particular for dressing, printing, coating, degreasing, waterproofing, sizing, painting, cleaning or impregnating	With a consumption capacity of 150 kg per hour or 200 tons per year	
(d)	D242	Installations for the production of carbon (hard-burnt coal) or electrographite by means of incineration or graphitization	*	
(e)	D3511	Installations for the building of, and painting or removal of paint from ships	With a capacity for ships 100 m long	

Explanatory notes :
- Column 1 contains the capacity thresholds referred to article 7, paragraph 1 (a).
- An asterisk (*) indicates that no capacity threshold is applicable (all facilities are subject to reporting).
- Column 2 contains the employee threshold referred to in article 7, paragraph 1 (b).
- "10 employees" means the equivalent of 10 full-time employees.

4.1.2.2 Selecting facilities using capacity thresholds

Parties that have opted for a "capacity approach" on selecting facilities should use column 1 of Annex I where threshold values for the production capacity are given for the activities required to report to the PRTR. The PRTR Protocol does not cover facilities with a production capacity below the given thresholds

For some activities column 1 lists an asterisk "*". No threshold is given for these categories

because all facilities belonging to these categories are required to report.

The European Community uses mainly production capacity as threshold.

Examples:
1. Dairy plant required to report on capacity threshold
A dairy plant with 40 employees has a capacity of processing 500 tons of milk per day into different products as cottage cheeses and various deserts (average value on an annual basis).
According to Annex I (main activity 8.c treatment and processing of milk) the facility is required to report to the PRTR because the capacity threshold of 200 ton is exceeded.

2. Brewery required to report on capacity threshold
A brewery with a production capacity of 3,2 million hectolitres per year has 600 employees. According to Annex I (main activity 8.b treatment and processing intended for the production of food and beverage products from vegetable raw materials other than of milk) is required to report to the PRTR. This is because the capacity of 3,2 million hectolitres a year equals a daily production capacity of 870 tons which exceeds the 300 tons threshold value..

4.1.2.3 Selecting facilities using employee thresholds

Parties that have opted for an "employee approach" on selecting facilities should use column 2 of Annex I where threshold values for number of employees are given for the activities required to report to the PRTR.

The employee threshold refers to the equivalent of a "full-time employee" and can be defined as 2,000 hours per year. The employee threshold for all Annex I activities is set to 10 employees. In other words, if the total number of hours worked by all employees (including contractor) is 20,000 hours or more, the facility meets the "full-time employee" threshold. All contractor employee hours, with the exception of minor on-site intermittent service vendors such as vending machine servicers, must be considered when a facility is making its full-time employee determinations. Also the hours worked by employees directly in support of the activities of a facility must be counted towards the 20,000 hour employee threshold, regardless of the location of the employees (i.e., at the facility or off-site)[11]

The US and Canada currently use an employee threshold in their PRTR's with a few typical exeptions like waste incineration etc…

[11] US Toxics Release Inventory (TRI) Program, see http://www.epa.gov/tri/

Examples:
1. Dairy plant required to report on employee threshold
A dairy plant with 40 employees has a capacity of processing 500 tons of milk per day into different products as cottage cheeses and various deserts (average value on an annual basis). According to Annex I (main activity 8.c treatment and processing of milk) the facility is required to report to the PRTR because the employee threshold of 10 employees is exceeded.

2. Brewery required to report on employee threshold
A brewery with a production capacity of 3,2 million hectolitres per year has 600 employees. According to Annex I (main activity 8.b treatment and processing intended for the production of food and beverage products from vegetable raw materials other than of milk) is required to report to the PRTR because the employee threshold of 10 employees is exceeded.

4.1.3 Selection of pollutants to report for facilities

Releases of any pollutant specified in annex II in quantities exceeding the applicable thresholds shall be reported on facility level. The general guidelines in PRTR Protocol for reporting emission data of a facility are as follows:

7. Reporting Requirements
1. Each Party shall either:
(a) Require the owner or the operator of each individual facility within its jurisdiction that undertakes one or more of the activities specified in annex I above the applicable capacity threshold specified in annex I, column 1, and:
(i) Releases any pollutant specified in annex II in quantities exceeding the applicable thresholds specified in annex II, column 1;
(ii) Transfers off-site any pollutant specified in annex II in quantities exceeding the applicable threshold specified in annex II, column 2, where the Party has opted for pollutant –specific reporting of transfers pursuant to paragraph 5 (d);
(iii) Transfers off-site hazardous waste exceeding 2 tons per year or other waste exceeding 2,000 tons per year, where the Party has opted for waste - specific reporting of transfers pursuant to paragraph 5 (d); or
(iv) Transfers off-site any pollutant specified in annex II in waste water destined for waste-water treatment in quantities exceeding the applicable threshold specified in annex II, column 1b; to undertake the obligation imposed on that owner or operator pursuant to paragraph 2;
or
(b) Require the owner or the operator of each individual facility within its jurisdiction that undertakes one or more of the activities specified in annex I at or above the employee threshold specified in annex I, column 2, and manufactures, processes or uses any pollutant specified in annex II in quantities exceeding the applicable threshold specified in annex II, column 3, to undertake the obligation imposed on that owner or operator pursuant to paragraph 2.

4.1.3.1 Applying thresholds for reporting (how to use Annex II)

The thresholds values in Annex II for triggering a report are essential parameters. The purpose for applying these threshold values is to avoid the need for facilities to report insignificant emissions while, at the same time, the reporting will cover most of total industrial emissions. The threshold values are meant for reporting purposes only: all emissions of each pollutant of a facility exceeding the threshold value must be reported.

"Releases" means any introduction of pollutants into the environment as a result of any human activity, whether deliberate or accidental, routine or non-routine, including spilling, emitting, discharging, injecting, disposing or dumping, or through sewer systems without final waste-water treatment.

"Off-site transfers" means the movement beyond the boundaries of the facility of either pollutants or waste destined for disposal or recovery and of pollutants in waste water destined for waste-water treatment. Waste water means used water containing substances or objects that is subject to regulation by national law.

According whether a Party has opted for a "capacity approach" or an "employee approach" for selecting facilities the use of thresholds differs.

Capacity approach and thresholds for releases and off-site transfers

Parties using a capacity approach shall use the thresholds for releases and off-site transfers, referred to in article 7, paragraph 1 (a)(i - iv), for the releases and transfers for reporting of the pollutants that are supplied in column 1 (a-c) and 2 of Annex II.

Parties shall require the owners or operators of facilities to report the pollutants from Annex II for routine activities (and also from extraordinary events) on:

- Releases to air (thresholds from column 1a, Annex II)
- Releases to water (thresholds from column 1b, Annex II)
- Releases to land, including by underground injection (thresholds from column 1c, Annex II)
- Off-site transfers of pollutants (thresholds from column 2, Annex II)

Employee approach and threshold for manufacture, process or use

Parties using an employee approach should base the reporting of a facility to the PRTR on the amount of manufacture, process or use in the calendar year. If the facility manufactures, processes or uses a substance on the Annex II list of pollutants and exceeds that threshold, all releases and transfers must be reported,.

The actual annual amount of a pollutant released by manufacturing, processing or use is to be calculated by:

Amount of substance in inventory at the beginning of the year	+	amount of substance brought on site during the year	+	amount of substance produced on site during the year	–	amount of substance in inventory at the end of the year

Releases by manufacturing, processing or use can also be calculated from other process information:

Amount of substance shipped as or in product during the year	+	amount of substance consumed on site during the year	+	amount of substance newly generated as waste during the year

A Party can make exemptions on the use of the thresholds. The US TRI for example makes an exemption known as the "*de minimis exemption"*[12] This exemption allows facilities to disregard certain minimal concentrations of toxic chemicals in mixtures or other trade name products they process or otherwise use from determinations of whether reporting thresholds have been exceeded, as well as release and other waste management calculations

How to use Annex II

The application of thresholds can be further illustrated by explaining Annex II, see also the excerpt from Annex II below:

- The abbreviation "*No.*" is the numerical identifier of the pollutant in the UNECE PRTR protocol.
- The "*CAS number*" is the precise identifier of the pollutants in the Chemical Abstracts Service[13].
- "*Pollutant*" is the common (English) name of the pollutant used in the PRTR Protocol
- The "*Threshold for releases (column 1)*" and "*Threshold for off-site transfers of pollutants (column 2)*" are the thresholds to be used for Parties opted for a capacity selection approach on releases to air, water and land.
- The "*Manufacture, process or use threshold (column 3)*" are the threshold to be used by Parties that have opted for an employee approach in selecting facilities.

[12] US Toxics Release Inventory (TRI) Program, section 313, see http://www.epa.gov/tri/guide_docs/1998/1998qa.pdf

[13] Chemical Abstracts Service, see http://www.cas.org/

- A hyphen (-) indicates that the parameter in question does not trigger a reporting requirement.

- An asterisk (*) indicates that, for this pollutant, the release threshold is to be used rather than a manufacture, process or use threshold.

- A double asterisk (**) indicates that, for this pollutant, the release threshold in column (1)(b) is to be used rather than a manufacture, process or use threshold.

- For PCDD + PCDF (dioxins + furans) the unit Teq in ng / dscm at 7% O2 is used. Teq stands for "*Toxicity Equivalents, the emission of 17 isomers of PCDD and PCDF related to the most toxic isomer 2,3,7,8-CDD"*.

Example, excerpt from Annex II, UNECE PRTR Protocol

No.	CAS number	Pollutant	Threshold for releases (column 1)			Threshold for off-site transfers of pollutants (column 2)	Manufacture, process or use threshold (column 3)
			to air (column 1a)	to water (column 1b)	to land (column 1c)		
5	10024-97-2	Nitrous oxide (N2O)	10 000	-	-	-	*
6	7664-41-7	Ammonia (NH3)	10 000	-	-	-	10 000
7		Non-methane volatile organic compounds (NMVOC)	100 000	-	-	-	*
12		Total nitrogen	-	50 000	50 000	10 000	10 000
47		PCDD + PCDF (dioxins + furans) (as Teq)	0.001	0.001	0.001	0.001	0.001
75		Triphenyltin and compounds	-	1	1	5	10 000
76		Total organic carbon (TOC) (as total C or COD/3)	-	50 000	-		**

4.1.3.2 Releases to air

The releases of facilities to the air should be reported per facility as emission data to air. Table 4.2 reproduces the list of pollutants for emissions to air from Annex II of the PRTR Protocol.

Table 4.2 Identification of pollutants to air from Annex II of the UNECE PRTR Protocol

No.	CAS number	Pollutant	Threshold for releases to air (column 1a)	Manufacture, process or use threshold (column 3)
			kg/year	kg/year
1	74-82-8	Methane (CH4)	100 000	*
2	630-08-0	Carbon monoxide (CO)	500 000	*
3	124-38-9	Carbon dioxide (CO2)	100 million	*
4		Hydro-fluorocarbons (HFCs)	100	*
5	10024-97-2	Nitrous oxide (N2O)	10 000	*
6	7664-41-7	Ammonia (NH3)	10 000	10 000
7		Non-methane volatile organic compounds (NMVOC)	100 000	*
8		Nitrogen oxides (NOx/NO2)	100 000	*
9		Perfluorocarbons (PFCs)	100	*
10	2551-62-4	Sulphur hexafluoride (SF6)	50	*
11		Sulphur oxides (SOx/SO2)	150 000	*
12		Total nitrogen	-	10 000
13		Total phosphorus	-	10 000
14		Hydrochlorofluorocarbons (HCFCs)	1	10 000
15		Chlorofluorocarbons (CFCs)	1	10 000
16		Halons	1	10 000
17	7440-38-2	Arsenic and compounds (as As)	20	50
18	7440-43-9	Cadmium and compounds (as Cd)	10	5
19	7440-47-3	Chromium and compounds (as Cr)	100	10 000
20	7440-50-8	Copper and compounds (as Cu)	100	10 000
21	7439-97-6	Mercury and compounds (as Hg)	10	5
22	7440-02-0	Nickel and compounds (as Ni)	50	10 000
23	7439-92-1	Lead and compounds (as Pb)	200	50
24	7440-66-6	Zinc and compounds (as Zn)	200	10 000
25	15972-60-8	Alachlor	-	10 000
26	309-00-2	Aldrin	1	1
27	1912-24-9	Atrazine	-	10 000
28	57-74-9	Chlordane	1	1
29	143-50-0	Chlordecone	1	1
30	470-90-6	Chlorfenvinphos	-	10 000
31	85535-84-8	Chloro -alkanes, C10-C13	-	10 000
32	2921-88-2	Chlorpyrifos	-	10 000
33	50-29-3	DDT	1	1
34	107-06-2	1,2-dichloroethane (EDC)	1 000	10 000

No.	CAS number	Pollutant	Threshold for releases to air (column 1a)	Manufacture, process or use threshold (column 3)
35	75-09-2	Dichloromethane (DCM)	1 000	10 000
36	60-57-1	Dieldrin	1	1
37	330-54-1	Diuron	-	10 000
38	115-29-7	Endosulphan	-	10 000
39	72-20-8	Endrin	1	1
40		Halogenated organic compounds (as AOX)	-	10 000
41	76-44-8	Heptachlor	1	1
42	118-74-1	Hexachlorobenzene (HCB)	10	5
43	87-68-3	Hexachlorobutadiene (HCBD)	-	10 000
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	10	10
45	58-89-9	Lindane	1	1
46	2385-85-5	Mirex	1	1
47		PCDD + PCDF (dioxins + furans) as Teq	0,001	0,001
48	608-93-5	Pentachlorobenzene	1	50
49	87-86-5	Pentachlorophenol (PCP)	10	10 000
50	1336-36-3	Polychlorinated biphenyls (PCBs)	0,1	50
51	122-34-9	Simazine	-	10 000
52	127-18-4	Tetrachloroethylene (PER)	2 000	10 000
53	56-23-5	Tetrachloromethane (TCM)	100	10 000
54	12002-48-1	Trichlorobenzenes (TCBs)	10	10 000
55	71-55-6	1,1,1-trichloroethane	100	10 000
56	79-34-5	1,1,2,2-tetrachloroethane	50	10 000
57	79-01-6	Trichloroethylene	2 000	10 000
58	67-66-3	Trichloromethane	500	10 000
59	8001-35-2	Toxaphene	1	1
60	75-01-4	Vinyl chloride	1 000	10 000
61	120-12-7	Anthracene	50	50
62	71-43-2	Benzene	1 000	10 000
63		Brominated diphenylethers (PBDE)	-	10 000
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	-	10 000
65	100-41-4	Ethyl benzene	-	10 000
66	75-21-8	Ethylene oxide	1 000	10 000
67	34123-59-6	Isoproturon	-	10 000
68	91-20-3	Naphthalene	100	10 000
69		Organotin compounds (as total Sn)	-	10 000
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	10	10 000
71	108-95-2	Phenols (as total C)	-	10 000
72		Polycyclic aromatic hydrocarbons (PAHs) b/	50	50
73	108-88-3	Toluene	-	10 000
74		Tributyltin and compounds	-	10 000
75		Triphenyltin and compounds	-	10 000
76		Total organic carbon (TOC) (as total C or COD/3)	-	**
77	1582-09-8	Trifluralin	-	10 000
78	1330-20-7	Xylenes	-	10 000
79		Chlorides (as total Cl)	-	10 000 c/

No.	CAS number	Pollutant	Threshold for releases to air (column 1a)	Manufacture, process or use threshold (column 3)
80		Chlorine and inorganic compounds (as HCl)	10 000	10 000
81	1332-21-4	Asbestos	1	10 000
82		Cyanides (as total CN)	-	10 000
83		Fluorides (as total F)	-	10 000 c/
84		Fluorine and inorganic compounds (as HF)	5 000	10 000
85	74-90-8	Hydrogencyanide (HCN)	200	10 000
86		Particulate matter (PM10)	50 000	*

Footnotes:
a/ Single pollutants are to be reported if the threshold for BTEX (the sum parameter of benzene, toluene, ethyl benzene, xylene) is exceeded.
b/ Polycyclic aromatic hydrocarbons (PAHs) are to be measured as benzo(a)pyrene (50-32-8), benzo(b)fluoranthene (205-99-2), benzo(k)fluoranthene (207-08-9), indeno(1,2,3-cd)pyrene (193-39-5) (derived from the Protocol on Persistent Organic Pollutants to the Convention on Long-range Transboundary Air Pollution).
c/ As inorganic compounds.

Examples:

1. Public power plant
A large coal fired public power plant (630 MW) reports releases to air for a reporting year. The table below illustrates how the threshold values for release to air can be used to determine which releases are required to report, following a capacity approach on selecting facilities.

Pollutant	**Thresholds (kg)** **Release / MPU**	**Actual release (kg)**	**Report?**
Carbon monoxide (CO)	500 000 /*	4 200 000	yes
Carbon dioxide, (CO2):	100 million /*	1 930 million	Yes
Nitrous oxide (N2O):	10 000 /*	24 400	Yes
Nitrogen oxides (NOx):	100 000 /*	807 000	yes
Sulphur oxides (SOx):	150 000 /*	1 720 000	yes
Chlorine and inorganic compounds (as HCl)	10 000 / 10 000	35 600	yes
Fluorine and inorganic compounds (as HF)	5 000 / 10 000	8 010	yes
Non methane volatile organic compounds (NMVOC)	100 000 /*	10 320 000	yes
Mercury	10 / 5	14 100	yes
Cadmium	10 / 5	566	yes
Lead	200 / 50	707	yes
Copper	100 / 10 000	1 410	yes
Zinc	200 / 10 000	4 240	yes
Arsenic	20 / 50	5 660	yes
Chromium	100 / 10 000	707	yes
Nickel	50 / 10 000	7 070	yes

Since all releases to air are above the threshold values they must all be reported when using the capacity approach.

In case the employee approach is used on selecting facilities the selection of releases and transfers is a little more complex:

- for a number of pollutants no MPU threshold is given in Annex I (*), these 'pollutants must be assessed with the release threshold
- the MPU thresholds on the trace metals can be applied on the results of calculations on elements composition and fuel use.

2. Spray coating facility
A spray coating facility has an annual release of 180 000 kg Non-methane volatile organic compounds (NMVOC) to the air. Annex II gives for NMVOC no manufacturing, process or use threshold but refers (with the *) to the release threshold to air of 100 000 kg/year. The facility is thus required to report the annual release of 180 000 kg NMVOC, independent the selection approach of the Party.

4.1.3.3 Releases to water

Two types of releases to water must be reported for a facility, namely:

- Direct releases to surface water and indirect releases to sewer without a final WWTP: they must be included in the reporting for the facility and indicated as releases to water;
- Indirect releases to an off-site waste water treatment plant (WWTP), they must be included in the reporting for the facility and indicated as transfers off-site. "Transfers off-site any pollutant specified in annex II in waste water destined for waste-water treatment in quantities exceeding the applicable threshold specified in annex II, column 1b;" These are treated as off-site transfers.

For cases where there is a background concentration of a certain pollutant present in water this can be taken in account. For example in cases where water is collected to be used as process or cooling water which is finally released again the release causes by background concentration of that pollutant can be subtracted from the release of the facility.

Table 4.3 reproduces the list of pollutants for direct releases to water from Annex II of the PRTR Protocol.

Table 4.3 Identification of direct release of pollutants to water from Annex II of the UNECE PRTR Protocol

No.	CAS number	Pollutant	Threshold for releases to water (column 1b)	Manufacture, process or use threshold (column 3)
			kg/year	kg/year
1	74-82-8	Methane (CH4)	-	*
2	630-08-0	Carbon monoxide (CO)	-	*
3	124-38-9	Carbon dioxide (CO2)	-	*
4		Hydro-fluorocarbons (HFCs)	-	*
5	10024-97-2	Nitrous oxide (N2O)	-	*
6	7664-41-7	Ammonia (NH3)	-	10 000
7		Non-methane volatile organic compounds (NMVOC)	-	*
8		Nitrogen oxides (NOx/NO2)	-	*
9		Perfluorocarbons (PFCs)	-	*
10	2551-62-4	Sulphur hexafluoride (SF6)	-	*
11		Sulphur oxides (SOx/SO2)	-	*
12		Total nitrogen	50 000	10 000
13		Total phosphorus	5 000	10 000
14		Hydrochlorofluorocarbons (HCFCs)	-	10 000
15		Chlorofluorocarbons (CFCs)	-	10 000
16		Halons	-	10 000
17	7440-38-2	Arsenic and compounds (as As)	5	50
18	7440-43-9	Cadmium and compounds (as Cd)	5	5
19	7440-47-3	Chromium and compounds (as Cr)	50	10 000
20	7440-50-8	Copper and compounds (as Cu)	50	10 000

No.	CAS number	Pollutant	Threshold for releases to water (column 1b)	Manufacture, process or use threshold (column 3)
21	7439-97-6	Mercury and compounds (as Hg)	1	5
22	7440-02-0	Nickel and compounds (as Ni)	20	10 000
23	7439-92-1	Lead and compounds (as Pb)	20	50
24	7440-66-6	Zinc and compounds (as Zn)	100	10 000
25	15972-60-8	Alachlor	1	10 000
26	309-00-2	Aldrin	1	1
27	1912-24-9	Atrazine	1	10 000
28	57-74-9	Chlordane	1	1
29	143-50-0	Chlordecone	1	1
30	470-90-6	Chlorfenvinphos	1	10 000
31	85535-84-8	Chloro -alkanes, C10-C13	1	10 000
32	2921-88-2	Chlorpyrifos	1	10 000
33	50-29-3	DDT	1	1
34	107-06-2	1,2-dichloroethane (EDC)	10	10 000
35	75-09-2	Dichloromethane (DCM)	10	10 000
36	60-57-1	Dieldrin	1	1
37	330-54-1	Diuron	1	10 000
38	115-29-7	Endosulphan	1	10 000
39	72-20-8	Endrin	1	1
40		Halogenated organic compounds (as AOX)	1 000	10 000
41	76-44-8	Heptachlor	1	1
42	118-74-1	Hexachlorobenzene (HCB)	1	5
43	87-68-3	Hexachlorobutadiene (HCBD)	1	10 000
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	1	10
45	58-89-9	Lindane	1	1
46	2385-85-5	Mirex	1	1
47		PCDD + PCDF (dioxins + furans) as Teq	0,001	0,001
48	608-93-5	Pentachlorobenzene	1	50
49	87-86-5	Pentachlorophenol (PCP)	1	10 000
50	1336-36-3	Polychlorinated biphenyls (PCBs)	0,1	50
51	122-34-9	Simazine	1	10 000
52	127-18-4	Tetrachloroethylene (PER)	-	10 000
53	56-23-5	Tetrachloromethane (TCM)	-	10 000
54	12002-48-1	Trichlorobenzenes (TCBs)	-	10 000
55	71-55-6	1,1,1-trichloroethane	-	10 000
56	79-34-5	1,1,2,2-tetrachloroethane	-	10 000
57	79-01-6	Trichloroethylene	-	10 000
58	67-66-3	Trichloromethane	-	10 000
59	8001-35-2	Toxaphene	1	1
60	75-01-4	Vinyl chloride	10	10 000
61	120-12-7	Anthracene	1	50
62	71-43-2	Benzene	200 (as BTEX) a/	10 000
63		Brominated diphenylethers (PBDE)	1	10 000
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	1	10 000
65	100-41-4	Ethyl benzene	200 (as BTEX)	10 000

No.	CAS number	Pollutant	Threshold for releases to water (column 1b)	Manufacture, process or use threshold (column 3)
66	75-21-8	Ethylene oxide	10	10 000
67	34123-59-6	Isoproturon	1	10 000
68	91-20-3	Naphthalene	10	10 000
69		Organotin compounds (as total Sn)	50	10 000
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	1	10 000
71	108-95-2	Phenols (as total C)	20	10 000
72		Polycyclic aromatic hydrocarbons (PAHs) b/	5	50
73	108-88-3	Toluene	200 (as BTEX) a/	10 000
74		Tributyltin and compounds	1	10 000
75		Triphenyltin and compounds	1	10 000
76		Total organic carbon (TOC) (as total C or COD/3)	50 000	**
77	1582-09-8	Trifluralin	1	10 000
78	1330-20-7	Xylenes	200 (as BTEX) a/	10 000
79		Chlorides (as total Cl)	2 million	10 000 c/
80		Chlorine and inorganic compounds (as HCl)	-	10 000
81	1332-21-4	Asbestos	1	10 000
82		Cyanides (as total CN)	50	10 000
83		Fluorides (as total F)	2 000	10 000 c/
84		Fluorine and inorganic compounds (as HF)	-	10 000
85	74-90-8	Hydrogencyanide (HCN)	-	10 000
86		Particulate matter (PM10)	-	*

4.1.3.4 Releases to land

Releases to land of any pollutant specified in annex II in quantities exceeding the applicable threshold are specified in annex II, column 2 for Parties that have opted for pollutant –specific reporting of transfers pursuant to paragraph 5 (d).

Table 4.4 reproduces the list of pollutants and thresholds for direct releases to land from Annex II of the PRTR Protocol.

Table 4.4 Identification and thresholds of releases to land from Annex II of the PRTR Protocol

No.	CAS number	Pollutant	Threshold for releases to land (column 1c)	Manufacture, process or use threshold (column 3)
			kg/year	kg/year
1	74-82-8	Methane (CH4)	-	*
2	630-08-0	Carbon monoxide (CO)	-	*
3	124-38-9	Carbon dioxide (CO2)	-	*
4		Hydro-fluorocarbons (HFCs)	-	*
5	10024-97-2	Nitrous oxide (N2O)	-	*
6	7664-41-7	Ammonia (NH3)	-	10 000
7		Non-methane volatile organic compounds (NMVOC)	-	*
8		Nitrogen oxides (NOx/NO2)	-	*
9		Perfluorocarbons (PFCs)	-	*
10	2551-62-4	Sulphur hexafluoride (SF6)	-	*
11		Sulphur oxides (SOx/SO2)	-	*
12		Total nitrogen	50 000	10 000
13		Total phosphorus	5 000	10 000
14		Hydrochlorofluorocarbons (HCFCs)	-	10 000
15		Chlorofluorocarbons (CFCs)	-	10 000
16		Halons	-	10 000
17	7440-38-2	Arsenic and compounds (as As)	5	50
18	7440-43-9	Cadmium and compounds (as Cd)	5	5
19	7440-47-3	Chromium and compounds (as Cr)	50	10 000
20	7440-50-8	Copper and compounds (as Cu)	50	10 000
21	7439-97-6	Mercury and compounds (as Hg)	1	5
22	7440-02-0	Nickel and compounds (as Ni)	20	10 000
23	7439-92-1	Lead and compounds (as Pb)	20	50
24	7440-66-6	Zinc and compounds (as Zn)	100	10 000
25	15972-60-8	Alachlor	1	10 000
26	309-00-2	Aldrin	1	1
27	1912-24-9	Atrazine	1	10 000
28	57-74-9	Chlordane	1	1
29	143-50-0	Chlordecone	1	1
30	470-90-6	Chlorfenvinphos	1	10 000
31	85535-84-8	Chloro -alkanes, C10-C13	1	10 000
32	2921-88-2	Chlorpyrifos	1	10 000
33	50-29-3	DDT	1	1
34	107-06-2	1,2-dichloroethane (EDC)	10	10 000
35	75-09-2	Dichloromethane (DCM)	10	10 000
36	60-57-1	Dieldrin	1	1
37	330-54-1	Diuron	1	10 000
38	115-29-7	Endosulphan	1	10 000
39	72-20-8	Endrin	1	1
40		Halogenated organic compounds (as AOX)	1 000	10 000
41	76-44-8	Heptachlor	1	1
42	118-74-1	Hexachlorobenzene (HCB)	1	5

No.	CAS number	Pollutant	Threshold for releases to land (column 1c)	Manufacture, process or use threshold (column 3)
43	87-68-3	Hexachlorobutadiene (HCBD)	1	10 000
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	1	10
45	58-89-9	Lindane	1	1
46	2385-85-5	Mirex	1	1
47		PCDD + PCDF (dioxins + furans) as Teq	0,001	0,001
48	608-93-5	Pentachlorobenzene	1	50
49	87-86-5	Pentachlorophenol (PCP)	1	10 000
50	1336-36-3	Polychlorinated biphenyls (PCBs)	0,1	50
51	122-34-9	Simazine	1	10 000
52	127-18-4	Tetrachloroethylene (PER)	-	10 000
53	56-23-5	Tetrachloromethane (TCM)	-	10 000
54	12002-48-1	Trichlorobenzenes (TCBs)	-	10 000
55	71-55-6	1,1,1-trichloroethane	-	10 000
56	79-34-5	1,1,2,2-tetrachloroethane	-	10 000
57	79-01-6	Trichloroethylene	-	10 000
58	67-66-3	Trichloromethane	-	10 000
59	8001-35-2	Toxaphene	1	1
60	75-01-4	Vinyl chloride	10	10 000
61	120-12-7	Anthracene	1	50
62	71-43-2	Benzene	200 (as BTEX) a/	10 000
63		Brominated diphenylethers (PBDE)	1	10 000
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	1	10 000
65	100-41-4	Ethyl benzene	200 (as BTEX)	10 000
66	75-21-8	Ethylene oxide	10	10 000
67	34123-59-6	Isoproturon	1	10 000
68	91-20-3	Naphthalene	10	10 000
69		Organotin compounds (as total Sn)	50	10 000
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	1	10 000
71	108-95-2	Phenols (as total C)	20	10 000
72		Polycyclic aromatic hydrocarbons (PAHs) b/	5	50
73	108-88-3	Toluene	200 (as BTEX) a/	10 000
74		Tributyltin and compounds	1	10 000
75		Triphenyltin and compounds	1	10 000
76		Total organic carbon (TOC) (as total C or COD/3)	-	**
77	1582-09-8	Trifluralin	1	10 000
78	1330-20-7	Xylenes	200 (as BTEX) a/	10 000
79		Chlorides (as total Cl)	2 million	10 000 c/
80		Chlorine and inorganic compounds (as HCl)	-	10 000
81	1332-21-4	Asbestos	1	10 000
82		Cyanides (as total CN)	50	10 000
83		Fluorides (as total F)	2 000	10 000 c/
84		Fluorine and inorganic compounds (as HF)	-	10 000
85	74-90-8	Hydrogencyanide (HCN)	-	10 000
86		Particulate matter (PM10)	-	*

Footnotes:
a/ Single pollutants are to be reported if the threshold for BTEX (the sum parameter of benzene, toluene, ethyl benzene, xylene) is exceeded.
b/ Polycyclic aromatic hydrocarbons (PAHs) are to be measured as benzo(a)pyrene (50-32-8), benzo(b)fluoranthene (205-99-2), benzo(k)fluoranthene (207-08-9), indeno(1,2,3-cd)pyrene (193-39-5) (derived from the Protocol on Persistent Organic Pollutants to the Convention on Long-range Transboundary Air Pollution).
c/ As inorganic compounds.

4.1.3.5 Off-site transfers of pollutants

Off-site transfers of pollutants can either be waste or waste water fed into a (public) sewer system. The PRTR Protocol text allows for waste two possibilities:

- pollutant specific reporting
- waste specific reporting.

Pollutant specific reporting can be generated by analysing the various wastes on their chemical composition. With the chemical composition the annual mass flow for each pollutant can be calculated.

For waste specific reporting Parties should define by means of national law what waste is designated as hazardous waste, the threshold is 2 tonnes for hazardous waste and 2000 tonnes for other waste.

Hazardous wastes and other wastes destined for recovery or disposal transfered off site including transboundary movements shall be indicated respectively with the 'R' or 'D' operation pursuant to annex III.

Table 4.5 reproduces the list of pollutants for off site transfers from Annex II of the PRTR Protocol.

Table 4.5 Thresholds for off-site transfers from Annex II of the PRTR Protocol

No.	CAS number	Pollutant	Threshold for off-site transfers of pollutants (column 2)	Manufacture, process or use threshold (column 3)
			kg/year	kg/year
1	74-82-8	Methane (CH4)	-	*
2	630-08-0	Carbon monoxide (CO)	-	*
3	124-38-9	Carbon dioxide (CO2)	-	*
4		Hydro-fluorocarbons (HFCs)	-	*
5	10024-97-2	Nitrous oxide (N2O)	-	*
6	7664-41-7	Ammonia (NH3)	-	10 000

No.	CAS number	Pollutant	Threshold for off-site transfers of pollutants (column 2)	Manufacture, process or use threshold (column 3)
7		Non-methane volatile organic compounds (NMVOC)	-	*
8		Nitrogen oxides (NOx/NO2)	-	*
9		Perfluorocarbons (PFCs)	-	*
10	2551-62-4	Sulphur hexafluoride (SF6)	-	*
11		Sulphur oxides (SOx/SO2)	-	*
12		Total nitrogen	10 000	10 000
13		Total phosphorus	10 000	10 000
14		Hydrochlorofluorocarbons (HCFCs)	100	10 000
15		Chlorofluorocarbons (CFCs)	100	10 000
16		Halons	100	10 000
17	7440-38-2	Arsenic and compounds (as As)	50	50
18	7440-43-9	Cadmium and compounds (as Cd)	5	5
19	7440-47-3	Chromium and compounds (as Cr)	200	10 000
20	7440-50-8	Copper and compounds (as Cu)	500	10 000
21	7439-97-6	Mercury and compounds (as Hg)	5	5
22	7440-02-0	Nickel and compounds (as Ni)	500	10 000
23	7439-92-1	Lead and compounds (as Pb)	50	50
24	7440-66-6	Zinc and compounds (as Zn)	1 000	10 000
25	15972-60-8	Alachlor	5	10 000
26	309-00-2	Aldrin	1	1
27	1912-24-9	Atrazine	5	10 000
28	57-74-9	Chlordane	1	1
29	143-50-0	Chlordecone	1	1
30	470-90-6	Chlorfenvinphos	5	10 000
31	85535-84-8	Chloro -alkanes, C10-C13	10	10 000
32	2921-88-2	Chlorpyrifos	5	10 000
33	50-29-3	DDT	1	1
34	107-06-2	1,2-dichloroethane (EDC)	100	10 000
35	75-09-2	Dichloromethane (DCM)	100	10 000
36	60-57-1	Dieldrin	1	1
37	330-54-1	Diuron	5	10 000
38	115-29-7	Endosulphan	5	10 000
39	72-20-8	Endrin	1	1
40		Halogenated organic compounds (as AOX)	1 000	10 000
41	76-44-8	Heptachlor	1	1
42	118-74-1	Hexachlorobenzene (HCB)	1	5
43	87-68-3	Hexachlorobutadiene (HCBD)	5	10 000
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	1	10
45	58-89-9	Lindane	1	1
46	2385-85-5	Mirex	1	1
47		PCDD + PCDF (dioxins + furans) as Teq	0,001	0,001
48	608-93-5	Pentachlorobenzene	5	50
49	87-86-5	Pentachlorophenol (PCP)	5	10 000
50	1336-36-3	Polychlorinated biphenyls (PCBs)	1	50
51	122-34-9	Simazine	5	10 000

No.	CAS number	Pollutant	Threshold for off-site transfers of pollutants (column 2)	Manufacture, process or use threshold (column 3)
52	127-18-4	Tetrachloroethylene (PER)	1 000	10 000
53	56-23-5	Tetrachloromethane (TCM)	1 000	10 000
54	12002-48-1	Trichlorobenzenes (TCBs)	1 000	10 000
55	71-55-6	1,1,1-trichloroethane	1 000	10 000
56	79-34-5	1,1,2,2-tetrachloroethane	1 000	10 000
57	79-01-6	Trichloroethylene	1 000	10 000
58	67-66-3	Trichloromethane	1 000	10 000
59	8001-35-2	Toxaphene	1	1
60	75-01-4	Vinyl chloride	100	10 000
61	120-12-7	Anthracene	50	50
62	71-43-2	Benzene	2000 (as BTEX) a/	10 000
63		Brominated diphenylethers (PBDE)	5	10 000
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	5	10 000
65	100-41-4	Ethyl benzene	2000 (as BTEX)	10 000
66	75-21-8	Ethylene oxide	100	10 000
67	34123-59-6	Isoproturon	5	10 000
68	91-20-3	Naphthalene	100	10 000
69		Organotin compounds (as total Sn)	50	10 000
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	100	10 000
71	108-95-2	Phenols (as total C)	200	10 000
72		Polycyclic aromatic hydrocarbons (PAHs) b/	50	50
73	108-88-3	Toluene	2000 (as BTEX) a/	10 000
74		Tributyltin and compounds	5	10 000
75		Triphenyltin and compounds	5	10 000
76		Total organic carbon (TOC) (as total C or COD/3)	-	**
77	1582-09-8	Trifluralin	5	10 000
78	1330-20-7	Xylenes	2000 (as BTEX) a/	10 000
79		Chlorides (as total Cl)	2 million	10 000 c/
80		Chlorine and inorganic compounds (as HCl)	-	10 000
81	1332-21-4	Asbestos	10	10 000
82		Cyanides (as total CN)	500	10 000
83		Fluorides (as total F)	10 000	10 000 c/
84		Fluorine and inorganic compounds (as HF)	-	10 000
85	74-90-8	Hydrogencyanide (HCN)	-	10 000
86		Particulate matter (PM10)	-	*

Footnotes:
a/ Single pollutants are to be reported if the threshold for BTEX (the sum parameter of benzene, toluene, ethyl benzene, xylene) is exceeded.
b/ Polycyclic aromatic hydrocarbons (PAHs) are to be measured as benzo(a)pyrene (50-32-8), benzo(b)fluoranthene (205-99-2), benzo(k)fluoranthene (207-08-9), indeno(1,2,3-cd)pyrene (193-39-5) (derived from the Protocol on Persistent Organic Pollutants to the Convention on Long-range Transboundary Air Pollution).
c/ As inorganic compounds.

Annex III
PART A DISPOSAL OPERATIONS ('D')
- Deposit into or onto land (e.g. landfill)
- Land treatment (e.g. biodegradation of liquid or sludgy discards in soils)
- Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories)
- Surface impoundment (e.g. placement of liquid or sludge discards into pits, ponds or lagoons)
- Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment)
- Release into a water body except seas/oceans
- Release into seas/oceans including sea-bed insertion
- Biological treatment not specified elsewhere in this annex which results in final compounds or mixtures which are discarded by means of any of the operations specified in this part
- Physico-chemical treatment not specified elsewhere in this annex which results in final compounds or mixtures which are discarded by means of any of the operations specified in this part (e.g. evaporation, drying, calcination, neutralization, precipitation)
- Incineration on land
- Incineration at sea
- Permanent storage (e.g. emplacement of containers in a mine)
- Blending or mixing prior to submission to any of the operations specified in this part
- Repackaging prior to submission to any of the operations specified in this part
- Storage pending any of the operations specified in this part

PART B RECOVERY OPERATIONS ('R')
- Use as a fuel (other than in direct incineration) or other means to generate energy
- Solvent reclamation/regeneration
- Recycling/reclamation of organic substances which are not used as solvents
- Recycling/reclamation of metals and metal compounds
- Recycling/reclamation of other inorganic materials
- Regeneration of acids or bases
- Recovery of components used for pollution abatement
- Recovery of components from catalysts
- Used oil re-refining or other reuses of previously used oil
- Land treatment resulting in benefit to agriculture or ecological improvement
- Uses of residual materials obtained from any of the recovery operations specified above in this part
- Exchange of wastes for submission to any of the recovery operations specified above in this part
- Accumulation of material intended for any operation specified in this part

4.1.3.6 Expected releases and transfers

Each individual source category as listed in Annex I releases or transfers a different set of pollutants. In table 4.6 an indicative list is given of the pollutants for which releases or transfers can be expected that might be above the reporting thresholds for each of the Annex I activities.

The pollutants are indicated in release to air (a) and water (w) and for off-site transfer (o), respectively. This indicative list is presented merely as guidance for Parties in identifying the pollutants that are likely to be emitted by a specific source category of Annex I of the PRTR Protocol and can be used as a checklist for reporting. Whether or not a pollutant is released or transferred above the threshold value depends on the specific characteristics of the facility.

Table 4.6; Sector specific checklist for pollutants likely to be released or transferred by source categories of Annex 1activities. (a = release to air, w = release to water, o = off-site transfer .

No.		Activity	1	2.	3.	4.	5.	6.	7.	8.
		Pollutant	Energy sector	Production and	Mineral industry	Chemical industry	Waste and waste-water	Paper and wood	Intensive livestock	Animal and vegetable
1	74-82-8	Methane (CH4)	a			a	a		a	a
2	630-08-0	Carbon monoxide (CO)	a	a	a	a				
3	124-38-9	Carbon dioxide (CO2)	a	a	a	a	a	a	a	a
4		Hydro-fluorocarbons (HFCs)		a	a		a			
5	10024-97-2	Nitrous oxide (N2O)	a			a				
6	7664-41-7	Ammonia (NH3)		a		a	a		awo	
7		Non-methane volatile organic compounds (NMVOC)	a	a	a	a	a	a		
8		Nitrogen oxides (NOx/NO2)	a	a	a	a	a	a	a	a
9		Perfluorocarbons (PFCs)		a		a	a			
10	2551-62-4	Sulphur hexafluoride (SF6)								
11		Sulphur oxides (SOx/SO2)	a	a	a	a	a	a	a	
12		Total nitrogen			wo	wo	wo	wo	wo	wo
13		Total phosphorus			wo	wo	wo	wo	wo	wo
14		Hydrochlorofluorocarbons (HCFCs)		a	a	a	a	a	a	a
15		Chlorofluorocarbons (CFCs)								
16		Halons		a	a	a	a	a	a	a
17	7440-38-2	Arsenic and compounds (as As)	aw	awo	awo	awo	awo			
18	7440-43-9	Cadmium and compounds (as Cd)	aw	awo	awo	awo	awo			
19	7440-47-3	Chromium and compounds (as Cr)	aw	awo	awo	awo	awo			
20	7440-50-8	Copper and compounds (as Cu)	aw	awo	awo	awo	awo			
21	7439-97-6	Mercury and compounds (as Hg)	aw	awo	awo	awo	awo			
22	7440-02-0	Nickel and compounds (as Ni)	aw	awo	awo	awo	awo			
23	7439-92-1	Lead and compounds (as Pb)	aw	awo	awo	awo	awo			
24	7440-66-6	Zinc and compounds (as Zn)	aw	awo	awo	awo	awo			
25	15972-60-8	Alachlor				awo	awo			
26	309-00-2	Aldrin				awo	awo			
27	1912-24-9	Atrazine				awo	awo			
28	57-74-9	Chlordane				awo	awo			
29	143-50-0	Chlordecone				awo	awo			
30	470-90-6	Chlorfenvinphos				awo	awo			
31	85535-84-8	Chloro -alkanes, C10-C13				awo	awo			
32	2921-88-2	Chlorpyrifos				awo	awo			
33	50-29-3	DDT				awo	awo			
34	107-06-2	1,2-dichloroethane				awo	awo			
35	75-09-2	Dichloromethane				awo	awo			
36	60-57-1	Dieldrin				awo	awo			
37	330-54-1	Diuron				awo	awo			
38	115-29-7	Endosulphan				awo	awo			
39	72-20-8	Endrin				awo	awo			
40		Halogenated organic compounds (as AOX)				awo	awo			
41	76-44-8	Heptachlor				awo	awo			
42	118-74-1	Hexachlorobenzene (HCB)				awo	awo			
43	87-68-3	Hexachlorobutadiene (HCBD)				awo	awo			
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)				awo	awo			
45	58-89-9	Lindane				awo	awo			
46	2385-85-5	Mirex				awo	awo			
47		PCDD + PCDF (dioxins + furans) as Teq	a	a	a	awo	awo	a		
48	608-93-5	Pentachlorobenzene				awo	awo			
49	87-86-5	Pentachlorophenol (PCP)				awo	awo			
50	1336-36-3	Polychlorinated biphenyls (PCBs)				awo	awo			
51	122-34-9	Simazine				awo	awo			
52	127-18-4	Tetrachloroethylene (PER)				awo	awo			

No.		Activity	1	2.	3.	4.	5.	6.	7.	8.
		Pollutant	Energy sector	Production and	Mineral industry	Chemical industry	Waste and waste-water	Paper and wood	Intensive livestock	Animal and vegetable
53	56-23-5	Tetrachloromethane (TCM)				awo	awo			
54	12002-48-1	Trichlorobenzenes (TCBs)				awo	awo			
55	71-55-6	1,1,1-trichloroethane				awo	awo			
56	79-34-5	1,1,2,2-tetrachloroethane				awo	awo			
57	79-01-6	Trichloroethylene				awo	awo			
58	67-66-3	Trichloromethane				awo	awo			
59	8001-35-2	Toxaphene				awo	awo			
60	75-01-4	Vinyl chloride				awo	awo			
61	120-12-7	Anthracene				awo	awo			
62	71-43-2	Benzene				awo	awo			
63		Brominated diphenylethers (PBDE)				awo	awo			
64		Nonylphenol ethoxylates (NP/NPEs) and related substances				awo	awo			
65	100-41-4	Ethyl benzene				awo	awo			
66	75-21-8	Ethylene oxide				awo	awo			
67	34123-59-6	Isoproturon				awo	awo			
68	91-20-3	Naphthalene				awo	awo			
69		Organotin compounds (as total Sn)				awo	awo			
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)				awo	awo			
71	108-95-2	Phenols (as total C)				awo	awo			
72		Polycyclic aromatic hydrocarbons (PAHs) b/				awo	awo			
73	108-88-3	Toluene				awo	awo			
74		Tributyltin and compounds				awo	awo			
75		Triphenyltin and compounds				awo	awo			
76		Total organic carbon (TOC) (as total C or COD/3)	wo	wo	wo	awo	awo	wo	wo	wo
77	1582-09-8	Trifluralin				awo	awo			
78	1330-20-7	Xylenes				awo	awo			
79		Chlorides (as total Cl)				awo	awo			
80		Chlorine and inorganic compounds (as HCl)				awo	awo			
81	1332-21-4	Asbestos				awo	awo			
82		Cyanides (as total CN)				awo	awo			
83		Fluorides (as total F)				awo	awo			
84		Fluorine and inorganic compounds (as HF)				awo	awo			
85	74-90-8	Hydrogencyanide (HCN)				a	a			
86		Particulate matter (PM10)	a	a	a	a	a	a	a	a

4.1.4 Reporting

Article 7.5
Each Party shall require the owners or operators of the facilities required to report under paragraph 2 to complete and submit to its competent authority, the following inf ormation on a facility-specific basis:

(a) The name, street address, geographical location and the activity or activities of the reporting facility, and the name of the owner or operator, and, as appropriate, company;

(b) The name and numerical identifier of each pollutant required to be reported pursuant to paragraph 2;

(c) The amount of each pollutant required to be reported pursuant to paragraph 2 released from the facility to the environment in the reporting year, both in aggregate and according to whether the release is to air, to water or to land, including by underground injection;

(d) Either:

(i) The amount of each pollutant required to be reported pursuant to paragraph 2 that is transferred off-site in the reporting year, distinguishing between the amounts transferred for disposal and for recovery, and the name and address of the facility receiving the transfer; or

(ii) The amount of waste required to be reported pursuant to paragraph 2 transferred off-site in the reporting year, distinguishing between hazardous waste and other waste, for any operations of recovery or disposal, indicating respectively with 'R' or 'D' whether the waste is destined for recovery or disposal pursuant to annex III and, for transboundary movements of hazardous waste, the name and address of the recoverer or disposer of the waste and the actual recovery or disposal site receiving the transfer;

(e) The amount of each pollutant in waste water required to be reported pursuant to paragraph 2 transferred off-site in t he reporting year; and

(f) The type of methodology used to derive the information referred to in subparagraphs (c) to (e), according to article 9, paragraph 2, indicating whether the information is based on measurement, calculation or estimation.

4.1.4.1 Release determination techniques

Many facilities already collect data suitable for use in determining releases and transfers to air, water and land. It should be noted that the release and transfer data on pollutants reported per facility can be based on three different principal determination methods:

- Measurements using standardized or accepted methods; often additional calculations are needed to convert the results of measurements into annual emission data.

- Calculations using nationally or internationally agreed estimation methods and emission factors, which are representative for the industrial sectors.

- Estimations (non-standardized) derived from best assumptions or expert guesses.

Measurements refer to when the releases and transfers of pollutants of a facility are derived from direct monitoring results for specific processes at the facility, based on actual measurements of pollutant concentrations for a given release route. The term measurements refers to results of standardized or accepted measurement methods (such as listed in Appendix 3)

Types of measurements that can be used are government compliance monitoring or prescribed self monitoring, process control measurements, worker exposure measurements or government permit or compliance measurements. These measurements can often directly be used to determine releases. Monitoring data needs however to be taken frequently enough to account for normal variations in operating conditions throughout the year, an average concentration can be used with an average flow rate to calculate the yearly emission.

Calculations refer to when the releases and transfers of pollutants are based on calculations using activity data (fuel used, production rate, etc.) and emission factors. In some cases more complicated calculation methods can be applied, using variables like temperature, global radiance etc. These cases should also be marked as calculations. Also, calculations based on a mass balance approach should be marked as calculations. Furthermore, the indication calculation is used, when the emission calculation method is obtained from published references.

Estimations refer to releases and transfers of pollutants that are determined by expert judgment, not based on publicly available references. The indication of estimation applies also for guesses of the emissions in case of absence of internationally approved emission determination methodologies or good practice guidelines.

See also table 4.7 for an overview of different types of determination methods for estimating releases and transfers of pollutants from facilities.

Table 4.7. Different types of determination methods for estimating releases and transfers of pollutants from facilities[14] and classification as measurement (M), calculation (C) or estimation (E)

Type of measurtement	Classification for PRTR
I. Direct Measurement	M
- Fugitive Air Emissions	M
- Measuring Point Source Air Emissions	M
- Measuring Surface Water Discharges	M
- Measuring Releases to Land	M
II. Materials Accounting and Mass Balance	C
- Estimating Fugitive Air Emissions by Materials Accounting	C
- Estimating Point Source Air Emissions by Materials Accounting	C
- Estimating Surface Water Discharges by Materials Accounting	C
- Estimating Releases to Land by Materials Accounting	C
III - Emission Factors	C
- Estimating Fugitive Air Emissions with Emission Factors	C
- Estimating Point Source Air Emissions with Emission Factors	C
- Estimating Surface Water Discharges and Releases to Land with Emission Factors	C
IV. Engineering Calculation	C / E
- Estimating Fugitive Air Emissions by Engineering Calculation	C / E
- Estimating Point Source Air Emissions by Engineering Calculation	C / E
- Estimating Surface Water Discharges by Engineering Calculation	C / E
- Estimating Releases to Land by Engineering Calculation	C / E

Note: measurements are not always to be considered as more reliable or accurate than calculations. An example which illustrates this is the determination of the amount of CO_2 from fuel use released to the atmosphere from a point-source. The direct measurement of the CO_2 emission load from stacks relies on determination of set of parameters as CO_2 concentration and

[14] Estimating Environmental Releases for Facility PRTR Reporting: Introduction and Guide to Methods - UNITAR 1997, http://www.unitar.org/cwm/prtr/UNITAR.htm

the total flow off flue gas, each of them introducing a new uncertainty and adding to the total uncertainty of the determination.

A more thorough and extensive overview and description of methods can be found in the following documents:

- Unitar guidance document "Estimating Environmental Releases for Facility PRTR Reporting, Introduction and Guide to Methods" from January 1997[15].

- IPPC Bref Monitoring. "The IPPC reference document on the general principles of monitoring is intended to provide information to guide IPPC permit writers and operators of IPPC installations in meeting their obligations under the IPPC Directive with regards to the monitoring requirements of industrial emissions."[16]

In Annex 3 "Analytical Procedures for 86 Substances" an indicative list is given of:

- Release estimation techniques (RETs) and the parameters (emission factors) needed for these RETs

- Measurement methods for relevant pollutants covered by CEN[17] or ISO[18] standards. This list is presented as guidance to the Parties regarding the availability of existing standardised measurement methods.

OECD's Resource Centre for PRTR Release Estimation Techniques (RETs)
The Resource Centre is an internet site that has been developed by the Task Force on PRTRs (Pollutant Release and Transfer Registers) of the OECD's Environment, Health and Safety Programme under the lead of Environment Canada.
The purpose of the site is to provide a clearinghouse of guidance manuals/documents of release estimation techniques for the principal pollutant release and transfer registries developed by OECD member countries. The manuals and documents include descriptive information on the sources of pollution and the pollutants that are released, as well as information on emission factors, mass balance methods, engineering calculations, and monitoring information.
The Resource Centre will be updated on a regular basis to include additional and new documents available.
http://206.191.48.253/

[15] Unitar: http://www.unitar.org/cwm/prtr/pdf/cat5/estimating_rels.pdf

[16] IPPC Bref: http://eippcb.jrc.es/cgi-bin/locatemr?ref_final_0203.pdf

[17] CEN, European Committee for Standardization http://www.cenorm.be/

[18] ISO, International Organization for Standardization: http://www.iso.org/

4.1.4.2 Uncertainty and presentation of the data

All emission data have to be expressed in kg/year and with three significant digits. Rounding to nearest, also known as round to even is to be preferred instead of chopping, also known as round toward zero. The rounding off to three significant digits does not refer to the statistical or scientific uncertainty, but reflects only the accuracy of the reported data as is shown in the example below.

Original result of the emission calculation.	Result to be reported (in three significant digits).
0 0000123456 kg/year	0 0000123 kg/year
0.0512495 kg/year	0.0512 kg/year
0.4591 kg/year	0.459 kg/year
1.23456 kg/year	1.23 kg/year
12.3456 kg/year	12.3 kg/year
123.456 kg/year	123 kg/year
1 234.567 kg/year	1 230 kg/year
12 345.678 kg/year	12 300 kg/year
1 234 567 890 kg/year	1 230 000 000 kg/year

4.1.4.3 Example format for reporting of releases and transfers of individual facilities

Table 4.8 gives an example format for reporting of releases and transfers of individual facilities.

Table 4.8 Example format for reporting of releases and transfers of individual facilities

Identification of the facility			
Name of parent company Name of the facility Address / City of the facility ZIP Code / Country Co-ordinates of the location NACE-code (4 digits) Main economic activity Capacity / production volume (for capacity selection approach) Number of employees (for employee selection approach) Regulatory bodies (optional) Number of installations (optional) Number of operating hours in year (optional)			
Annex I Activities/Processes (according to Annex I)		Activity codes (according to Annex I)	
Activity 1 (main Annex I activity) “ Activity N		Code 1 “ Code N	
Air			
Releases to AIR for the facility for |each pollutant exceeding threshold value (according to Annex II, column 1a or column 3)			
Pollutant 1, name and numerical identifier “ Pollutant N	M: measured C : calculated E : estimated	in kg/year	
Water			
Emission data to WATER (direct or indirect) for the facility for each pollutant exceeding threshold value (according to Annex II, column 1b or column 3)			
Pollutant 1, name and numerical identifier “ Pollutant N	M: measured C : calculated E : estimated	in kg/year	
Land			
Transfers of pollutant / waste for the facility for each pollutant or waste exceeding threshold value (according to Annex II, column 1c or column 3)			
Pollutant 1 name and numerical identifier “ Pollutant N	M: measured C : calculated E : estimated	in kg/year	
Off-site transfers			
Off-site transfers of pollutant / waste for the facility for each pollutant or waste exceeding threshold value (according to Annex II, column 2 or column 3)			
Pollutant / waste1 name and numerical identifier “ Pollutant / waste1	M: measured C : calculated E : estimated	Indication of: hazardous waste (hw) or other waste (ow), recovery (R) or disposal (D) and transboundary movements hazardous waste.	in kg/year
	Name and adress of recoverer or disposer for each pollutant / waste		
	Name and adress of the actual recovery or disposal site for each pollutant / waste		

4.2 Diffuse sources

Art 7, par 7: 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.

A PRTR under the UNECE 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 other sources, the so called diffuse sources.

4.2.1 Definition of diffuse source categories

The UNITAR Guidance on Estimating Non-point Source Emissions [19] (1998) provides an overview and definitions of other (non-point or diffuse) sources as domestic activities and consumer product use, transportation and traffic, agriculture, small- and medium-sized enterprises. Since many of the Parties to the Aarhus Convention already have signed other conventions and protocols as UNFCCC and UNECE LRTAP the use of a standardized sectoral classification for sources is recommended. The "*Nomenclature For Reporting*"[20] (NFR) is a reporting structure that is used for submitting data to UNECE and EMEP. The NFR is closely linked to the Common Reporting Format[21] (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.

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

[20] Guidelines for Estimating and Reporting Emission Data under the Convention on Long-range Transboundary Air Pollution, www.unece.org/env/documents/ 2003/eb/air/ece.eb.air.15.E.pdf

[21] Common Reporting Format, CRF, http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/2759.php

A list of diffuse sources according the NFR and CRF structure is presented in table 4.9 below.

Table 4.9. list of 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), see 4.2.2.

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 & 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

CRF/NFR Code	CRF/NFR category	Above threshold facilities might occur?	Proxy for diffuse source estimation
4.B	manure management	+	Pr / pp /X
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

4.2.2 Determination of diffuse source data

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".*

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.

4.2.2.1 Below threshold facilities

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 7,1b). 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 and / 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

As a starting point for this estimation data on the release and transfer of pollutants 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)

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

- (Total production of Annex I category– production of Annex I facilities)/ total production of Annex I category
- (Total number of employees of Annex I category–number of employees of Annex I facilities) / Total number of employees of Annex I category
- (Total added value of Annex I category – added value of Annex I facilities) / Total added value of Annex I category

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

4.2.2.2 Activities not listed in Annex 1 of the Protocol

The general approach for estimating the contribution of other diffuse sources is to construct appropriate emission factors which are linked to source parameters that are known or which can be easily obtained ("proxies"). These source parameters could be, for example, the average number of vehicle miles traveled in the case of road traffic, the size and composition of cultivated area in the case of agriculture, the tonnage of pesticide or fertilizer use and the locations where these chemicals are applied, etc. 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.

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.

4.2.3 Release estimation techniques

A review of documents available from various countries and organizations[22] (World Health Organization) shows that there appears to be several basic estimation methods which are "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.

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.

The United States Environmental Protection Agency (USEPA) maintains an extensive database of emission factors[23]. 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 [24] project, has undertaken a considerable effort to develop emission factors which are based on emission measurements from European industries. There is however frequent cross referencing between the two collections.

UNITAR Guidance on Estimating Non-point Source Emissions

The UNITAR Guidance on Estimating Non-point Source Emissions (1998) an introduction to non-point source emissions estimation and explains some of the terminology used 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.

The IPPC Guidelines

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[22] Reference Guide to Emission Estimation Models for Pollutant Release and Transfer Registers, 2000, http://www.unitar.org/cwm/prtr/pdf/cat5/eemodels.pdf

[23] USEPA's databses on emission factos, http://www.epa.gov/ttn/chief/efinformation.html

[24] CORINAIR http://reports.eea.eu.int/EMEPCORINAIR4/en

The UNFCCC has issued the (revised) 1996 IPCC Guidelines[25] to provide assistance in the preparation of national GHG inventories. The Guidelines consists of a series of three volumes:

- 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.

- 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 (CO_2) and methane (CH_4), as well as some other trace gases, from six major emission source categories.

- 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.

4.2.4 Geospatial information and spatial disaggregation.

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

4.2.5 Designating an authority for diffuse source reporting

Each Party shall 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.

[25] IPPC Guidelines http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm

Example: Organisation of the Dutch PRTR "Emissie Registratie"
The Emission Registration is performed under supervision (chairmanship) of the Inspectorate for Environmental Protection of the Ministry of Housing, Spatial Planning and the Environment (VROM-Inspectie: VI) 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 organisations are members of the Co-ordination Committee for the Monitoring of Target Sectors (CCDM), as do the policy directorates of VROM that pursue a target sectors policy. The CCDM conducts the entire process and controls in particular the course of the process. Furthermore, the organisations are members of the working group Emission Monitor (WEM), in which the progress and the co-ordination with respect to reporting are discussed.

On executive level the participating organisations are represented in so-called task groups that collect and process data with the view to calculate for instance the emissions for a target sector or compartment in accordance with agreed methodologies as described in the various method reports and the meta-information sheets. The general methodology has been described in more detail in the section Methods Explanation. The emissions 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 thereupon stored in the central database of the Emission Registration (ER-C) in which the emissions are regionalised and supervised by the RIVM. Finally TNO drafts the report that is approved by the organisations 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 site. Annually a written summary is made, in which a selection of emission data is reproduced that is especially used for monitoring the progress with regard to the objectives of the government concerning the reduction of the emissions. *[http://www.emissieregistratie.nl]*

5. Data management

This chapter gives guidance on how Parties could organise the PRTR data flows. Quality assessment is the responsibility of the Parties which are obliged to validate the PRTR data. Quality assessment is important to assure completeness, consistency and credibility of the data on the releases and transfers of pollutants in the PRTR.

Figure 5.1 illustrates the different data flows.

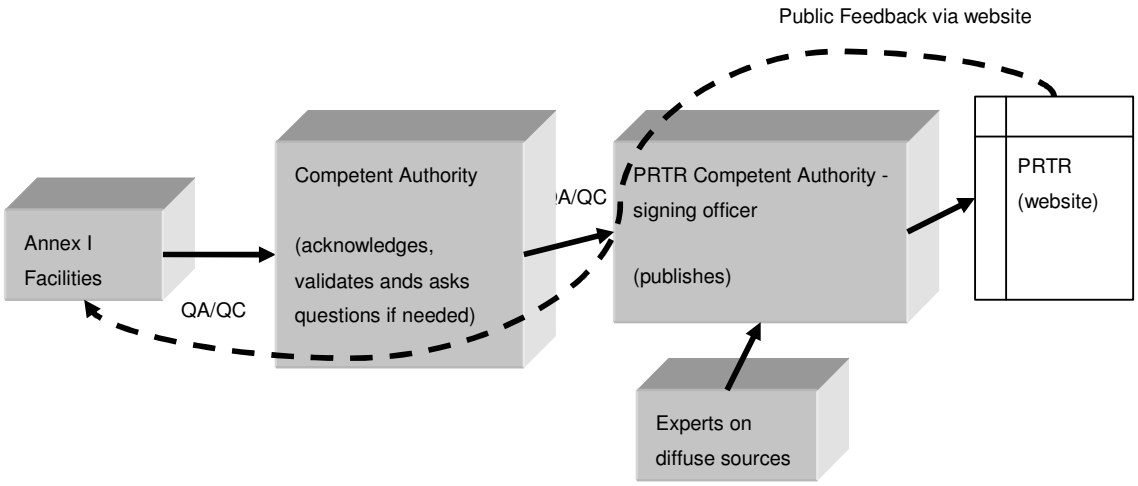


Figure 5.1; Data flows of PRTR data

Important note: the PRTR Protocol assumes that public access to the PRTR data and feedback from the public will result in improvement of the quality of the reported PRTR data. The data review therefore occurs after reporting. Contrary to other international protocols and conventions as UNFCCC and LRTAP the requirements in the PRTR Protocol on Quality Assessment do not include independent review as part of the reporting process. This chapter on data management and quality assessment therefore does not intend to give guidance on data verification but focuses on data validation (see section 5.2.1).

5.1 Data transfer

A Party implementing a PRTR should design the data transfer system to allow a smooth and possibly automated data flow from individual facilities to the competent authorities and to a publicly accessible web site.

5.1.1 Responsibility

Art. 9. Data collection and record-keeping
1. Each Party shall require the owners or operators of the facilities subject to the reporting requirements of article 7 to collect the data needed to determine, in accordance with paragraph 2 below and with appropriate frequency, the facility's releases and off-site transfers subject to reporting under article 7 and to keep available for the competent authorities the records of the data from which the reported information was derived for a period of five years, starting from the end of the reporting year concerned. These records shall also describe the methodology used for data gathering.
2. Each Party shall require the owners or operators of the facilities subject to reporting under article 7 to use the best available information, which may include monitoring data, emission factors, mass balance equations, indirect monitoring or other calculations, engineering judgments and other methods. Where appropriate, this should be done in accordance with internationally approved methodologies.

5.1.1.1 Responsibility in data flows

Each Party is responsible for organizing its national PRTR activities, taking into account the requirements of the PRTR Protocol.

The Parties will collect and register the data on releases and transfers of pollutants per facility in the PRTR on a national level. The transfer of PRTR data should be properly organized to ensure that all quality aspects are met. This means that the allocation of responsibilities to the involved organizations should be based on a transparent framework of agreements. Streamlining the data transfer can be encouraged in several ways and on different levels of aggregation. In general three levels can be distinguished: the facility level, the competent authority level and the national government level of the Party.

Many Parties have already different authorities responsible for the collection of data on releases and transfers from facilities. For small facilities municipal and regional authorities are often the competent bodies, whereas the national authorities can be competent for the larger facilities. Either way a Party should assign one competent authority for the PRTR and arrange the data flows between the different authorities involved.

5.1.1.2 Responsibility of Facilities

The owners or operators of Annex I facilities that are subject to reporting to the PRTR are responsible for:

- the collection of the data needed to determine the facility's releases and off-site transfers (art 9.1) using the best available information, which may include monitoring data, emission factors, mass balance equations, indirect monitoring or other calculations, engineering judgments and other methods. Where appropriate, this should be done in accordance with internationally approved methodologies. (art 9.2)
- keeping records which describe the methodology used for determining the facility's releases and off-site transfers (art 9.1).
- Storing the records of the data from which the reported information was derived available for the competent authorities for a period of five years, starting from the end of the reporting year concerned (art 9.1).
- Assuring the quality of the information that is reported (art 10, 1).
- Reporting to the competent authority

5.1.1.3 Responsibility of competent authority

The competent authority is responsible for:

- Collecting the reports on releases and transfers of pollutants of the Annex I facilities under their area of authority.
- Performing quality assessment, validation (and if possible verification) with regard to the collected PRTR data of the Annex I facilities on releases and transfers of pollutants.

and

- determine the releases and transfers of pollutants of the below threshold facilities of Annex I
- determine the releases and transfers of pollutants of other sources

5.1.1.4 Responsibility of national authority

The national authority is responsible for:

- Publishing the PRTR data on a publicly assessable website.
- Response on public feedback.

5.1.2 Methods of reporting and transmitting data and software solutions

5.1.2.1 Submitting facility data

Parties can use software tools to facilitate and streamline the data transfer. Facility data on releases and transfers of pollutants can be submitted by:

- electronic submission, eg. over the internet
- magnetic or optic media like floppy disks or cd-roms
- paper forms

Submission of the facility data to the competent authorities in an electronic form is most preferable and allows for an automated data flow. An electronic tool can also be enhanced with checks on consistency. Letting facilities submit paper forms to the PRTR is the least preferred way as it is most costly to process and automate and is most prone to errors.

Parties can choose to provide an electronic tool for submitting the facility level data or letting software vendors develop commercial solutions that deliver the data in the required format. The recent reporting to EPER is an example of this. All facilities in Austria have submitted their data by using electronic means. Also the data transfer used in Finland, Italy and Portugal was mainly electronic. The EPA, responsible for the US Toxics Release Inventory (US TRI) also gives guidance on table and data formats to software vendors to develop third party solutions[26] .

5.1.2.2 Relational databases for PRTR's

A PRTR could be stored in an integrated relational database with data on releases and transfers of pollutants. A relational database consists of a collection of tables, each having a unique name. A table includes relationships with other tables forming a relational database.

A relational database structure could support QA/QC issues and prevent a broad range of copying and typing errors by data screening during data input. Exchange of data should be in open formats, like XML. XML (Extensible Markup Language) is a simple, flexible text format derived from SGML (ISO 8879). XML plays an important role in the exchange of a wide variety of data on the internet and elsewhere.

A relatively simple relational database could be built around the structure as given below. Each emission record contains:

[26] EPA, Magnetic Media File Formats for RY2003, February 13, 2004, see http://www.epa.gov/tri/guide_docs/2003/Mag_Media_03.pdf

- A link to a list of pollutants, containing all properties and attributes of each pollutant such as:
    - Thresholds
    - CAS numbers
    - Global Warming Potential
    - Associated types of release
    - etc…

- A link to a list of emission types (emissions to air, emissions to water, offsite transfers of waste water, offsite transfers of waste, ...)

- A link to a list of locations, that either are
    - Facilities for above threshold annex 1 facilities; facility properties and attributes are stored in a table "facilities"

    or
    - Administrative units (competent authorities: municipalities, provinces, ...); administrative unit properties and attributes are stored in a table "Administrative_Units"

- Each facility and administrative unit contains a link to a list of source-categories.

An example of such a structure is illustrated in figure 5.2.

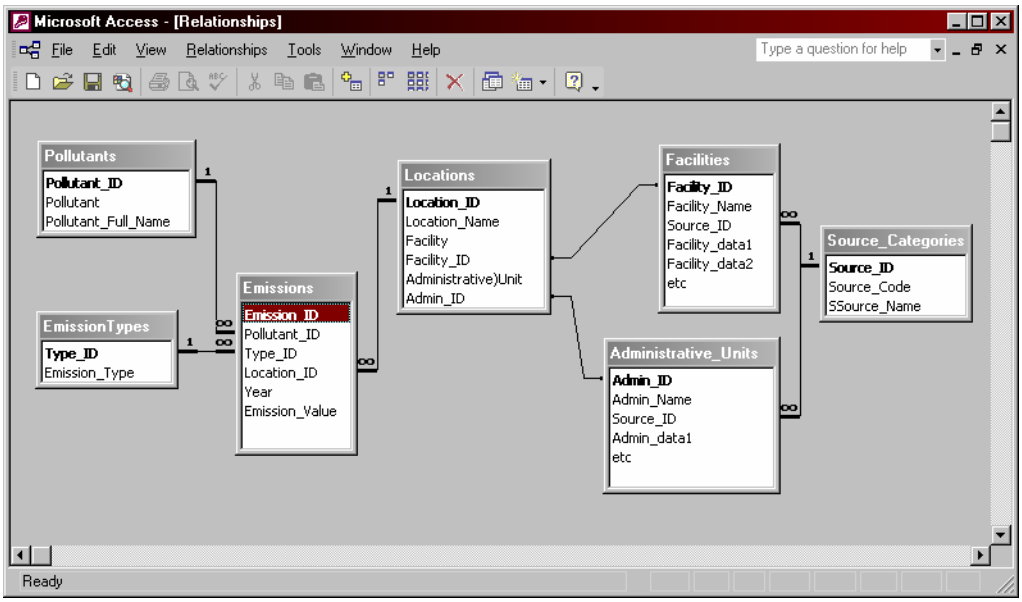


Figure 5.2, relationships in a relatively simple PRTR relational database, screenshot of MS Acces

In developing a PRTR special attention has to be paid to data security. The data in the PRTR web site is to be marked as read- only and is only to be modified by an authorised senior officer of the publising authority.

5.2 Quality assessment

Article 10: QUALITY ASSESSMENT
1. Each Party shall require the owners or operators of the facilities subject to the reporting requirements of article 7, paragraph 1, to assure the quality of the information that they report.
2. Each Party shall ensure that the data contained in its register are subject to quality assessment by the competent authority, in particular as to their completeness, consistency and credibility, taking into account any guidelines that may be developed by the Meeting of the Parties.

5.2.1 Data validation

Validation is an important part of quality assessment, or quality assurance and quality control (QA/QC). Quality assessment is a system of routine activities, to measure and control the quality of the PRTR data as it is being developed. The QA/QC system should be designed to provide routine and consistent checks to ensure data integrity, correctness, and completeness, identify and address errors and omissions and to document and archive PRTR data and to record all QA/QC activities.

The IPCC report on Good Practice and Management of Uncertainties in emission inventories defines validation as follows: "*Validation is the establishment of sound approach and foundation. In the context of emission inventories, validation involves checking to ensure that the inventory has been compiled correctly in line with reporting instructions and guidelines. It checks the internal consistency of the inventory. The legal use of validation is to give an official confirmation or approval of an act or product*."

Validation activities include general methods such as accuracy checks on data acquisition and calculations and the use of approved standardised procedures for emission calculations, measurements, estimating uncertainties, archiving information and reporting. Also validation could include planned systems of review procedures conducted by personnel not directly involved in the PRTR compilation/development process. Reviews verify that data quality objectives were met, ensure that the inventory represents the best possible estimates of releases and transfers of pollutants given the current state of scientific knowledge and data available, and support the effectiveness of the validation. In a PRTR this review is happening by means of public feedback.

The data validation is the responsibility of the Parties. Before publishing the data in the PRTR the Parties should ensure that the data is complete, consistent and reported according to the requirements of the PRTR Protocol and the Guidance Document.

There is a difference between data validation and data verification. Validation focuses on whether or not guidance has been applied correctly. Verification (such as "ground truthing"), while important, is not part of a data collection and dissemination process of a PRTR (see Figure 5.3).

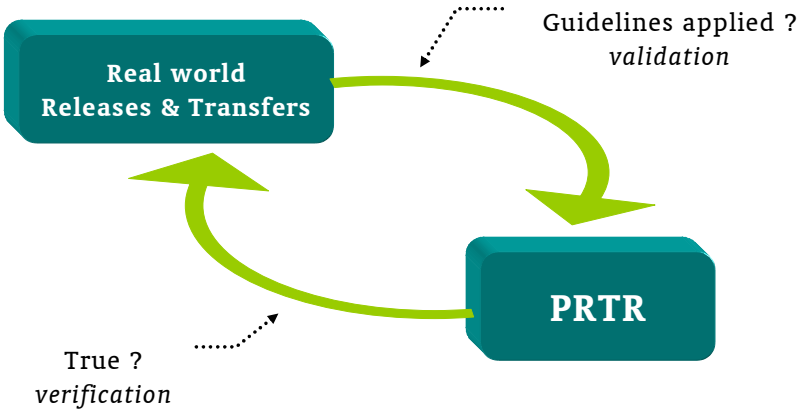


Figure 5.3 , Quality Assessment of PRTR data on releases and transfer of pollutants, the verification takes mainly place by public feedback

Issues related to QA/QC and data validation and quality assessment are completeness, consistency and credibility of the data on the releases and transfers of pollutants.

Completeness can be defined on two aspects:

- information on all (expected) emissions
- all information that is material to users for assessing the reported data on releases and transfers of pollutants. This information should appear in the report in a manner consistent with the declared boundaries, scope, and time period.

Consistency is the unambiguous and uniform use of definitions, source identification and methodologies for the estimation of emissions over several years to allow trend analysis. By using standardised formats, Parties will be able to compare the data with previous data. As facilities might be bought and sold, owners might differ from year to year. Parties are recommended to use a facility identifier that will be consistent over time despite such changes in ownership.

Credibility refers to the trustworthiness, authenticity or reliability of the data. In the context of PRTR's consistency and credibility are closely linked. If the approaches and data sources used in an inventory development project are considered consistent, then users will have an acceptable degree of confidence in the emissions data developed from those techniques.

Another important issue is transparency. Transparency is used to represent the condition of being clear and free from pretence. For the interpretation of the data on releases and transfers of pollutants, it is important to know how the data collection was performed, how the releases and

transfers of pollutants were measured or estimated, which methodology and emission factors were used to estimate emissions, what the units of the reported data are and confirmation that validation was done by the competent authorities. It is the responsibility of the Member States to establish the reporting requirements for industry and the methodologies to be used.

The PRTR should be expandable. The PRTR should be designed in such a way that inclusion of other substances than the 86 Annex II pollutants is possible. The PRTR should also be designed in a way that makes it possible to add other sources, categories etc. A relational database structure allows for this.

Techniques for data validation
Techniques for data validation that can be used are:

- format checks
- completeness checks
- reasonableness checks and limits

Format checks are to ensure that correct formats are used throughout the process of collecting the data of the releases and transfer of pollutants. These checks can be used in the submission of facility level data and also in establishing data of other and diffuse sources.

Completeness checks are to confirm that 1) estimates are reported for all source categories and to check that known data gaps that result in incomplete source category emissions estimates are documented and 2) that all information for assessing the reported data on releases and transfers of pollutants is available and consistent with the declared boundaries, scope, and time period.

Reasonableness checks and limits are to determine that the data on releases and transfers of pollutants not exceed the physical possibilities which can be caused by errors, like errors in using units. Making errors in using tons instead of kg's results in an error of a factor 1000 for example.

5.3 Data presentation

The PRTR must offer an aggregated overview with the national totals of all reported releases and transfers. Presentation of this data must be in both aggregated and non-aggregated forms (art 5, paragraph 1) along three dimensions as:

- Pollutants,
- sources or sectors, and
- administrative units in a spatial aggregation.

The reports with aggregated national totals can be used for other international protocols and will reduce duplication of efforts.

The PRTR register must present the information on releases of pollutants in an adequate spatial disaggregation (art. 7, par 7). For this geographic information systems (GIS) can be used. GIS is a powerful tool which presents layers of information in a geographical way. This implies that the

releases and transfers of pollutants of Annex I facilities are connected with their geographical co-ordinates are shown on the maps, but not all national systems have done so.

In the relational database structure of figure 5.2 such geographical c-ordinates could be stored as properties of the locations (facility or administrative unit).

What's in Your Backyard?
UK's website "What's in Your Backyard" is an example a PRTR with spatial disaggregation. The website gives on-line access to the Environmental Agency's data for England and Wales and acces to the pollution inventory. Further ratings of pollution hazards of local waste facilities and data on water quality discharges to sea, floodplains and landfill sites can be accessed.
http://216.31.193.171/asp/1_introduction.asp

5.4 Time table

The PRTR Protocol sets forth an annual reporting cycle obligation for Parties. However, in consideration of the problems that some Parties may have in setting up a PRTR, including compiling and validating the necessary information, the PRTR Protocol establishes flexibility in incorporation and publication of PRTR data. Parties that are economic integration organisations, such as the EU, report according to a different timetable.

Article 8

1. "Each Party shall ensure that the information required to be incorporated in its register is publicly available, compiled and presented on the register by calendar year. The reporting year is the calendar year to which that information relates. For each Party, the first reporting year is the calendar year after the Protocol enters into force for that Party. The reporting required under Article 7 shall be annual. However, the second reporting year may be the second calendar year following the first reporting year." (emphasis added)

- Different possibilities foreseen under Article 8 of the PRTR Protocol:
  - One year gap between the first reporting year and the second reporting year

Article 8 of the PRTR Protocol establishes an annual reporting cycle. Nevertheless, for the second cycle, the PRTR allows that the second reporting year is the second calendar year following the first reporting year. This option is initially conceived for Parties that would have to put in place a PRTR for the first time and build up the organisational structure from scratch. For countries with experience, such as simplified version of a PRTR in place, it seems more logical to use an annual reporting cycle from the beginning.

  - The calendar for the publication of data: the exception for the regional economic integration organisations.

2. "Each Party that is not a regional economic integration organisation shall ensure that the information is incorporated into its register within fifteen months from the end of each reporting year. However, the information for the first reporting year shall be incorporated into its register within two years from the end of that reporting year."

3. "Each Party that is a regional economic integration organisation shall ensure that the information for a particular reporting year is incorporated into its register six months after the Parties that are not regional economic integration organisations are required to do so."

Article 8 also establishes the timeframe to incorporate data into the Register, i.e., within 15

months from the end of each reporting year or even two years for the first reporting year. Article 8(3) allows regional integration organisations (i.e., the EU) 6 more months to incorporate the data into a PRTR.

As in the case of the reporting cycle, the two-year option is thought to be useful for Parties that would have to put in place this type of register for the first time.

According to the calendar proposed by the PRTR Protocol, the public may not have access to data for the reporting year until 15 months or more[27] after the reporting year, a long delay to achieve the goals of a PRTR. Some countries have succeeded in reducing the time to collect, validate and publish the data to 12 months. Parties where this goal could be achieved should be encouraged to adopt a tighter time scedule.

Example:

Country X ratifies the PRTR Protocol and it enters into force for that Country X in 2006. The first reporting year is therefore 2007. Country X, as a party, has then the option of:

(a) publishing the report in 2008; or

(b) publishing the report in 2009

Country X can then base the second report on data from 2009. For the remaining years, the annual cycle should be respected.

- Proposal for a time table

The publication and dissemination of PRTR data is the end of a long process which starts with the collection of data from the reporting facilities, the validation of data from the competent authorities and the final publication in the Register. Each party should clearly establish a calendar for data collection, validation and publication. The validation of data may take time so Parties should make realistic calendars and make them publicly available.

Phase	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
Collection /notification															
Validation/ notification															
Publication/ dissemination															

- Data compilation: could take place during the first six months of the reporting year: from January until June. Companies will the have to collect data on their releases and transfers and communicate them to the competent authority.

- Data validation: could take place during next six months of the reporting year. This validation will entail in many cases going back to companies and asking for clarifications or new data.

[27] or for regional economic integration organisation, until 21 (or 30, if the option of two years is adopted).

- Data publication: could take place in the first three months of the next reporting year. For decentralised systems, the central competent authority may first have to gather all national information from the regional authorities.

Countries making use of the options of skipping one year can developed other calendars, e.g., data could be collected during the whole reporting year, nine months can be used for the validation of data and publication can take place the last three months.

Part III Data Dissemination and Public Acces

6. Data Dissemination

6.1 Making PRTR data accessible

The PRTR Protocol's main objective is to enhance public access to information (Article 1). The Protocol was created on the basis of Article 5.9 of the Aarhus Convention and is part of the Convention's pillar on access to information and in particular the dissemination of environmental data. Data accessibility is therefore one of the crucial issues for proper implementation of the Protocol.

The obligations set forth in the Protocol can be summarized as follows:

(1) The information is easily publicly accessible by electronic means, and when this is not possible, by effective non-electronic means;
(2) The information contained in the register is accessible without having to state an interest; and
(3) Access to the information contained in the register is free of charge.

Different parts of the Protocol affirm that the register is meant to be an electronic database and it should therefore be accessible by electronic means. Alternatives are to be provided where this is not possible. This obligation, however, does not refer to the dissemination as such of the data contained in the register but to the accessibility of the register.

Accessibility is a broad term that implies not only physical access to the information but also presentation of that information in a form that is easy to use and understand. Accessibility entails that the Register (as an electronic database) is easy to find; that the citizen can easily locate specific information he or she is interested in within the register; and that such information is presented in a way that is comprehensible (i.e. not presented in an obscure fashion). This applies both to registers accessible through electronic means and registers accessible by other effective means.

It is clear that the Parties should aim at establishing a system where the PRTR information is disseminated through an easily accessible user-friendly website through Internet. However, this will not always be possible due to economic and technical constraints. From the wording of the Protocol it also seems clear that Parties should always leave open the possibility for access upon request. This interpretation is also in line with the Aarhus Convention.

In order to ensure that the accessibility is effective, the Party should inform potential users of the existence of the website and the register along with the places where it can be consulted, for example, via mass media (for other details see section 7).

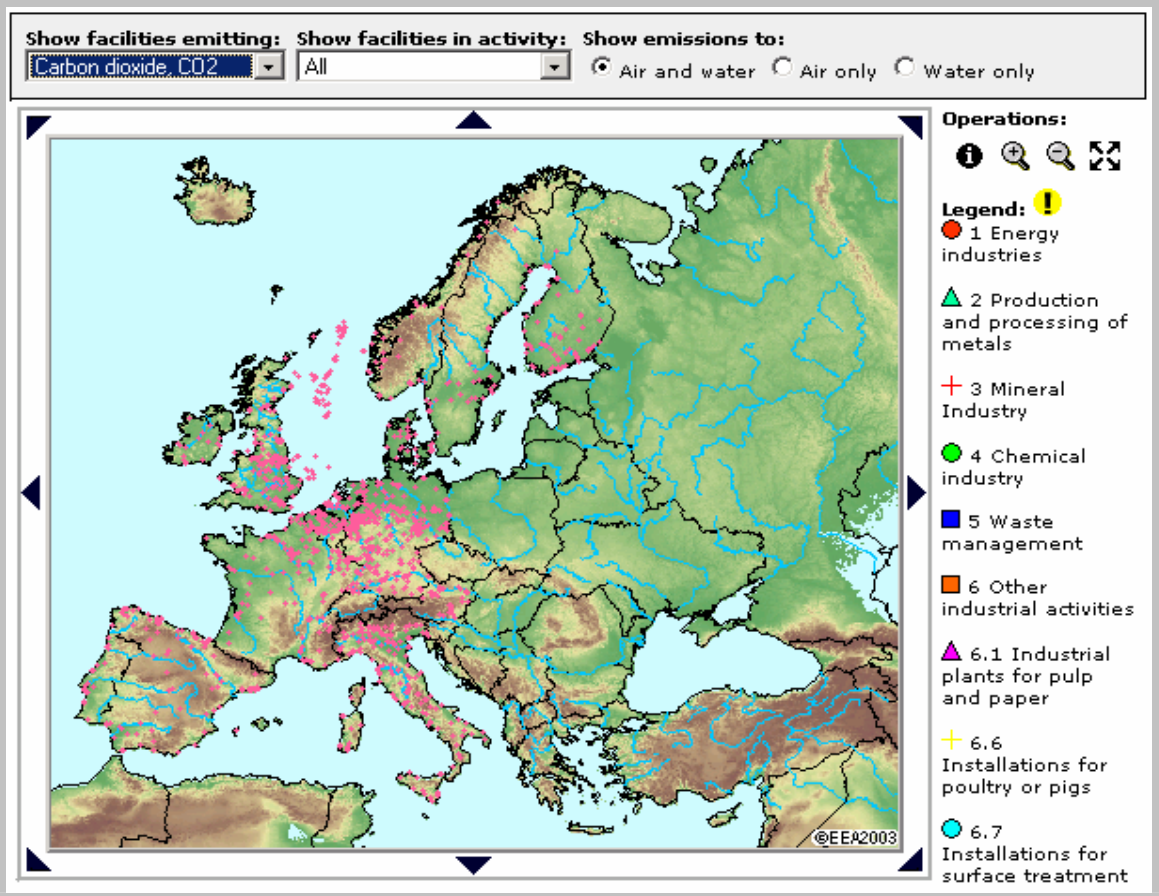
Electronic means

Article 11.1 of the Protocol obliges Parties to ensure that the Register is publicly accessible via direct electronic access through public communication networks. The goal behind this Article is a computerized register, the information of which is available through Internet (or in the future

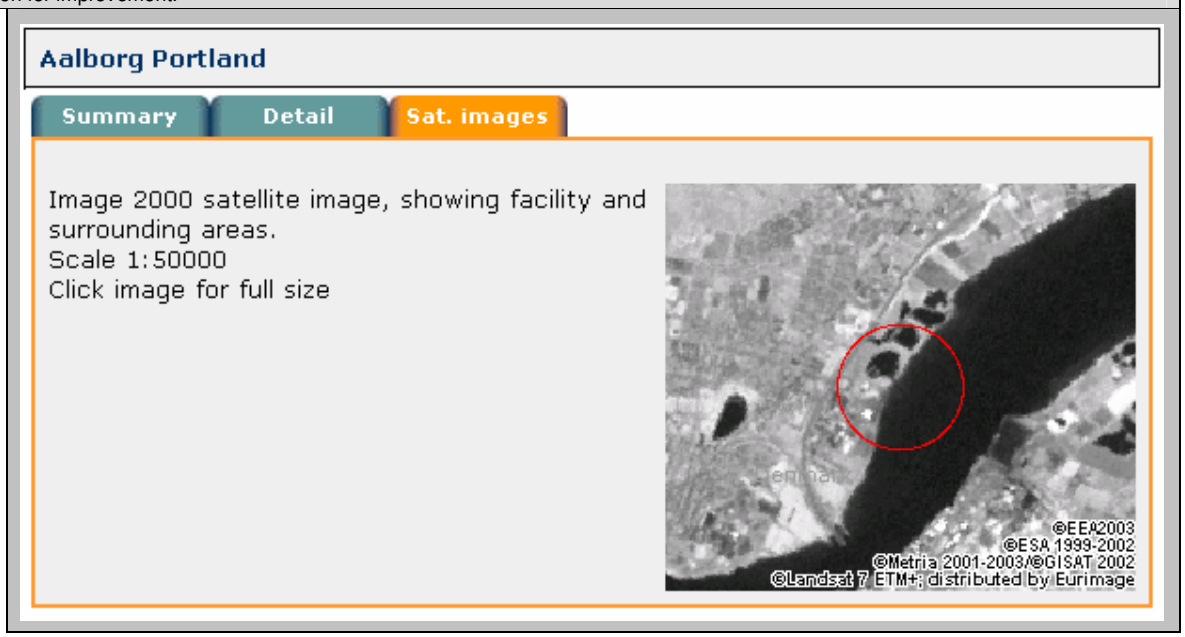
other more developed public communication networks). In fact, the Internet is specifically mentioned in Article 5.4. This implies the creation of a website which provides access to all the PRTR information. Furthermore, an electronic database available through Internet is the most suitable form to ensure that the information is "continuously and immediately available" (as the Protocol intends).

According to Article 4(h), the design of the Register, and therefore the website, should be user-friendly and ensure accessibility. The way the information is presented should be a reflection of the structure of the register, allowing for individual searches by pollutant, media, facility and geographic area. The EPER web site pictured below provides an example. The most user-friendly formats are probably interactive electronic maps or GIS systems where the user can identify his/her neighbourhood and the locations of reporting facilities (as colored spots) close to that area. Further links with information about the facility, pollutants and so on could be then accessed through this first identification.

EPER Website



The EPER website was the result of the joint efforts of the European Commission, the European Environment Agency and the EU Member States. This website allows research by map, media (for the moment only air and/or water), facility and industrial activity. Information on the facility includes satellite photographs of facility locations (see next page). Users can download reports by country from the site, data in XML, and background information. It includes description of key substances, their impacts on human health and the environment as well as the relevant EPER reporting thresholds. For the time being the website is only available in English, but it is under revision for improvement.



The national PRTR website should be in the national language or languages. In addition, at least basic information of interest to the international community could be provided in English.[28]

Article 11.2 and 11.3 introduces the obligation to provide this information with out an interest to be stated and free of charge. This obligation will probably be addressed mainly when dealing with individual requests to access to PRTR data, but it is pertinent to mention it in cases of access to direct electronic means as well.

When a PRTR website has been developed and is accessible through the Internet, the Party should not ask citizens seeking information, as a condition for access to the website, to state why that they want access to the information. While such information cannot used to control access, it can be useful feedback to be obtained on a voluntary basis.

Non-electronic means

As mentioned, an Internet-based register will not always be easily publicly accessible. In many countries, only a limited number of citizens may have ready access to a computer and the internet. Where this is the case, if the register is available only via electronic means, large sections of the public would not have access to PRTR data. The PRTR Protocol has foreseen

[28] This is proposed in the "Recommendation on the more effective use of electronic information tools to provide public access to environmental information", to be considered for adoption by the Second Meeting of the Parties in Almaty. http://www.unece.org/env/documents/2005/pp/wg.1/ece.mp.ppwg.1.2005.7.e.pdf

these cases and has provided for alternatives.

Facilitating electronic access

> **Article 11.5:**
>
> "Where the information contained in its register is not easily public accessible by direct electronic means, each Party shall facilitate electronic access to its register in publicly accessible locations, for example in public libraries, offices of local authorities or other appropriate places." (emphasis added)

The wording of the article clearly refers to "facilitate electronic access". The Protocol foresees here situations where the general public does not have electronic tools, such as computers, or where access to Internet is not easy. This could be the case in many countries, including many high-income countries, where only a limited sector of the population has access to Internet at reasonable price or knows how to use it, especially among certain age groups.

In these cases, the Parties shall facilitate electronic access in publicly accessible locations. The Protocol provides two examples: public libraries and offices of local authorities. This of course assumes that libraries and local authorities have computers linked to the Internet, which may not be the case. Such access, however (and this is the case for accessibility in any appropriate location) has to be made publicly known, for example by posting on the portal website of the library (computer desk-top) the link to the PRTR.

> **Public locations for environmental information**
>
> *The OSCE Centres*: On 26 February 2004 OSCE made a call for the creation of a network of environmental centres to be set up in five Central Asian States (at the Third Regional Seminar on the Implementation of the Aarhus Convention in Central Asia, held in Dushanbe). These centres could also provide information on PRTRs as well as access to PRTR websites.
>
> *The Ireland ENFO Centre*: ENFO is a national service that disseminates information on environmental matters. Information materials produced by ENFO are available in many public offices throughout the country, including local authority offices, public libraries, motor tax offices and some university and school libraries. ENFO also prepares teacher resource packs. Its web site provides a searchable library database, environmental tips for the home, thematic materials, and links to the web sites of environmental agencies, businesses and NGOs. This web site is in both English and Gaelic.

Opportunity for using other public locations may differ from one country to another. These public locations can include the offices of regional authorities (in particular those in charge of environmental issues), regional ministries of environment, regional and national environmental agencies and authorities, universities or even at city halls. The location should be in a place where the public would logically and naturally go to obtain environmental information. This possibility could also be expanded to places where health information can be obtained.

Accessibility upon request

The second possibility foreseen by the PRTR Protocol, in cases where PRTR information is not easily publicly accessible by direct electronic means, is accessibility upon request.

> **Article 11.2:**
>
> "Where the information contained in its register is not easily publicly accessible by direct electronic means, each Party shall ensure that its competent authority upon request provides that the information by any other effective means, as soon as possible and at the latest within one month after the request has been submitted." (emphasis added)

In this case, the person wishing the information must ask for it. This is the case not only where there is no accessibility through electronic means because the register is not available as an electronic database on the Internet, but also where the public does not have broad access to Internet. It can also be the case if there is information that has been kept confidential by the competent authority.

The procedure is very similar to that under the Aarhus Convention. Any person wanting to obtain information contained in the PRTR will have access without having to explain why he/she wants to have access to that information. It is important that there is a clear competent authority to whom the person can address his/her request. This competent authority has to be easy to identify, for example, by designating at all levels of government and in all regions, a person whose email, address and telephone number are available. Another possibility is to create hotlines or information points where the public can obtain information about the person responsible or even PRTR data.

Requesting information

The UK Environment Agency includes on its website a section on "Your Right to Know" with specific information on the"*How to make a request for information"* toolkit, including a telephone number, links to make a request for information online or find the local office, an enquiry form and the address of the nearest Environment Agency office to address a query.

Once the information has been requested, the competent authority is obliged to answer within one month. The objective is to ensure that the public is informed in a prompt manner. In many cases, this will depend on the means used to transfer the information, which will have to be adapted to the necessities of the person requesting the information.

If the information requested is already available and does not require any preparation from the public authority, the time-limit should considerably be reduced. If some elaboration is required or the authority addressed does not hold the information, the time-limit of one month may be reasonable.

Other means

Although the PRTR is, or aims to be, an electronic database, electronic means will not always be effective to disseminate and make accessible PRTR data. As has been mentioned, not everybody owns a computer or has access to Internet connections. Thus Parties should consider other means to disseminate PRTR information.

Most countries that have PRTRs or similar systems publish annual PRTR-based reports (including the USA, UK, Netherlands, Canada and now the EU under its EPER system). These reports summarize the information at national level and also include analyses and describe trends, as well as provide some comparison of facilities and regions, identifying the largest pollutant or the most polluted regions. These reports can reach specific sectors of the public, provide overview information, and can also reduce the costs of having to deal with particular requests for information.

In countries where computers are scarce or access to Internet is difficult, paper versions are even more important for dissemination of the PRTR data. Such reports will also facilitate the authorities' task of fulfilling requests for information. When the person requesting access to

PRTR data has a computer but not access to internet, for example, a CD Rom containing the PRTR information and maps can be a solution.

When such electronic supports do not exist, the Party should prepare paper versions of national information or more specific information affecting an area. In many cases the paper versions cannot be as comprehensive or detailed, or if they are, not as easy to read as the Internet or electronic versions. Electronic versions provide multiple tools for research and allow for compilation of information in ways not always be possible in paper versions. Annual reports (at national, regional and/or local level) that compile PRTR data and address issues that could be of importance for the general public may ease dealing with requests for information.

Other means of dissemination include the provision of PRTR information and analyses based thereon to the media or via television teletexts.

Making PRTR information available through reports:

The CEC's "Taking Stock". The North American Commission for Environmental Cooperation (CEC) is an international organization created by the North American Agreement on Environmental Cooperation, the environmental side agreement to the North American Free Trade Agreement (NAFTA), signed by Canada, Mexico and the US. The CEC publishes *Taking Stock*, an annual trinational report on chemical pollution from industrial facilities.

Taking Stock 2001 is the eighth in the CEC's Taking Stock series on sources and management of industrial pollutants in North America. Its analyses are based on 1995–2001 data from the US Toxics Release Inventory (TRI) and the Canadian National Pollutant Release Inventory (NPRI). Results from 2001, trends over the seven years from 1995 to 2001 and from 1998 to 2001 are presented. (In English, French and Spanish)

EPER Review Report: According to the EPER decision, the European Commission reviews the reporting process and its results after each reporting cycle. The first EPER Review Report evaluates 2001 reporting and data delivered in the then 15 Member States as well as Norway and Hungary, and compares EPER data with national data for selected greenhouse gases and air pollutants.

Spanish regional reports: Spain has so far not developed a GIS system for PRTR information, but each Autonomous Community has developed reports with facility information, similar to what could be obtained from a PRTR website. These reports provide an example of a first step for a system where a website is not fully operative or where internet access is not widely spread.

Costs to Users

Article 11.3: "Subject to paragraph 4, each Party shall ensure access to information contained in this register is free of charge"

Article 11.4: "Each Party mat allow its competent authority to make a charge for reproducing and mailing the specific information referred to in paragraph 2, but such charge shall not exceed a reasonable amount." (emphasis added)

In principle, and according to Article 11.3, access to PRTR information is free of charge. However, Article 11.4 allows the Parties to charge up to a reasonable amount for reproduction of and mailing the specific information requested. This could be the case for example, when the competent authority has to develop a specific report or CD Rom or has to mail the requested information to the concerned person.

The PRTR Protocol does not specify the maximum amount that could be charged. It only says that it has to be reasonable. Many countries consider that the charge should not exceed the costs of producing or reproducing the documents. Therefore, if the documents already exist, the only chargeable cost would be the cost of mailing the report.

6.2 Confidentiality

The objective of the PRTR Protocol is to make information on polluting emission accessible. Although in principle all information available will be disseminated, Article 12 sets forth the conditions under which certain information on the register may be withheld from public view. The article is not mandatory. Each Party can decide whether to apply confidentiality criteria or, on the contrary, to make all emissions data accessible. This is, for example, the case for EPER data.

Article 12

1. Each Party may authorize the competent authority to keep information held on the register confidential where the public disclosure of that information would adversely affect:

(a) International relations, national defence or public security;

(b) The course of justice, the ability of a person to receive a fair trial or the ability of a public authority to conduct an enquiry of a criminal or disciplinary nature;

(c) The confidentiality of commercial and industrial information, where such confidentiality is protected by law in order to protect a legitimate economic interest;

(d) Intellectual property rights; or

(e) The confidentiality of personal data and/or files relating to a natural person if that person has not consented to the disclosure of the information to the public, where such confidentiality is provided for in national law."

The aforementioned grounds for confidentiality shall be interpreted in a restrictive way, taking into account the public interest served by disclosure and whether the information relates to releases into the environment.

The structure of Article 12 is very similar to that of the Aarhus Convention's provisions on confidentiality. However, the grounds for confidentiality retained by the PRTR Protocol are more limited than those of the Aarhus Convention, which contains three additional grounds for confidentiality compared to the PRTR Protocol. The additional grounds were considered during the negotiations of the PRTR Protocol but in the end were discarded as being irrelevant or inappropriate in the context of a PRTR.

Article 12's wording has other differences from its parallel in the Aarhus Convention, especially in relation to the protection of economic interests as a specific ground for confidentiality. As a consequence of these differences, although the Protocol contains fewer grounds for confidentiality, its Article 12 provides greater scope for confidentiality than its homologue in the Aarhus Convention.

Article 12 of the Protocol contains five exceptions for confidentiality. These are presented in the table, along with an overview of their use in practice in existing PRTR systems.

GROUND FOR EXCEPTION	USE IN PRACTICE
(a) international relations, national defense or public security;	• Used infrequently
(b) the course of justice, the ability of a person to receive a fair trial or the ability of a public authority to conduct an enquiry of a criminal or disciplinary nature;	• Used infrequently
(c) The confidentiality of commercial and industrial information, where such confidentiality is protected by law in order to protect a legitimate economic interest;	• Used by companies when information on chemicals substances could give advantage to competitors concerning production process and efficiency : mostly used in pollutant specific systems in reporting transfers
(d) Intellectual property rights; or	• Used by companies when information on chemicals could give advantage to competitors concerning the composition of certain preparations and products
(e) The confidentiality of personal data and/or files relating to a natural person if that person has not consented to the disclosure of the information to the public, where such confidentiality is provided for in national law.	• Used by individual farmers e.g., pig and poultry farms, whose farm is also a residence

The two grounds that are more likely to be claimed by companies or individuals are: confidentiality of commercial and industrial information (Article 12.1(c)); and confidentiality of personal data (Article 12.1 (e)). These grounds will be dealt with in more detail below.

In order for certain information reported by a company or individual to be kept confidential and not disseminated in the PRTR system, the reporting company or individual must make a specific request. When a request for confidentiality is made by a facility on one of the Article 12.1 grounds, the competent authority must take a decision on that request that strikes a balance between the private interest to keep the information confidential and the public interest to know that particular information. The last paragraph of Article 12.1 requires that the grounds for keeping data confidential must be interpreted strictly.

Two aspects should be taken into account by a competent authority when dealing with confidentiality claims:

(1) The public interest served by disclosure

(2) Whether the information relates to releases into the environment.

The basic presumption under the PRTR Protocol is that all the information is public. This presumption places the burden of proving the existence of a real threat to the commercial or other interest on the company or person alleging the threat. In these cases, the company or individual should provide reasons to substantiate his/her claim, so that the competent authority can then verify whether there are genuine concerns. If there is no real danger for the private interest in disseminating the information, the competent authority should refuse the claim and allow the public access to the data.

If the assessment indicates that there is a genuine threat to the commercial or private interest, the competent authority must decide whether the public interest to know the information overcomes the private interest to keep the information confidential. If the information has already been made publicly available, e.g., under other programs, permits or reporting requirements, the confidentiality claim should be refused. This will imply an effort of coordination among

different authorities.

The wording of the PRTR Protocol suggests that only the chemical name could be kept confidential.

In any case, those countries where PRTRs or similar systems are in place report only a few cases per year where it has been decided to keep some information confidential. For example, for the 2000 reporting year in the USA's TRI, only three out of 91,513 reports were listed as trade secrets reports. For the 1999 reporting year in Canada's NPRI, only 6 out of 8,595 reports were kept confidential.

If a Party decides to allow withholding of information on the basis of one of the Article 12.1 grounds for confidentiality, it can be helpful to develop specific guidelines on how to apply the exceptions. The guidelines would include: the cases where each ground could apply, how to strike a balance between the public interest for disclosure (in this case, to make the information publicly available in the PRTR website) and the private interest to keep the information confidential, what type of information can be kept confidential, e.g., only the chemical name or only the name/address of the company, and how to present the reasons for the information being kept confidential. However, even with the help of guidelines, the exceptions cannot be automatically applied. In each case, there should be an analysis of each of the claims presented, keeping in mind that the exceptions have to be strictly applied.

In many cases, the facility requesting confidentiality will have a right to appeal a negative decision. The public, however, can also challenge the decision of the competent authority to grant confidentiality under Article 14 of the PRTR Protocol, if for example a request for access to data kept confidential is refused. More generally, for Parties to the Aarhus Convention, there should be no doubt about the existence of a right to access to justice in these cases (as already mentioned in Chapter 2).

Confidentiality of commercial or industrial information

Economic interests are the most likely ground for confidentiality that will be claimed by industrial facilities. In fact, this has been almost the only reason for granting confidentiality in countries with PRTRs or similar systems[29].

The wording of this provision in the PRTR Protocol is slightly different than the wording of the Aarhus Convention and it provides broader ground for confidentiality.

The Aarhus Convention states that "A request for environmental information may be refused if the disclosure would adversely affect (…) (d) the confidentiality of commercial or industrial information, where such confidentiality is protected by law in order to protect a legitimate economic interest. Within this framework, information on emissions which is relevant for the protection of the environment shall be disclosed". Article 12 of the PRTR Protocol states:

[29] The importance of this ground of confidentiality is clear. For instance, the Commission for Environmental Cooperation (CEC) of North America, in the framework of its North American Pollutant Release and Transfer Register (PRTR) Project, issued a paper on Confidential Business Information comparing USA, Canada and Mexico systems (Issue paper #2: "Confidential Business Information", December 2002

"1. (c) The confidentiality of commercial and industrial information, where such confidentiality is protected by law in order to protect a legitimate economic interest;"

"2. Within the framework of paragraph 1(c), any information on releases which is relevant for the protection of the environment shall be considered for disclosure according to national law." (Emphasis added)

In the Aarhus Convention context, once proved that the information is relevant to the protection of the environment (and in the case of PRTR this is obvious), the information has to be disclosed. In the context of the PRTR Protocol, once proved that the information is relevant for the protection of the environment, the information shall be considered for disclosure, and thus submitted to an evaluation in order to consider whether it should be disclosed or not. This provides greater potential for granting confidentiality.

The difference is related to the different contexts of the Convention and the Protocol. The Aarhus Convention refers to confidentiality in terms of passive dissemination (access to information upon request), whereas the PRTR Protocol does so in terms of active dissemination. Therefore, as a prior step, it is up to the competent authority responsible for PRTR data to decide whether the data concerned should be made publicly available or not. At the same time, in the context of the Protocol, all information included in the Register will intrinsically be relevant for the protection of the environment, due to the purposes and functioning of this type of register. This could explain the difference in the wording, as application of the same wording as in the Aarhus Convention will mean that the exception would be virtually inapplicable in practice.

In the case of off-site transfers, confidentiality on the ground of commercial and industrial interest would only be relevant when the information could serve to deduce by chemical inversion the production process and efficiency of the facility, and this could only happen in pollutant-specific reporting.

The competent authority should in any case bear in mind the obligation to restrictively interpret the grounds for confidentiality. As shown earlier in this section, cases where data has been kept confidential on the ground of trade secret are few.

Forms for Claiming Trade Secrecy

The US EPA has developed a five-page form for claiming trade secrecy of information to be submitted to the TRI. The US EPA determines that the claim is frivolous, it may assess a penalty of up to $25,000 per claim. If the information provided is false or misleading, the claimant can be punishable with a fine and/or imprisonment.

Personal data: problems with farmers

Article 12

(e) The confidentiality of personal data and/or files relating to a natural person if that person has not consented to the disclosure of the information to the public, where such confidentiality is provided for in national law. (…)

This ground for confidentiality will mainly be claimed by individual farmers, especially where diffuse sources of pollution from agriculture are reported in the PRTR. As it is now, mainly owners of pig and poultry farms would be affected. The competent authority may however decide that information on the name and address is not provided as a private residence but rather

as the domicile of an economic activity and therefore should not be subject to confidentiality.

Nonetheless, real concerns may exist for particular cases. For example, in the UK data about individual farmers has been kept confidential due to threats of eco-terrorist attack. This is a very exceptional case. The Netherlands has kept other information confidential as a way of ensuring the veracity and accuracy of data reported. This approach, however, does not seem to be in line with PRTR goals. Do not know if appropriate for inclusion. Ask UK and Netherlands

Presentation of information kept confidential

Article 12.3

Whenever the information is kept confidential according to paragraph 1, the register shall indicate what type of information has been withheld through, for example, providing generic chemical information if possible, and for what reason it has been withheld."

The presentation of information that has been kept confidential may vary depending on the type of information. Where the name of the chemical is kept confidential, the chemical family or similar generic information should be provided. For example, one proposal to group the 86 pollutants into broad categories would list: heavy metals (no. 17-24), gaseous substances (no. 1-11, 14-16), pesticides (no. 25-30), chlorinated organic substances/parameters (AOX, Trichloromethane, dioxins, etc), other organic substances/parameters (Anthracene, Benzene, PAH, etc.) and other inorganic substances/parameters (hydrogen cyanide, total nitrogen, PM10, chlorides, etc.).

Where personal data is kept confidential, all information except the name, address of the operator/owner and the geographical location of the facility should be given. Geographical information might be presented at a broader scale (e.g., 10km instead of 1km), or at least the region where the facility operates.

In any case, the register should clearly mention, maybe in the portal of each search, the number of cases where confidentiality has been applied and the reasons for which the information has been withheld. The explanation should not be limited to indicate the ground that has served to withheld the information i.e., protection of economic interest. Rather, it should explain the reasons for which it was considered that disclosing the information will negatively affect the economic interest of the facility and the inexistence of an overriding public interest. For example, one legitimate ground could be that disclosure of the name of the chemical plus the quantities released will allow competitors to deduce by chemical inversion the production process and efficiency of the facility.

Limiting confidentiality

In some countries, a form has been created for confidentiality claims, and only some specific data can be kept confidential.

For example, in USA only the chemical name can be kept confidential on the basis of commercial and industrial interest. All other information, such as the facility name and address and the amounts of releases and transfers, is included in the database. A generic name for the chemical is substituted.

In the current EPER system (at EU level) no EPER information is confidential, therefore, in principle neither the chemical nor the name and coordinates of the company can be kept confidential. Furthermore, the EU has recently adopted new legislation on access to information implementing the Aarhus Convention going beyond it to state that information relating to emissions "may not" be kept confidential.

The proposal for a Regulation to establish a European PRTR refers to Directive 2004/3/EC on Access to Environmental Information when dealing with confidentiality. It seems that the intention is to broadly interpret "information relating to emissions" and therefore not to allow confidentiality claims based on commercial and industrial information or protection of personal data. (However some concerns exist on the way Directive 2004/3/EC will work once combined with Directive 95/46/EC on protection of personal data).

6.3 Using PRTR information

Using PRTR information

PRTR data are useful for all sectors of society, including government, enterprises, NGOs, other stakeholders, workers or the general public.

- General public: PRTR data will help the public to be better informed and therefore to better participate in the decision making process for environmental issues. This will enhance democracy in general and environmental democracy in particular. The public may also pressure poorly performing companies to improve contributing to pollution reduction. PRTR data will help the public have information about pollution in their neighborhood and thus to gain knowledge of local health issues.

- Governments: PRTR data are useful to monitor facility compliance with permit requirements as well as national implementation of international commitments, such as plans for the reduction of greenhouse gas emissions. For example, PRTR systems could be linked to data needed for national and international emissions trading schemes. PRTR data help to identify activities that contribute to a specific environmental problem and consequently adopt more efficient regulatory action.

- Enterprises: reporting and estimation models will help companies to gain a better idea of their performance and efficiency thereby stimulating the introduction of more efficient processes which will in turn increase competitiveness. Furthermore, as information is provided for all facilities, PRTRs will help companies to better compare their performance with that of their direct competitors, creating an incentive for action (investment in more efficient technologies and processes). Making releases and transfers information publicly available will help to increase company accountability

Showing how PRTR data can be used:

USEPA prepared in May 2003 a paper on "How are the Toxic Inventory Release Data Used" containing success stories from governments, academia, business and citizens on the use of PRTR information.

Putting PRTR information into context

The PRTR Protocol is mainly a tool for citizens. PRTR data can only be useful if properly explained and put into context. Lay persons have to be able to approach PRTRs and the data in order to make analyses and draw conclusions. If those to whom it is addressed are unable to understand it, they will not be able to use it. A clear and attractive presentation of the data is essential to give incentives to citizens to approach and use PRTRs

As mentioned before, accessibility also entails that the information is understandable for all who consult a PRTR. This is especially important for information in PRTRs, as many pollutants are not well-known to lay persons. Putting PRTR information into context is implicit in the obligation to make PRTR information accessible. As mentioned before, co-operation with NGOs, civil organizations and the industrial sector will enhance the accessibility of the PRTR system by identifying the users' needs.

- Explanations of pollutants: Explanations should be geared to the general public. For example, clicking on a pollutant name, a box or a link to another website could provide users with the information to understand the type of substance and its properties

- Pollutant effects on health (environmental quality and impacts): Information on a pollutant should be supplemented by a clear explanation of its relationship to health effects. Many countries already have experience providing information on levels of ozone and other local air pollutants. Similar information can be provided for each pollutant including also the levels at which the pollutant is considered a health risk.

- Economic sectors and permit requirements: Descriptions of the weight of an economic sector in contributing to total emissions of certain pollutants can be also useful for the general public, especially for pollutants that are of general concern. Inclusion of information about permit requirements, e.g., the amount of a pollutant a company is authorized to release, will help the public interpret the information and identifying well-performing companies.

Putting PRTR information into context

The Environment Agency for England and Wales and Friends of the Earth worked together to improve the official Pollutant Emission Inventory, adding a Geographical Information Systems (GIS) for users to locate polluting facilities as well as other features. This cooperation was a success, and with the improvements Friends of Earth closed its own Factory Watch web site.

The England and Wales pollution inventory provides fact sheets on pollutants under its "What's in your backyard" glossary. The information includes symbols indicating the potential hazards of each substance (e.g., health problems, local effects, global effects), sources of its releases to the environment, its Pollution Inventory Classification, links to explain terms used, the scientific name, other names, including trade names, CAS number, why the substance was selected for the Pollution Inventory, properties, potential uses, standard risk phrases for substances, possible local environmental impacts, possible global environmental impacts, possible health concerns, controlling legislation and international agreements and links for further information.

Linking PRTRs to supporting information

Article 5.5: "Each Party should provide links, in its register to its relevant existing publicly accessible databases on subject matters related to environmental protection"

Since PRTRs are intended to be electronic databases, PRTR websites have the potential to become portals to environmental information, linking not only different PRTR data but also other relevant environmental and ancillary information that may be spread over different databases whose existence is not well known to the public. The PRTR Protocol has foreseen this and suggests (though this is not an obligation) that Parties link their PRTR systems to other accessible data bases on subject matters related to environmental protection.

Links to supporting websites dealing with health and pollutants issues could include (see more

details in Chapter 7):

- International organizations dealing with PRTRs or other pollutant emissions or release data and methods: in addition to UNECE website, other links can go to OECD, UNITAR, IOMC, North American Commission for Economic Co-operation and WHO.

- Issues of direct interest for the purposes of a PRTR: for example, to registers of chemicals covered by international conventions, such as the POPs Convention and to international health and environment guidelines. These registers could furthermore be a first step in convergence of the waste-specific and pollutant-specific PRTR systems.

Links to Companies and Civil Society:

While it is important to put PRTR data into context, sometimes it is difficult to provide all the information in a single website. Links to company and NGO websites can provide further information.

This can help to address concerns expressed by some companies that presentation of isolated PRTR data can create misleading impressions of their environmental performance. Links could be provided to company websites that put the information into context. Each company's site could describe, for example, the conditions of its permit or whether it is releasing pollutants within or below the permit requirements.

Other links could be provided to NGOs and other associations that use PRTR data: their sites could provide more information about the significance of the data, including health effects and name and shame efforts related to the PRTR Protocol or to the Aarhus Convention in general.

Providing links to supporting information

The UK Pollution Inventory website links not only to other national and international PRTR websites but also to international conventions dealing with specific substances, guidance documents, other national agencies providing additional information, such as DEFRA, NGOs working in a specific area (for example links to Environmental Defence Scorecard) and even scientific institutions or companies where further information can be obtained.

6.4 Links to other PRTR databases

The PRTR is supposed to be a computerized database. However, the PRTR Protocol allows for the Parties to link several databases where relevant PRTR information can be found, allowing Parties cost savings in putting in place a PRTR system. A national PRTR website thus might simply be a link to a regional PRTR website. Parties that already have in place specific registers or websites dealing with pollution, for example in a specific media such as air, may wish to link these into a national PRTR.

Article 4: "In accordance with this Protocol, each Party shall establish and maintain a publicly accessible national pollutant release and transfer register that: … (j) is a structured, computerised database or several linked databases maintained by the competent authority."

Article 5.6: "Each Party shall provide links in its register to the pollutant release and transfer registers of other Parties to the Protocol and, where feasible, to those of other countries."

List of Internet links that could be included in a PRTR web site:

- Other national, regional or international PRTR websites: The parties have the obligation to provide links to PRTRs of other Parties. Where feasible, the Parties are also obliged to provide links to PRTRs of countries that have not ratified the Protocol. These links could include the future E-PRTR, USA's TRI, Canada's NRPI, the Netherlands, UK, Japan, Australia and so on. The creation of Regional PRTRs could reduce the efforts and therefore the costs for many countries in setting up a PRTR (see section 7).

- Other register websites: the Parties can also provide links to specific registers dealing with other issues related to environmental protection in general and more precisely to pollution. These websites can be national or international. Examples include, for air pollution, the EMEP website, and existing websites on accidental releases or diffuse sources of pollution at national or regional level (even if not in a format compiling with PRTR Protocol requirements).

7. Building Capacity & Public Awareness

Effective implementation of a PRTR system will require capacity building. A national initiative to develop a PRTR is thus an opportunity to review and strengthen relevant capacity in public authorities as well as in stakeholders, in particular the industries and facilities reporting to the register as well as the groups that will use its information. Moreover, public awareness and use are needed for a PRTR to function, so raising public awareness is closely tied to capacity building. The PRTR Protocol addresses both issues in Article 15:

Article 15
CAPACITY-BUILDING

1. Each Party shall promote public awareness of its pollutant release and transfer register, and shall ensure that assistance and guidance are provided in accessing its register and in understanding and using the information contained in it.
2. Each Party should provide adequate capacity-building for and guidance to the responsible authorities and bodies to assist them in carrying out their duties under this Protocol.

Section 7.1 below reviews capacity building and Section 7.2 discusses public awareness. The PRTR Protocol also links International Co-operation with capacity building: this is the topic of Section 7.3.

7.1 Capacity building and public awareness raising

The PRTR Protocol addresses countries with a range of economic conditions and different institutions and legal systems for environmental management. The scale and type of capacity building and awareness raising activities needed with thus differ. Some countries, including those with economies in transition, will face important challenges in strengthening their institutions, including those for areas such as environmental monitoring and information systems (UNECE, 2003).

Each country acceding to the Protocol will need to integrate capacity building and awareness raising activities into its overall strategy for PRTR development. Experience across countries has shown that several areas for capacity building have proved crucial in PRTR development (IOMC, 2003). Based on this experience, countries developing PRTRs should pay close attention to the following issues:

- Developing an appropriate national legal framework;
- Ensuring adequate financial means;
- Developing capacity on the part of reporting facilities to monitor or estimate pollutant releases and transfers accurately;
- Strengthening public authorities' human and technical capacity to process pollution data and to manage PRTR databases and web sites; and
- Ensuring effective cooperation among government and other institutions involved.

Methods for capacity building can include workshops and training for government officials and

for key stakeholder actors and representatives. In many countries, national research institutes and universities can play an important role developing appropriate methods and providing training. The use of international experience – through both multilateral forums as well as bilateral technical assistance – can also be quite valuable. Once a national PRTR system is in place, it can benefit from mechanisms to review its performance and provide for steady improvement.

Strengthening government capacity

Countries beginning PRTR development may benefit strongly from cooperation with Parties that already have a system in place. International organizations such as UNITAR can also provide important expertise in planning. Funding for the early stages of PRTR development may be necessary. In general, international cooperation can help the body proposing a PRTR to build support across levels and sectors of government.

Initiatives to strengthen government capacity for PRTRs will be more successful if they are linked to efforts to strengthen related areas, such as industrial permitting and monitoring. Here, countries may need to improve communication and coordination among authorities. Different national bodies may be responsible for monitoring pollution to different media, such as air and water. In decentralized systems, coordination may need to be strengthened between national and sub-national agencies responsible for pollution monitoring (see Section 2.1). This has been the case in EECCA countries, some of which are developing unified monitoring systems to strengthen coordination. PRTR development can provide a further opportunity for such efforts (UNECE, 2003).

Improving the information technology base and capacity of environmental authorities will also be important. Ties with sub-national authorities will also be important, as these may have close knowledge of and working relationships with main polluting facilities. In this context, a strong pilot PRTR, hosted by an active regional government, will be useful to build momentum for introducing a national PRTR. The local or regional officials who have gained experience in piloting the regional PRTR can help to share skills with their colleagues in other regions.

Ensuring effective reporting by facilities

An effective PRTR depends on timely and accurate reporting from facilities. National authorities may need to develop:

- Appropriate reporting forms and methods – indeed, PRTRs can provide an opportunity to improve existing reporting methods, e.g. through on-line reporting; and
- Guidance documents for technical issues related to pollution monitoring or estimation (these can in particular be based on Part II of this report).

Pilot PRTR projects can help test and refine these methods. Moreover, workshops and discussions with representatives from reporting facilities will be useful to ensure that the methods are understood. Industry associations can play an important role in disseminating methods and possibly also in providing training. It may be useful to focus attention first on sectors with high emissions – these commonly include energy, chemicals, oil refining, and ferrous and non-ferrous metals.

When the European Union established its EPER system, EU officials held workshops and met

with authorities in each Member country to review implementation requirements (see section 2). In addition, in Germany, implementing officials held two rounds of national workshops with all relevant stakeholders, including facility representatives, to review EPER requirements. The first workshops were held at the introduction of the new system, to explain the reporting requirements. The second were held in conjunction with the first reporting cycle, to help resolve technical questions in monitoring, estimating and submitting pollution data.

7.2 Raising public awareness

A PRTR system is not effective unless it is used by the public and by key stakeholders (as seen at section 6). Thus, raising public awareness is an essential element in PRTR development and implementation.

It is important for public authorities to define the public and stakeholders as broadly as possible. Potential users to be informed and encouraged to participate in PRTR development can include (based on EcoForum, 2003):

- Environmental NGOs;
- Industry and economic associations;
- Workers and management at industrial facilities;
- Public health institutions and groups;
- Teachers, students and educational groups;
- Neighborhood community groups ; and
- The press, in particular interested journalists.

Just as important, the general public needs to be aware of the PRTR and its potential uses. Press contacts and press releases are a key method to seek the attention of newspapers, TV channels and other news organizations. The graphic elements of PRTRs, such as map-based information, can provide an interesting element for news stories. Officials should consider innovative channels for reaching the public, such as television teletext services.

Different forms of awareness raising can take place at different stages of PRTR development (Ahrens, EEB, in OECD, 2000):

- Stakeholders should be informed of plans for the *design and development of a PRTR*, to encourage their participation in the development process and their support for implementation (this could be posted in Register's website).
- The *launch* of a new PRTR is a key moment to raise public awareness, for example through press releases and other attention-getting activities. An effective launch will create momentum for ongoing use. For example, the European Union's EPER web site was visited by over 100,000 users in its first three months. In Hungary, authorities invited the press to the March 2004 launch of the national EPER site.
- The *Regular updates (usually annual)* of a PRTR are also opportunities to renew interest, for example through press releases that summarize major developments in pollution levels. Information notes could be tailored to different interests, such as pollution levels in particular areas or releases from specific industries. These can be linked to other information, such as

dissemination of local air quality levels.

In addition, many types of users will be interested in PRTR information between updates. Journalists and researchers, for example, may use PRTR information for in-depth articles about specific facilities, industries, or localities. (Ahrens in OECD, 2000)

Publicity for PRTRs

The European Commission and European Environment Agency organised a launch event for the inauguration of the EPER web site. The press was invited, as well as representatives of governments, industrial sectors and NGOs. The event was announced on the front page of DG Environment web site. Some news organizations, including the BBC, described the event and provided electronic links to the EPER site from their own web sites. Posters, T-shirts, brochures, a video, which can now be seen at EPER website, and mouse pads were also distributed in the promotional campaign.

7.3 International Co-operation

Article 16
INTERNATIONAL COOPERATION

1. The Parties shall, as appropriate, cooperate and assist each other:
(a) In international actions in support of the objectives of this Protocol;
(b) On the basis of mutual agreement between the Parties concerned, in implementing national systems in pursuance of this Protocol;
(c) In sharing information under this Protocol on releases and transfers within border areas; and
(d) In sharing information under this Protocol concerning transfers among Parties.
2. The Parties shall encourage cooperation among each other and with relevant international organizations, as appropriate, to promote:
(a) Public awareness at the international level;
(b) The transfer of technology; and
(c) The provision of technical assistance to Parties that are developing countries and Parties with economies in transition in matters relating to this Protocol.

Under the Protocol, international cooperation is an important mechanism for implementation, and is closely tied to capacity building, information exchange, and public awareness, as well as convergence among PRTR systems.

International Organizations Working on PRTRs

The work of several international organizations may be useful to Parties establishing PRTR systems: some have developed guidance documents, and others organize workshops and provide training.

The UN Economic Commission for Europe (UNECE) hosts the Secretariat for the Aarhus Convention and its PRTR Protocol. UNECE also runs several related activities, such as work under the "Environment for Europe" Programme to strengthen environmental monitoring and reporting in EECCA countries. The Aarhus Secretariat at UNECE has set up a Clearinghouse, through which countries can exchange information on needs and technical assistance

opportunities.[30]

The UN Institute for Training and Research (UNITAR) has developed resource documents and guidance for PRTR development and has also organized workshops in developing countries. UNITAR has compiled both its own materials and those of many countries and international organizations in a CD-ROM. UNITAR also runs a web-based "virtual classroom" for PRTRs.[31]

The Organisation for Economic Co-operation and Development, which brings together 30 Member countries with advanced economies, has worked on PRTRs for almost 10 years. OECD has recommended their use in Member countries. OECD has developed guidance documents for PRTRs, covering both overall implementation as well as technical issues such as emissions estimation.

OECD and UNITAR work together on PRTRs in the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), along with five other international organizations: the Food and Agriculture Organization of the United Nations (FAO); the International Labour Organization (ILO); the United Nations Environment Program (UNEP); the United Nations Industrial Development Organization (UNIDO); and the World Health Organization (WHO). IOMC's group on PRTRs seeks to improve coordination between international organizations, governments and other interested parties in ongoing and planned efforts for PRTR development and implementation.[32]

Other organizations working on PRTRs include the North American Commission for Environmental Cooperation (CEC), which has supported Mexico in its PRTR development. The Regional Environmental Center for Central and Eastern Europe has organized workshops to raise awareness and build capacity for PRTR development in Member countries. The REC has also assisted countries to undertake pilot PRTR studies and initiatives (IOMC, 2003).

Bilateral technical assistance

There are several examples of bilateral co-operation for PRTRs, both within the UNECE region and globally. For example, the Netherlands sponsored workshops in EU accession countries and in Central and Eastern European countries prior to the signing of the Protocol. Environment Canada (working with UNITAR) has supported a project in Chile, and Norway in Zambia.

Overall, however, the IOMC concludes that "international financial and technical support for PRTR development remains small", and it calls on both multilateral institutions and bilateral donors to integrated PRTR initiatives into their major funding programs (IOMC, 2003).

The Aarhus Clearinghouse provides a central electronic means to exchange information on laws and practices related to the Aarhus Convention, including the development of national PRTRs. This can be a key mechanism to exchange information on specific needs and opportunities for bilateral co-operation.

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[30] See http://aarhusclearinghouse.unece.org/resources.cfm

[31] See http://www.unitar.org/cwm/b/prtr/index.htm

[32] See http://www.who.int/iomc/groups/prtr

International PRTR systems

The PRTR Protocol encourages information sharing among Parties, in particular for transboundary transfers as well as in border areas (Article 16). There are already a few examples of transboundary PRTRs.

Most notable is the EU's EPER system, which collects and presents emissions data from EU Member countries.[33] EPER currently provides information across 15 countries, and its future versions will cover at least 25 EU Members. While several EU Member countries have their own EPER or PRTR web sites, others refer users to the EPER site. The EPER system is being revised into the E-PRTR, which will fulfill the requirements of the PRTR Protocol. EPER may provide a model for other sub-regional groups, which could share resources for a common PRTR web site. However, individual countries should undertake their own non-electronic means of dissemination (see Chapter 6).

The North American Commission for Environmental Cooperation (CEC) operates the Taking Stock database, which brings together data from the U.S. Toxic Release Inventory and the Canadian National Pollutant Release Inventory (and, as it becomes available, data from the Mexican Registro de Emisiones y Transferencia de Contaminantes).[34]

In at least two cases, pollution inventories have been developed for shared ecosystems. The Great Lakes Commission, which brings together eight US states and two Canadian provinces, has set up a Regional Air Toxics Emissions Inventory to cover releases. The participating US states and provinces provide data for the inventory, which will be available to the public via an on-line interface scheduled for development at the end of 2004.[35]

In Europe, the International Commission for the Protection of the Danube River has assembled an inventory of water pollution releases to the Danube River basin. In 2004, data for 2000 were available via an on-line, map-based interface.[36]

Raising awareness at international level

Countries may find it useful to pool their resources for international programs to raise public awareness. The Regional Environmental Center in Szentendre, Hungary, has worked to raise awareness and encourage development of PRTRs in Central and Eastern European Countries.

Efforts to raise public awareness at international level have been carried out mainly by environmental NGOs and NGO coalitions. The European ECO forum, a coalition of 200 environmental NGOs, has disseminated information on the PRTR protocol, including an explanatory booklet, to encourage international public support.

Convergence

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[33] See http://www.eper.cec.eu.int/

[34] See http://www.cec.org/takingstock/highlights/PRTR-CEC.cfm

[35] See http://www.glc.org/air/

[36] See http://www.icpdr.org

The convergence of PRTR systems will be a key task for international co-operation within the context of the PRTR Protocol. Article 3 of the Protocol, on General Provisions, states that "Parties shall strive to achieve convergence among national pollutant release and transfer registers." This call is taken up in Article 17 on the Meeting of the Parties: Paragraph 3 refers to convergence between the two types of PRTR system, pollutant-specific and waste-specific (see Chapter 2). Paragraph 2(a) has a more general call to "Review the development of pollutant release and transfer registers, and promote their progressive strengthening and convergence." The Protocol thus sets a long-term goal of convergence between different PRTR systems, tied to efforts to review and strengthen national PRTRs.

On a sub-regional basis, the North American Commission for Environmental Cooperation has promoted comparability between the three North American PRTR systems through regular studies as well as an Action Plan adopted in 2002. Moreover, since 1996 the U.S. TRI and Canadian NPRI have taken a series of steps to improve the comparability of their data and reporting.

In Europe, the development of the E-PRTR will create a harmonized common PRTR across all Member countries of the European Union.

Convergence is a long-term goal under the Protocol. Already in the short-term, the PRTR Protocol will promote further environmental co-operation among UNECE countries. Overall, the Protocol is a remarkable development that has come out of the Aarhus Convention and the broader Environment for Europe process. It will join other international agreements in encouraging public access to information and public participation in decision-making on the environment, and it will also help to reduce pollution across the UNECE region.

Annexes

1. Glossary and Table of definitions

1.1 Glossary

Abbreviations

BAT	:	Best Available Technology
BREF notes	:	BAT reference documents
BTEX	:	Benzene, Toluene, Ethyl Benzene and Xylenes
CAS	:	Chemical Abstract Service
CEC	:	Commission for Environmental Corporation
CEFIC	:	Cefic - European Chemical Industry Council
CEN	:	European Committee for Standardization
CRF	:	Common Reporting Format (UNFCCC reporting)
EECCA	:	Eastern Europe Caucasus and Central Asia
EPER	:	European Pollutant Emission Register
E-PRTR	:	European PRTR
EU	:	European Union
ICCA	:	International Council of Chemical Associations
IOMC	:	Inter-Organisation Programme of Sound Management of Chemicals
IPCC	:	Intergovernmental Panel on Climate Change
IPPC Directive	:	Integrated Pollution Prevention and Control Directive
ISIC	:	International Standard Industrial Classification
ISO	:	International Organization for Standardization
LRTAP	:	Convention on Long Range Transboundary Air Pollutants
MARPOL	:	International Convention for the Prevention of Pollution from Ships
MPU	:	Manufacture, use or process, in relation to the employee approach on selecting facilities and using thresholds.
NFR	:	Nomenclature for reporting (UNECE LRTAP reporting format)
NGO	:	Non Governmental Organisation
NMVOC	:	The generic term for the sum of all Non Methane Volatile Organic Compounds. The group includes individual VOCs such as benzene, polycyclic aromatic hydrocarbons (PAHs) and 1,3-butadiene
NPRI	:	Canada's National Pollutant Release Inventory
OECD	:	Organisation For Economic Corporation and Development
OSPAR	:	Oslo and Paris Commission
POP	:	Persistent Organic Pollutant
PRTR	:	Pollutant Release and Transfer Register
QA/QC	:	Quality Assurance and Quality control
RET	:	Release estimation technique
SME	:	Small and medium-sized enterprises
TEQ	:	Toxic Equivalent (dioxins and furans)

TOC	:	Total organic carbon
TRI	:	Toxic Release Inventory (US)
UNCED	:	United Nations Conference on Environment and Development
UN-ECE	:	United Nations Economic Committee for Europe
UNFCCC	:	United Nations Framework on Climate Change
UNITAR	:	United Nations Training Programme
WWTP	:	Waste Water Treatment Plant
XML	:	Extensible Markup Language

1.2 Definitions

Definitions from Article 2 of the PRTR Protocol

"**Competent authority**" means the national authority or authorities, or any other competent body or bodies, designated by a Party to manage a national pollutant release and transfer register system;

"**Convention**" means the Convention on Access to Information, Public Participation in Decision making and Access to Justice in Environmental Matters, done at Aarhus, Denmark, on 25 June 1998;

"**Diffuse sources**" means 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;

"**Facility**" means one or more installations on the same site, or on adjoining sites, that are owned or operated by the same natural or legal person;

The terms "**national**" and "**nationwide**" shall, with respect to the obligations under the Protocol on Parties that are regional economic integration organizations, be construed as applying to the region in question unless otherwise indicated;

"**Off-site transfer**" means the movement beyond the boundaries of the facility of either pollutants or waste destined for disposal or recovery and of pollutants in waste water destined for waste-water treatment;

"**Party**" means, unless the text indicates otherwise, a State or a regional economic integration organization referred to in article 24 which has consented to be bound by this Protocol and for which the Protocol is in force.

"**Pollutant**" means a substance or a group of substances that may be harmful to the environment or to human health on account of its properties and of its introduction into the environment;

"**The public**" means one or more natural or legal persons, and, in accordance with national legislation or practice, their associations, organizations or groups;

"**Release**" means any introduction of pollutants into the environment as a result of any human activity, whether deliberate or accidental, routine or non-routine, including spilling, emitting, discharging, injecting, disposing or dumping, or through sewer systems without final waste-water treatment;

"**Waste**" means substances or objects which are:

(a) Disposed of or recovered;

(b) Intended to be disposed of or recovered; or

(c) Required by the provisions of national law to be disposed of or recovered;

"**Hazardous waste**" means waste that is defined as hazardous by the provisions of national law;

"**Other waste**" means waste that is not hazardous waste;

"**Waste water**" means used water containing substances or objects that is subject to regulation by national law.

Definitions based on the EU EPER Decision

"**Emission**" is the direct release of a pollutant to air, soil and water as well as the indirect release by transfer to an off-site wastewater treatment plant.

"**Reporting cycle**" is the cycle of the total reporting process, consisting of the collection, validation, submission, management and dissemination of the reported data.

"**Site**" is the geographical location of the facility.

"**Substance**" means any chemical element and its compounds, with the exception of radioactive substances.

Definitions from the EU IPPC Directive

"**Emission**" shall mean the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into the air, water or land;

"**Operator**" shall mean any natural or legal person who operates or controls the installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated.

"**Pollution**" shall mean the direct or indirect introduction as a result of human activity, of substances, vibrations, heat or noise into the air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment.

Definitions from the EU Proposal for an E-PRTR

"**Channelled releases**" means the releases of pollutants into the environment through any kind of pipe, regardless of the shape of its cross-section.

"**Installation**" means a stationary technical unit where one or more activities listed in Annex I are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution.

"**Reporting year**" means the calendar year for which data on releases of pollutants and off-site transfers must be gathered.

2. Further Reading

United Nations Institute for Training and Research (UNITAR) http://www.unitar.org/cwm/prtr/UNITAR.htm

International Guidance Documents on PRTR Design

Title	Date	Language
Implementing a National PRTR Design Project	1997	English Spanish
Supplement 1: Preparing a National PRTR Infrastructure Assessment	1997	English Spanish
Supplement 2: Designing the Key Features of a National PRTR System	1997	English Spanish
Supplement 3: Implementing a PRTR Pilot Reporting Trial	1997	English Spanish
Supplement 4: Structuring a National PRTR Proposal	1997	English Spanish
Addressing Industry Concerns Related to PRTRs	1998	English

Estimation and Reporting of Emission Releases

Title	Date	Language
Guidance for Facilities on PRTR Data Estimation and Reporting	1998	English
Estimating Environmental Releases for Facility PRTR Reporting: Introduction and Guide to Methods - The Hampshire Research Institute for UNITAR	1997	English
Guidance on Estimating Non-point Source Emissions	1998	English

International PRTR Conferences, Workshops and Related Events

Title	Date	Language
Memorias del Taller Sobre el registro de Emisiones y Transferencia de Contaminantes Para los Paises de las Americas, 29-31 de julio 1997, Queretaro, Mexico - UNITAR, OECD, SEMARNAP, CEC, UNEP	1998	Spanish Memoria 1 Memoria 2 Memoria 3 Memoria 4 Memoria 5 Memoria 6 Memoria 7 Anexo 1 Table

PRTR Websites

Title	Website
UNITAR Training and Capacity Building Programme to Facilitate the Design and Implementation of National Pollutant Release and Transfer Registers (PRTRs)	Online Version Offline (PDF) Version

3. Analytical procedures for 86 pollutants

In table A3.1 – A 3.3 indicative lists are given of standardized analytical procedures for the measurement of some of the 86 PRTR pollutants of Annex II in releases and transfers to air, water and land. When no standardized analytical procedure is given it means that there is (yet) no aggreement on an international level on how to determine the pollutant and one should look for national used procedures.

3.1 Standardized analytical procedures for the determination of pollutants of Annex II released to air

Table A3.1 gives an indicative list of measurement methods of pollutants to air.

Table A3.1 indicative list of standardized analytical procedures for the determination of the 86 pollutants of Annex II in releases and transfers to air, water and land.

			Air ()
No.	CAS number	Pollutant	
1	74-82-8	Methane (CH4)	
2	630-08-0	Carbon monoxide (CO)	ISO 12039:2001
3	124-38-9	Carbon dioxide (CO2)	ISO 12039:2001
4		Hydro-fluorocarbons (HFCs)	
5	10024-97-2	Nitrous oxide (N2O)	
6	7664-41-7	Ammonia (NH3)	
7		Non-methane volatile organic compounds (NMVOC)	EN 12619:1999
			EN 13526:2001
			EN 13649:2001
8		Nitrogen oxides (NOx/NO2)	ISO 10849:1996,
			ISO 11564:1998,
9		Perfluorocarbons (PFCs)	
10	2551-62-4	Sulphur hexafluoride (SF6)	
11		Sulphur oxides (SOx/SO2)	ISO 7934:1989, ISO 7935:1992, ISO 11632:1998
12		Total nitrogen	
13		Total phosphorus	
14		Hydrochlorofluorocarbons (HCFCs)	
15		Chlorofluorocarbons (CFCs)	
16		Halons	
17	7440-38-2	Arsenic and compounds (as As)	EN 14385:2004
18	7440-43-9	Cadmium and compounds (as Cd)	EN 14385:2004
19	7440-47-3	Chromium and compounds (as Cr)	EN 14385:2004
20	7440-50-8	Copper and compounds (as Cu)	EN 14385:2004
21	7439-97-6	Mercury and compounds (as Hg)	EN 13211:2001
22	7440-02-0	Nickel and compounds (as Ni)	EN 14385:2004
23	7439-92-1	Lead and compounds (as Pb)	EN 14385:2004
24	7440-66-6	Zinc and compounds (as Zn)	
25	15972-60-8	Alachlor	
26	309-00-2	Aldrin	
27	1912-24-9	Atrazine	
28	57-74-9	Chlordane	
29	143-50-0	Chlordecone	

			Air ()
No.	CAS number	Pollutant	
30	470-90-6	Chlorfenvinphos	
31	85535-84-8	Chloro -alkanes, C10-C13	
32	2921-88-2	Chlorpyrifos	
33	50-29-3	DDT	
34	107-06-2	1,2-dichloroethane	
35	75-09-2	Dichloromethane	
36	60-57-1	Dieldrin	
37	330-54-1	Diuron	
38	115-29-7	Endosulphan	
39	72-20-8	Endrin	
40		Halogenated organic compounds (as AOX)	
41	76-44-8	Heptachlor	
42	118-74-1	Hexachlorobenzene (HCB)	
43	87-68-3	Hexachlorobutadiene (HCBD)	
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	
45	58-89-9	Lindane	
46	2385-85-5	Mirex	
47		PCDD + PCDF (dioxins + furans) as Teq	EN 1948-1:1996 / EN 1948-2:1996 / EN 1948-3:1996
48	608-93-5	Pentachlorobenzene	
49	87-86-5	Pentachlorophenol (PCP)	
50	1336-36-3	Polychlorinated biphenyls (PCBs)	
51	122-34-9	Simazine	
52	127-18-4	Tetrachloroethylene (PER)	
53	56-23-5	Tetrachloromethane (TCM)	
54	12002-48-1	Trichlorobenzenes (TCBs)	
55	71-55-6	1,1,1-trichloroethane	
56	79-34-5	1,1,2,2-tetrachloroethane	
57	79-01-6	Trichloroethylene	
58	67-66-3	Trichloromethane	
59	8001-35-2	Toxaphene	
60	75-01-4	Vinyl chloride	
61	120-12-7	Anthracene	
62	71-43-2	Benzene	
63		Brominated diphenylethers (PBDE)	
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	
65	100-41-4	Ethyl benzene	
66	75-21-8	Ethylene oxide	
67	34123-59-6	Isoproturon	
68	91-20-3	Naphthalene	
69		Organotin compounds (as total Sn)	
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	
71	108-95-2	Phenols (as total C)	
72		Polycyclic aromatic hydrocarbons (PAHs) b/	ISO 11338-1:2003 ISO 11338-2:2003
73	108-88-3	Toluene	
74		Tributyltin and compounds	
75		Triphenyltin and compounds	
76		Total organic carbon (TOC) (as total C or COD/3)	
77	1582-09-8	Trifluralin	
78	1330-20-7	Xylenes	
79		Chlorides (as total Cl)	
80		Chlorine and inorganic compounds (as HCl)	EN 1911-1:1998
			EN 1911-2:1998
			EN 1911-3:1998
81	1332-21-4	Asbestos	ISO 10397:1993
82		Cyanides (as total CN)	
83		Fluorides (as total F)	
84		Fluorine and inorganic compounds (as HF)	
85	74-90-8	Hydrogencyanide (HCN)	
86		Particulate matter (PM10)	ISO 9096:2003, ISO 10155:1995, ISO 12141:2002, ISO 14164:1999,

			Air ()
No.	CAS number	Pollutant	
			EN 13284-1:2001 EN 13284-2:2004

ISO 12039:2001, Stationary source emissions -- Determination of carbon monoxide, carbon dioxide and oxygen -- Performance characteristics and calibration of automated measuring systems
ISO 12039:2001, Stationary source emissions -- Determination of carbon monoxide, carbon dioxide and oxygen -- Performance characteristics and calibration of automated measuring systems
EN 12619:1999 Stationary source emissions - Determination of the mass concentration of total gaseous organic carbon at low concentrations in flue gases - Continuous flame ionisation detector method
EN 13526:2001 Stationary source emissions - Determination of the mass concentration of total gaseous organic carbon in flue gases from solvent using processes - Continuous flame ionisation detector method
EN 13649:2001 Stationary source emissions - Determination of the mass concentration of individual gaseous organic compounds - Activated carbon and solvent desorption method
ISO 10849:1996, Stationary source emissions -- Determination of the mass concentration of nitrogen oxides -- Performance characteristics of automated measuring systems
ISO 11564:1998, Stationary source emissions -- Determination of the mass concentration of nitrogen oxides -- Naphthylethylenediamine photometric method
ISO 7934:1989, Stationary source emissions -- Determination of the mass concentration of sulfur dioxide -- Hydrogen peroxide/barium perchlorate/Thorin method
ISO 7935:1992, Stationary source emissions -- Determination of the mass concentration of sulfur dioxide -- Performance characteristics of automated measuring methods
ISO 11632:1998, Stationary source emissions -- Determination of mass concentration of sulfur dioxide -- Ion chromatography method
EN 14385:2004 Stationary source emissions - Determination of the total emission of As, Cd, Cr, Co, Cu, Mn, Ni, Pb, Sb, Tl and V
EN 14385:2004 Stationary source emissions - Determination of the total emission of As, Cd, Cr, Co, Cu, Mn, Ni, Pb, Sb, Tl and V
EN 13211:2001 Air quality - Stationary source emissions - Manual method of determination of the concentration of total mercury
EN 1948-1:1996 Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs - Part 1: Sampling
EN 1948-2:1996 Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs - Part 2: Extraction and clean-up
EN 1948-3:1996 Stationary source emissions - Determination of the mass concentration of PCDDs/PCDFs - Part 3: Identification and quantification
ISO 11338-1:2003, Stationary source emissions -- Determination of gas and particle-phase polycyclic aromatic hydrocarbons -- Part 1: Sampling
ISO 11338-2:2003, Stationary source emissions -- Determination of gas and particle-phase polycyclic aromatic hydrocarbons -- Part 2: Sample preparation, clean-up and determination
EN 1911-1:1998 Stationary source emissions - Manual method of determination of HCl - Part 1: Sampling of gases
EN 1911-2:1998 Stationary source emissions - Manual method of determination of HCl - Part 2: Gaseous compounds absorption
EN 1911-3:1998 Stationary source emissions - Manual method of determination of HCl - Part 3: Absorption solutions analysis and calculation
ISO 10397:1993, Stationary source emissions -- Determination of asbestos plant emissions -- Method by fibre count measurement
ISO 9096:2003, Stationary source emissions -- Manual determination of mass concentration of particulate matter
ISO 10155:1995, Stationary source emissions -- Automated monitoring of mass concentrations of particles -- Performance characteristics, test methods and specifications
ISO 12141:2002, Stationary source emissions -- Determination of mass concentration of particulate matter (dust) at low concentrations -- Manual gravimetric method
ISO 14164:1999, Stationary source emissions -- Determination of the volume flowrate of gas streams in ducts -- Automated method
EN 13284-1:2001 Stationary source emissions - Determination of low range mass concentration of dust - Part 1: Manual gravimetric method
EN 13284-2:2004 Stationary source emissions - Determination of low range mass concentration of dust - Part 2: Automated measuring systems

3.2 Standardized analytical procedures for the determination of pollutants of Annex II in water

Table A3.2 gives an indicative list measurement of pollutants to water.

Table A3.2 indicative list of standardized analytical procedures for the determination of the 86 pollutants of Annex II in releases and transfers to water.

No.	CAS number	Pollutant	Standard	Analytical method	Working range
1	74-82-8	Methane (CH4)		Only in air	
2	630-08-0	Carbon monoxide (CO)		Only in air	
3	124-38-9	Carbon dioxide (CO2)		Only in air	
4		Hydro-fluorocarbons (HFCs)		Only in air	
5	10024-97-2	Nitrous oxide (N2O)		Only in air	
6	7664-41-7	Ammonia (NH3)		Only in air	
7		Non-methane volatile organic compounds (NMVOC)		Only in air	
8		Nitrogen oxides (NOx/NO2)		Only in air	
9		Perfluorocarbons (PFCs)		Only in air	
10	2551-62-4	Sulphur hexafluoride (SF6)		Only in air	
11		Sulphur oxides (SOx/SO2)		Only in air	
12		Total nitrogen	DIN 38409-27	Oxid. or Red./Chemolumin,	over 0,5 mg/l
			EN 12260	Oxidation / Chemolumin.	0,5 -200 mg/l
			EN ISO 11905-1	Oxidation with Peroxodisulfat	0,02 - 5 mg/l
13		Total phosphorus	ISO 15681-1/-2	Peroxodisulfat, FIA/CFA	0,1 -10 mg/l
			EN 1189	Peroxodisulfat, Photometry	0,005 - 0,8 mg/l
14		Hydrochlorofluorocarbons (HCFCs)		Only in air	
15		Chlorofluorocarbons (CFCs)		Only in air	
16		Halons		Only in air	
17	7440-38-2	Arsenic and compounds (as As)	ASTM D5673	ICP-MS	over 1 µg/l
			EN ISO 11969	Hydrid-AAS	1 -10 µg/l
		DIN 38406-29 should be deleted, because by 02/2005 it is planed to replace it by DIN EN ISO 17294-2	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0.08 mg/l
18	7440-43-9	Cadmium and compounds (as Cd)	ASTM D5673	ICP-MS	over 0,1 µg/l
			EN ISO 5961	ET-AAS	0,3 - 3 µg/l
			DIN 38406-16	Voltammetry	0,1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 0,5 µg/l
			ISO 17294-2	ICP-MS	over 0,1 µg/l
			EN ISO 11885	ICP-AES	over 0.01 mg/l
19	7440-47-3	Chromium and compounds (as Cr)	ASTM D5673	ICP-MS	over 0,1 µg/l
			EN 1233	ET-AAS	5 - 100 µg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0,01 mg/l
20	7440-50-8	Copper and compounds (as Cu)	ASTM D5673	ICP-MS	over 0,1 µg/l
			DIN 38406 -7	ET-AAS	2 - 50 µg/l
			DIN 38406-16	Voltammetry	1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0,01 mg/l
21	7439-97-6	Mercury and compounds (as Hg)	EN 1483	Cold vapour-AAS	0,1 -10 µg/l
			EN12338	CV-AAS with amalgamation	0,01- 1 µg/l

No.	CAS number	Pollutant	Standard	Analytical method	Working range
22	7440-02-0	Nickel and compounds (as Ni)	ASTM D5673	ET-AAS	over 0.2 µg/l
			DIN 38406-11	ET-AAS	5 - 100 µg/l
			DIN38406-16	Voltammetry	0,1 - 10 µg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	
23	7439-92-1	Lead and compounds (as Pb)	ASTM D5673	ICP-MS	over 0,1 µg/l
			DIN 38406-6	ET-AAS	5 - 50 µg/l
			DIN 38406-16	Voltammetry	0,1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 0,1 µg/l
			ISO 17294-2	ICP-MS	over 0,1 µg/l
			EN ISO 11885	ICP-AES	over 0,07 mg/l
24	7440-66-6	Zinc and compounds (as Zn)	ASTM D5673	ICP-MS	over 0.2 µg/l
			DIN 38406-16	Voltammetry	1 µg/l - 50 mg/l
		see above	DIN 38406-29	ICP-MS	over 1 µg/l
			ISO 17294-2	ICP-MS	over 1 µg/l
			EN ISO 11885	ICP-AES	over 0,005 mg/l
25	15972-60-8	Alachlor	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
26	309-00-2	Aldrin	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
27	1912-24-9	Atrazine	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			EN ISO 11369	HPLC/UV	over approx. µg/l
			EN ISO 10695	GC/NPD (MS for conf.)	over 50 ng/l
28	57-74-9	Chlordane			
29	143-50-0	Chlordecone			
30	470-90-6	Chlorfenvinphos	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			DIN EN 12918	GC	0,01 - 1 µg/l
31	85535-84-8	Chloro -alkanes, C10- C13			
32	2921-88-2	Chlorpyrifos	DIN EN 12918	GC	0,01 - 1 µg/l
33	50-29-3	DDT	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
34	107-06-2	1,2-dichloroethane	EN ISO 10301	GC or Headspace-GC	over 5 or over 100 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
35	75-09-2	Dichloromethane	EN ISO 10301	GC or Headspace-GC	over 50 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
36	60-57-1	Dieldrin	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
37	330-54-1	Diuron	EN ISO 11369	HPLC/UV	over 0,1 µg/l
38	115-29-7	Endosulphan	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
39	72-20-8	Endrin	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
40		Halogenated organic compounds (as AOX)	DIN 38409-22	SPE-AOX	over 10 µg/l
			ISO 9562	AOX	over 10 µg/l
41	76-44-8	Heptachlor	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l

No.	CAS number	Pollutant	Standard	Analytical method	Working range
42	118-74-1	Hexachlorobenzene (HCB)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
43	87-68-3	Hexachlorobutadiene (HCBD)	EN ISO 10301	GC after Extraction	over 0,01 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
45	58-89-9	Lindane (Gamma-HCH)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
46	2385-85-5	Mirex			
47		PCDD + PCDF as Teq (dioxins + furans)	ISO 18073	GC/MS	
48	608-93-5	Pentachlorobenzene	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
49	87-86-5	Pentachlorophenol (PCP)	EN 12673	GC/ECD/MS after derivatisation	0,1 - 1000 µg/l
			ISO 8165-2	GC/ECD after derivatisation	over 0,1 µg/l
50	1336-36-3	Polychlorinated biphenyls (PCBs)	EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
51	122-34-9	Simazine	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			EN ISO 11369	HPLC/UV	over 0,1 µg/l
			EN ISO 10695	GC/NPD (MS for conf.)	over 50 ng/l
52	127-18-4	Tetrachloroethylene (PER)		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,1 or over 0,2 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
53	56-23-5	Tetrachloromethane (TCM)		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,01 or over 0,1 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
54	12002-48-1	Trichlorobenzenes (TCBs)		Only in air	
			EN ISO 6468	GC/ECD	over approx. 10 ng/l
			DIN 38407-2	GC/ECD	over approx. 10 ng/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
55	71-55-6	1,1,1-trichloroethane		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,02 or over 0,1 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
56	79-34-5	1,1,2,2-tetrachloroethane		Only in air	
			EN ISO 10301	GC after Extraction	over 0,05 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
57	79-01-6	Trichloroethylene		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,05 or over 0,2 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
58	67-66-3	Trichloromethane		Only in air	
			EN ISO 10301	GC or Headspace-GC	over 0,05 or over 0,3 µg/l

No.	CAS number	Pollutant	Standard	Analytical method	Working range
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
59	8001-35-2	Toxaphene			
60	75-01-4	Vinyl chloride	DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
61	120-12-7	Anthracene	ISO 17993	HPLC/Fluorescence	over 0,01 µg/l
62	71-43-2	Benzene	DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
63		Brominated diphenylethers (PBDE)			
64		Nonylphenol ethoxylates (NP/NPEs) and related substances	ISO/FDIS 18857-1	GC/MS	0,02 - 0,2 µg/l
65	100-41-4	Ethyl benzene	DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
66	75-21-8	Ethylene oxide			
67	34123-59-6	Isoproturon	EN ISO 11369	HPLC/UV	over 0,1 µg/l
68	91-20-3	Naphthalene	DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			ISO 17993	HPLC/Fluorescence	over 0,01 µg/l
69		Organotin compounds (as total Sn)	DIN 38407-13	GC/MS - FPD - AED	10 - 1000 ng/l
			ISO 17353	GC/MS - FPD - AED	10 - 1000 ng/l
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)	prEN ISO 18856	GC/MS	0,02 - 0,150 µg/l
71	108-95-2	Phenols (as total C)	EN 12673	GC/ECD/MS after derivatisation	0,1 -1000 µg/l
			ISO 8165-2	GC/ECD after derivatisation	over 0,1 µg/l
			CNR-IRSA 5060	Destillation/Photometry	over 1 µg/l
72		Polycyclic aromatic hydrocarbons (PAHs) b/	ISO 17993	HPLC/Fluorescence	over 0,01 µg/l
73	108-88-3	Toluene	DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
74		Tributyltin and compounds	DIN 38407-13	GC/MS - FPD - AED	10 - 1000 ng/l
			ISO 17353	GC/MS - FPD - AED	10 - 1000 ng/l
75		Triphenyltin and compounds	DIN 38407-13	GC/MS - FPD - AED	10 - 1000 ng/l
			ISO 17353	GC/MS - FPD - AED	10 - 1000 ng/l
76		Total organic carbon (TOC) (as total C or COD/3)	DIN EN 1484	TOC/DOC	0,3 - 1000 mg/l
			ISO 8245	TOC/DOC	0,3 -1000 mg/l
77	1582-09-8	Trifluralin	ISO/TS 11370	TLC, AMD-Technique	over 50 ng/l
			EN ISO 10695	GC/NPD (MS for conf.)	over 50 ng/l
78	1330-20-7	Xylenes	DIN 38407-9	Headspace-GC/FID	over 5 µg/l
			DIN EN ISO 15680	Purge/Trap + Therm. Desorp.	10 ng/l - 100 µg/l
			ISO 11423-1/-2	Headspace-GC or GC after extraction	over 2 µg/l or over 5 µg/l
79		Chlorides (as total Cl)	EN ISO 10304-1*	IC	0,1 - 50 mg/l
			EN ISO 10304-2*	IC	0,1 - 50 mg/l
			EN ISO 10304-4*	IC	0,1 - 50 mg/l
			CNR-IRSA 4070	Potentiometric titration	over 0.7 mg/l
80		Chlorine and inorganic compounds (as HCl)		Only in air	
			DIN EN ISO 7393-1/-2/-3	Titrimetric or colorimetric or iodometric	0,03 - 5 or 0,71- 15 mg/l

No.	CAS number	Pollutant	Standard	Analytical method	Working range
					Cl_2
81	1332-21-4	Asbestos		Only in air	
82		Cyanides (as total CN)	DIN EN ISO 14403	UV-Digestion/CFA	over 3 µg/l
			DIN 38405-14	Destillation/Photometry	0,01 - 1 mg/l
			ISO 6703-1	Photometric or titrimetric	
83		Fluorides (as total F)	DIN EN ISO 10304-1[6]	IC	0,01 - 10 mg/l
			ISO 10359-1	Elektrochemical technique	0,2 - 2 mg/l
			DIN 38405-4	Ionselective electrode	0,2 - 2000 mg/l
84		Fluorine and inorganic compounds (as HF)		Only in air	
85	74-90-8	Hydrogencyanide (HCN)		Only in air	
86		Particulate matter (PM10)		Only in air	
			ISO 11923	Glass-fibre filtration	

3.3 Standardized analytical procedures for the determination of pollutants of Annex II in waste

Table A3.3 gives an indicative list measurement of pollutants in waste and sludge. The overview is based on CEN standards cited in the IPPC Bref on monitoring.

Table A3.3 indicative list of standardized analytical procedures for the determination of the 86 pollutants of Annex II in waste (solid and / or sludge).

			waste				
No.	CAS number	Pollutant	Sampling plan / taking / transport storage	Pre treatment	extraction	Analysis Quantification	Overall Measurement report
1	74-82-8	Methane (CH4)					
2	630-08-0	Carbon monoxide (CO)					
3	124-38-9	Carbon dioxide (CO2)					
4		Hydro-fluorocarbons (HFCs)					
5	10024-97-2	Nitrous oxide (N2O)					
6	7664-41-7	Ammonia (NH3)					
7		Non-methane volatile organic compounds (NMVOC)					
8		Nitrogen oxides (NOx/NO2)					
9		Perfluorocarbons (PFCs)					
10	2551-62-4	Sulphur hexafluoride (SF6)					
11		Sulphur oxides (SOx/SO2)					
12		Total nitrogen	GR1 / GR5 / GR6			EN 13342 (2000)	
13		Total phosphorus	GR1 / GR5 / GR6			WI 308-034	

No.	CAS number	Pollutant	waste Sampling plan / taking / transport storage	Pre treatment	extraction	Analysis Quantification	Overall Measurement report
14		Hydrochlorofluorocarbons (HCFCs)					
15		Chlorofluorocarbons (CFCs)					
16		Halons					
17	7440-38-2	Arsenic and compounds (as As)					
18	7440-43-9	Cadmium and compounds (as Cd)					
19	7440-47-3	Chromium and compounds (as Cr)	GR4			WI 292-036 / WI 292-036	
20	7440-50-8	Copper and compounds (as Cu)					
21	7439-97-6	Mercury and compounds (as Hg)					
22	7440-02-0	Nickel and compounds (as Ni)					
23	7439-92-1	Lead and compounds (as Pb)					
24	7440-66-6	Zinc and compounds (as Zn)					
25	15972-60-8	Alachlor					
26	309-00-2	Aldrin					
27	1912-24-9	Atrazine					
28	57-74-9	Chlordane					
29	143-50-0	Chlordecone					
30	470-90-6	Chlorfenvinphos					
31	85535-84-8	Chloro -alkanes, C10-C13					
32	2921-88-2	Chlorpyrifos					
33	50-29-3	DDT					
34	107-06-2	1,2-dichloroethane					
35	75-09-2	Dichloromethane					
36	60-57-1	Dieldrin					
37	330-54-1	Diuron					
38	115-29-7	Endosulphan					
39	72-20-8	Endrin					
40		Halogenated organic compounds (as AOX)	GR1 / GR5 / GR6	WI 308-047	WI 308-047	WI 308-047	
41	76-44-8	Heptachlor					
42	118-74-1	Hexachlorobenzene (HCB)					
43	87-68-3	Hexachlorobutadiene (HCBD)					
44	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)					
45	58-89-9	Lindane					
46	2385-85-5	Mirex					
47		PCDD + PCDF (dioxins + furans) as Teq					
48	608-93-5	Pentachlorobenzene					
49	87-86-5	Pentachlorophenol (PCP)					
50	1336-36-3	Polychlorinated biphenyls (PCBs)	GR4 / GR1 / GR5 / GR6			WI 292-021 / WI308-046	
51	122-34-9	Simazine					
52	127-18-4	Tetrachloroethylene (PER)					
53	56-23-5	Tetrachloromethane (TCM)					
54	12002-48-1	Trichlorobenzenes (TCBs)					
55	71-55-6	1,1,1-trichloroethane					
56	79-34-5	1,1,2,2-tetrachloroethane					
57	79-01-6	Trichloroethylene					
58	67-66-3	Trichloromethane					
59	8001-35-2	Toxaphene					
60	75-01-4	Vinyl chloride					
61	120-12-7	Anthracene					
62	71-43-2	Benzene					

No.	CAS number	Pollutant	waste Sampling plan / taking / transport storage	Pre treatment	extraction	Analysis Quantification	Overall Measurement report
63		Brominated diphenylethers (PBDE)					
64		Nonylphenol ethoxylates (NP/NPEs) and related substances					
65	100-41-4	Ethyl benzene					
66	75-21-8	Ethylene oxide					
67	34123-59-6	Isoproturon					
68	91-20-3	Naphthalene					
69		Organotin compounds (as total Sn)					
70	117-81-7	Di-(2-ethyl hexyl) phthalate (DEHP)					
71	108-95-2	Phenols (as total C)					
72		Polycyclic aromatic hydrocarbons (PAHs) b/					
73	108-88-3	Toluene					
74		Tributyltin and compounds					
75		Triphenyltin and compounds					
76		Total organic carbon (TOC) (as total C or COD/3)	GR1 / GR5 / GR6			EN 13137 (2001)	
77	1582-09-8	Trifluralin					
78	1330-20-7	Xylenes					
79		Chlorides (as total Cl)					
80		Chlorine and inorganic compounds (as HCl)					
81	1332-21-4	Asbestos					
82		Cyanides (as total CN)					
83		Fluorides (as total F)					
84		Fluorine and inorganic compounds (as HF)					
85	74-90-8	Hydrogencyanide (HCN)					