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POLLUTANT RELEASE AND TRANSFER REGISTERS (PRTRS)

A Tool for Environmental Policy and Sustainable Development

GUIDANCE MANUAL FOR GOVERNMENTS

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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F O R E W O R D

In early 1991, OECD Environment Ministers called for a reduction of the pollution burden as one of their major goals for the 1990s. Pollution prevention at source was seen to be a key focus for this effort since pollution which is never generated does not need to be controlled or its effects cleaned up later. In keeping with the trend toward market-based instruments to encourage pollution prevention efforts, the OECD Pollution Prevention and Control Group undertook an effort aimed at accelerating pollution prevention and reduction by examining mechanisms for compiling and publishing data about pollutant releases and transfers, i.e. pollutant release and transfer registers (PRTRs).

A PRTR system usually calls for firms to report periodically on their releases and transfers of a variety of substances of interest. This information is made publicly accessible bearing in mind legitimate needs for business confidentiality. The results provide comparative quantitative information among reporters and have stimulated investors and other affected and interested parties to ask questions of firms whose performance is significantly below normal for their sector and to demand improvement.

A PRTR thus provides a powerful incentive for reporters to cut releases and transfers. Corporate and environmental group spokespersons alike have said that PRTRs have had a stronger impact than many regulatory programmes even though a PRTR sets no improvement goals mandatorily. Simply by making pollutant release and transfer information accessible encourages firms to take pollution prevention actions. A number of OECD Member countries have implemented some version of a PRTR system.

The Manual is meant for national governments who are considering whether to implement a PRTR; it describes the key points which need to be taken into account in order to realise the benefits of a PRTR while keeping cost of the system as low as practical.

The Manual was prepared by Dr. Harvey Yakowitz of the Secretariat under the auspices of the Pollution Prevention and Control Group, assisted by Ms. Claudia Fénérol, an independent consultant.

The Guidance Manual is published on the responsibility of the Secretary-General of the OECD and derestricted on the recommendation of the OECD Pollution Prevention and Control Group. This Manual represents a contribution of the OECD as follow-up to the UN Conference on Environment and Development (Rio de Janeiro, 1992), specifically Agenda 21, Chapter 19. This publication is produced within the framework of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC):

> The Inter-Organization Programme for the Sound Management of Chemicals (IOMC) was established in 1995 by UNEP, ILO, FAO, WHO, UNIDO and the OECD (the Participating Organizations), following recommendations made by the 1992 UN Conference on Environment and Development to strengthen co-operation and increase international co-ordination in the field of chemical safety. The purpose of the IOMC is to promote co-ordination of the policies and activities pursued by the Participating Organizations, jointly or separately, to achieve the sound management of chemicals in relation to human health and the environment.

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P R E F A C E

POLLUTANT RELEASE AND TRANSFER REGISTERS: A TOOL FOR ENVIRONMENTAL POLICY AND SUSTAINABLE DEVELOPMENT:

DESCRIPTION, GENERAL PRINCIPLES AND PURPOSES OF THIS MANUAL

Environmental policy should seek to protect humans and/or the environment from risks and to conserve natural resources and energy. This should be done in a cost-effective manner and provide all affected and interested parties the opportunity to participate in the selection of policy options. Once a path has been selected, those who must respond to the policy requirements should be given as much flexibility as possible to do so. Prevention of potentially harmful releases and/or transfers to environmental media can be beneficial to all parties. The public benefits by achieving environmental protection, while industry can benefit from more efficient use of resources.

Today, governments throughout the world are seeking to attain sustainable development -- economic and social progress while protecting the environment. Essential to this goal reducing pollutant releases/transfers, as well as natural resource and energy consumption per unit of output. Governments are looking to reduce wastage and prevent pollution at the source as a basic tenet of environment policy. In order properly to set and operate environmental policies in the 21st century, governments must know the current state of their national environment and should have a consistent and valid means to measure changes in environmental status.

In order to do this, many governments collect data about various releases to different media such as soil, air and water and transfers of substances offsite for treatment or disposal. Often these data are collected by multiple agencies, each with specific programmes and projects for using the data. These agencies might collect similar information which could be collected more efficiently on one reporting form. Duplicative reporting requirements, e.g. for local and national purposes, are not unknown. Often, there is little coordination among collectors of the data when specific policy proposals are made. Furthermore, there may be little or no public access to the data.

Efficient environmental policy also requires having sufficient knowledge about pollutants. Having only some of the necessary information leaves a government ill-prepared to establish clear and competent programmes. Among the types of data needed for a fuller understanding of the impacts of releases and transfers of pollutants are the identities of the pollutants, the amounts released and/or transferred, the potential risks involved and the sources of these substances -- in particular the exact locations of these sources. Governments also must consider how these factors can vary over time, making it necessary to obtain this information periodically, probably annually.

Nations are now adding a new component to their environmental policies by bringing the public into discussions. This approach recognises that the public should be informed about pollutant releases and transfers. The view that the public has the right to know about environmental information is in keeping with Agenda 21, Principle 10 which 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".

Chapter 19 of Agenda 21 addresses the approach governments could take to collect sufficient data about various environmental media while providing public access to the information. Governments, with the co-operation of industry and the public, should 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. The principle of the right of the community and workers to know these risks should be recognised but balanced with industry's right to protect confidential business information. As Agenda 21 points out, industry should provide data for substances produced, specifically for the assessment of potential risks to human health and the environment. These data should be made available to national authorities, international bodies and other interested parties involved in hazard and risk assessment, and to the greatest extent possible to the public, taking into account legitimate claims of confidentiality.

Combining the need to know about releases and/or transfers with the public right-to-know about possible risks from them has led several countries to develop and implement pollutant release and transfer registers (PRTRs). A PRTR system calls for developing a database of releases and/or transfers of a set of substances of interest and making this database publicly accessible. Usually, facilities which release and/or transfer one or more of the substances are required to report periodically as to what is released, how much and to what environmental media. In some versions of a PRTR, releases from diffuse sources such as transport and agricultural pursuits are estimated using statistical methods; the results of these estimations are also made publicly accessible.

A PRTR is a means to obtain regular, periodic information about releases and/or transfers of substances of interest and to make this information accessible to all who may be interested and/or affected by it. As such, a PRTR is one tool for promoting efficient and effective policies to preserve and protect the environment and to promote sustainable development. If properly designed and implemented, a PRTR can be very effective in identifying areas of policy need and in setting priorities for risk reduction.

Certain basic principles underlie the establishment of an effective PRTR system. When these principles are properly taken into account, the full capabilities of a PRTR are most likely to be realized, i.e. useful environmental benefits are realised at affordable costs which are fairly distributed. The basic principles concerning establishment of a PRTR system include:

-- PRTR systems should provide data to support the identification and assessment of possible risks to humans and the environment by indicating sources and amounts of potentially harmful releases and transfers to all environmental media.

-- The PRTR data should be used to promote prevention of pollution at the source, e.g. by encouraging implementation of cleaner technologies.

-- National governments should use PRTR data to evaluate the progress of environmental policies and to assess to what extent national environmental goals are, or can be, achieved.

-- In devising a PRTR system or when modifying existing systems, governments should consult with affected and interested parties to develop a set of goals and objectives for the system and to identify potential benefits and estimate costs to reporters, government and society as a whole.

-- PRTR systems should cover an appropriate number of substances which may be potentially harmful to humans and/or the environment into which they are released or transferred.

-- PRTR systems should involve both the public and private sectors as appropriate: a PRTR should include those facilities or activities which might release and/or transfer substances of interest and, if appropriate, diffuse sources.

-- To reduce duplicative reporting, PRTR systems should be integrated to the degree practicable with existing information sources such as licenses or operating permits.

-- Both voluntary and mandatory reporting mechanisms for providing PRTR inputs should be considered with a view as to how best to meet national goals and objectives of the system.

-- The comprehensiveness of any PRTR in helping to meet environmental policy goals should be taken into account, e.g. whether to include releases from diffuse sources ought to be determined by national conditions and the need for such data.

-- The results of a PRTR should be made accessible to all affected and interested parties on a timely and regular basis.

-- Any PRTR system should undergo evaluations and have the flexibility to be altered by governments in response to these evaluations or to the changing needs of affected and interested parties.

-- The data handling and management capabilities of the system should allow for verification of data entries and outputs and be capable of identifying geographical distribution of releases and transfers.

-- PRTR systems should allow, insofar as possible, for comparison of information and cooperation with other national PRTR data systems and consideration for possible harmonization with similar international data bases.

-- A compliance mechanism to best meet the needs of the goals and objectives should be agreed by affected and interested parties.

-- The entire process of establishing the PRTR system, its implementation and operation, should be transparent and objective.

The purpose of this Manual is to provide information aimed primarily at national governments that may wish to consider implementing a PRTR system. The Manual does not seek to prescribe a specific course of action; rather, it gives a set of options for how to implement the various principles underlying an effective PRTR system. Conditions within each country will dictate the precise details of how a specific national PRTR system will develop in practice. This Manual is meant to provide a firm foundation rooted in the basic principles for whatever PRTR approach is deemed most useful by a national government.

The Manual is organised along five main themes, including:

- Major issues in deciding whether to establish a PRTR;
- Formulating goals/objectives and a list of substances for a PRTR;
- Data handling and management issues;
- Making PRTR outcomes publicly accessible; and
- Implementing a full PRTR system.

In the course of this guidance, key points ranging from whether a PRTR could be mandatory, voluntary or some combination of the two, confidentiality of data, thresholds, international issues and where to obtain assistance and information about PRTRs are addressed. Potential benefits and costs of a PRTR are also examined in detail. As in any endeavour, the benefits of implementing a PRTR in a particular country should outweigh the costs, or another environmental policy tool should be considered. The information in this Manual was provided by a variety of affected and interested parties, e.g. private sector, government at various levels, citizens' groups, legal experts, international organisations and bodies, and trade associations. It is meant to help governments who opt for a PRTR to ensure that benefits do outweigh costs and that their PRTR system best meets the goals and priorities set out for the PRTR and assists in meeting environmental policy aims.

INTRODUCTION

As a follow-up activity to the United Nations Conference on Environment and Development (UNCED), the OECD was asked by its Member countries and the United Nations to prepare a guidance manual for national governments considering establishing a Pollutant Release and Transfer Register (PRTR). A PRTR provides publicly accessible data about quantities of releases and/or transfers of a set of potentially harmful substances, the origin of these releases and transfers and their geographic distribution on a timely, regular periodic basis. Many OECD countries either have implemented a PRTR or intend to do so, e.g. Australia, Canada, Czech Republic, Mexico, Netherlands, Norway, United Kingdom and the United States. The European Union intends to set up a PRTR in the near future. In addition, a number of other countries are examining whether to begin a PRTR programme, e.g. Egypt, South Africa and Hungary.

The OECD efforts began in 1993 when the Pollution Prevention and Control Group, which is composed of representatives of OECD Member countries, decided to lead an effort aimed at accelerating pollution prevention and reduction by examining improved mechanisms for compiling and publishing data about pollutant releases and transfers.

The Pollution Prevention and Control Group also decided that the OECD should perform this work in the context of multi-organisation implementation of Chapter 19 of UNCED Agenda 21. These organisations included the World Health Organisation, UN Environment Programme - International Register of Potentially Toxic Chemicals, UN Institute of Training and Research and the International Programme on Chemical Safety. The Group decided that all parties who might be affected and interested in PRTRs, e.g. government at all levels, private sector interests, citizen groups, international bodies, non-OECD member representatives, etc., should participate fully in the process of developing the Guidance Manual.

Therefore, the elements of this Guidance Manual were developed by means of a process which sought to obtain wide agreement among parties who are interested and affected by PRTR activities. This process consisted of OECD convening a series of five workshops, (hosted by the European Commission, Canada, Switzerland, United Kingdom and The Netherlands) over a two-year period. Each workshop agenda called for the in-depth consideration of one of the main foundations for a PRTR including:

- Major issues in deciding whether to establish a PRTR;
- Formulating goals, objectives and a list of substances for a PRTR;
- Data handling and management in a PRTR system;
- Making PRTR outcomes publicly accessible; and
- Implementing a full PRTR system.

The workshop format consisted of convening a set of expert panellists representing affected and interested parties such as national government, local or regional government, various private sector interests (chemicals, steel, electrical, petroleum and electronic products, etc.), citizen groups, labour, international organisations and bodies and representatives of non-OECD member countries. The panels examined details of each of the main themes from a wide variety of points-of-view followed by in-depth questions and comments from the floor. About one hundred participants took an active role in each workshop. Many

submitted short papers on the topic of interest; these were circulated and proved invaluable to the process of developing the Manual.

In each workshop, after two days of intensive discussion, a small drafting group was convened consisting of each affected and interested party and chaired by OECD. This drafting group was charged with the task of developing a detailed outline and overview of the main outcomes of the discussions. The object of the exercise was to provide the OECD Secretariat with a firm basis for drafting the Chapter of the Manual based on the Workshop outcomes.

On the third and final day of each workshop, a draft detailed outline and overview was provided in written form to each participant. After providing a suitable period of time for participants to review the outline and develop responses, it was discussed in plenary with a view toward revising it so as to obtain wide support of the participants for the main bases of the Chapter relating to the workshop. This was achieved in every instance.

Using the "final" detailed outline and overview as a basis, plus the papers submitted by participants, the OECD Secretariat drafted a Chapter of the Manual based on the theme of each workshop. Each Chapter was sent to all workshop participants for review and comment. At the end of the review period, the OECD Secretariat revised the draft Chapter, taking into account the comments received. The revised Chapter was then submitted to the Pollution Prevention and Control Group. This Group has formal responsibility for recommending release of the results of OECD efforts concerning pollution prevention and control; PRTR activities come under this *proviso.* When acceptable to the Group, each Chapter was then ready to be included in this Manual.

This Manual represents the efforts of affected and interested parties and has been reviewed in detail by them. As such, the Manual is meant to represent the current state of thinking on the need, the benefits, potential costs, the goals and how best to implement a PRTR as a tool for environmental policy. The Manual will help governments by indicating steps they will need to consider as they move toward implementing a PRTR appropriate to their national purposes.

CHAPTER 1

USEFULNESS OF INSTITUTING A NATIONAL POLLUTANT RELEASE AND TRANSFER REGISTER

I. What is a Pollutant Release and Transfer Register?

A Pollutant Release and Transfer Register (PRTR) is a catalogue or register of potentially harmful pollutant releases or transfers to the environment from a variety of sources. A PRTR includes information about releases or transfers to air, water and soil as well as about wastes transported to treatment and disposal sites. This register also consists of reports about specific species such as benzene, methane or mercury as contrasted with broad categories of pollution such as volatile organic compounds, greenhouse gases or heavy metals. The development and implementation of a PRTR system adapted to national needs represents a means for governments to track generation, release and the fate of various pollutants over time.

A PRTR can be an important tool in the total environment policy of a government -- providing otherwise difficult to obtain information about the pollution burden, encouraging reporters to reduce pollution, and engendering broad public support for government environmental policies. Indeed, governments may wish to set forth long-term national environmental goals to promote sustainable development and then use PRTR as an important tool to examine objectively how well these goals are being met.

II. What are the benefits of a PRTR?

One set of benefits to a national government from instituting a PRTR involves establishing the following in a consistent, defensible form:

(a) Who is generating potentially harmful releases or transfers to various environmental media?

(b) What pollutants are being released or transferred?

(c) How much is being released or transferred over a specific time period?

(d) To what media are these pollutants being released or transferred and, how much of each is going to air, water or soil?

(e) What is the geographic distribution of pollutant releases or transfers?

Once the information is correctly categorised in the PRTR system, the government authorities are in a position to track each pollutant release and transfer consistently over time. Authorities can then set priorities for reducing or even eliminating the most potentially damaging pollutant releases. One example

of this is in the framework of integrated pollution prevention and control efforts undertaken to prevent or minimise the risk to humans and/or the environment.

The PRTR reporting process itself tends to promote pollution prevention by indicating to reporters, especially small- and medium-sized enterprises, the amounts of valuable material resources being released as pollutants and thus simply wasted. In countries having a PRTR system, this information has spurred firms to cut this wastage. It has resulted in avoiding costs, increasing efficiency and reducing environmental harm simultaneously.

The results of a PRTR can be instrumental in pin-pointing priority candidates for the introduction of technologies for cleaner production. Suppose, for example, that two facilities are engaged in similar activities using similar feedstocks and are producing similar outputs, but one of the two is reporting far greater releases of certain pollutants. This can be a signal that cleaner production technology would be a good investment for the more polluting facility.

For a government, a PRTR can help achieve pollution prevention, lessening the burden of control regulations, which require a large bureaucracy to monitor and enforce. Wastes not generated do not require disposal facilities, and water pollutants not created do not require wastewater treatment facilities. Since specific chemicals or classes of chemicals (alkanes, carcinogens, etc.) covered by a PRTR may differ in terms of inherent hazard, a high release/transfer total for a given pollutant may not always translate into high risk. Conversely, a pollutant having a lower release/transfer level may in reality pose a greater risk. This concept of hazard differential needs to be considered in the design of a PRTR as well as how to convey such results to the public.

PRTR results provide local, regional, national and international information. With a PRTR system in place, local or regional governments can assess the status of local environments and can use PRTR results as one input for assessing risks to human health and the environment. The use of PRTR data as a key input for assessing such risks enables national authorities or international groups to estimate and compare environmental problems on a consistent and common basis, e.g. by considering multiple pathways to exposure and movement through the environment of the pollutants covered by the PRTR. In other words, PRTR results can be used as inputs for dispersion models in order to obtain estimates of environmental status as a function of time and place.

A PRTR can provide data about accidental releases such as spills or emissions arising from a fire at an industrial facility. Moreover, PRTR data can aid in debates about land-use planning and in licencing decisions for various types of potential sources of pollutants ranging from giant facilities to small- and medium-sized firms. Also, an internationally compatible register system could be beneficial in setting and monitoring international goals and commitments. Sharing collected data can help countries maximise risk-reduction efforts.

Finally, the existence of a PRTR can serve as a major driving force for pollution reduction throughout many sectors of the economy. In fact, dissemination of PRTR data has led to a competition among generators of pollutants to reduce these releases. After all, no one wants to be perceived by the general public as a wilful spoiler of the environment or contributor to possible adverse health effects.

III. Considerations for implementing an effective PRTR

In order to realise the benefits of a PRTR, a number of decisions should be taken to ensure that the PRTR functions as desired in the areas it covers. The precise goals and objectives of the PRTR should be defined clearly. In setting the objectives, a number of points need be taken into account; these involve basic issues which affect the nature, operation and results of a PRTR. What follows describes major issues

which must be considered when setting goals for a PRTR. (More detailed discussion of the PRTR goal-setting process is included in Chapter 2.)

First, the terms "release" and "transfer" need to be defined explicitly for purposes of the PRTR. In other words, what constitutes a reportable release and what constitutes a reportable transfer? For example, if some quantity of hazardous waste is generated at a facility which then pre-treats and disposes half on-site and ships the other half to a licensed disposal facility; what must the generator report for purposes of the PRTR?

Unforeseen releases and transfers also need to be considered. Examples of unforeseen releases are spills, accidents resulting in releases, and remedial actions to clean up their effects and the effects of past environmental damage (such as transfers during remedial actions concerning abandoned hazardous wastes or dealing with obsolete or discarded pesticides or paints). Including them as a separate category within a PRTR would provide a means to compare this source of releases over time and also might help motivate better control of reportable chemicals.

Second, the chemicals to be covered by the PRTR must be decided at an early stage. For example, a PRTR should be concerned about the likelihood of exposure from releases or transfers that are known to cause or can be expected to cause adverse effects to humans and/or the environment. Many lists of chemicals, species, or classes of pollutants have been compiled; countries operating PRTR systems each have published "their" list. A national government intending to institute a PRTR will probably wish to involve the public and representatives of those installations who will likely report releases in the process leading to the development of a national PRTR list. This process ensures that affected and interested parties each have an opportunity to provide information and reasoning as to why certain species are included or excluded. Moreover if certain chemicals are not generated nationally, they could be excluded *a priori.* (Hereafter, this list of reportable species will be referred to as "The List".)

Third, the scope of the PRTR must also be considered. Clearly, "point sources" such as factories are not the only contributors to releases and transfers of pollutants. "Diffuse sources" such as transport activities and agricultural operations also generate large quantities of pollutants of many types. Governments that are contemplating a PRTR may wish to include both diffuse and point sources into a single PRTR so as to obtain a view of the contribution of each set of sources.

Fourth, the role and relationship of licence (permit) conditions specifying what actions an entity must take in order to operate legally need to be clarified. Licenses are usually crafted to ensure that data provided by the licence can be used to serve one or more particular environmental purposes. For example, BOD and/or COD of releases to watercourses may be needed by the authorities in order to ensure clean water supplies. Some licenses require continuous monitoring such as of certain stack gases; others require periodic measurements. Whether all, some, or none of the data required for licenses can or should be used in PRTR reporting, and how, deserves careful examination by government during the design phase of the PRTR system.

It should also be borne in mind that PRTRs are not programmes to control chemical pollution; licenses and permits for air emissions, water discharges, etc., are designed for pollution control. PRTRs can, however, provide important insights into the effectiveness of control programmes. To some extent, PRTRs can take advantage of control programmes and of existing data that have already been collected.

Finally, the resources consumed by a particular PRTR approach must be considered in determining whether and how to implement a PRTR.

A. Data collection and management

The data for a PRTR are usually taken from point sources of pollution as well as from diffuse sources. In the case of point sources, individual facilities such as automobile assemblers, chemical plants, fertiliser manufacturers, power plants, research facilities, steel mills and electroplating facilities provide a set of data elements for each pollutant of concern on one form and report these data for a given time period. A listing of point sources of pollutants identifying those who may be required to report releases and/or transfers needs to be compiled. This list can include major industrial facilities, small- and medium-sized enterprises, as well as government owned or operated facilities (such as public power plants). In order to decide what specific installations might be excluded from reporting requirements, countries having a PRTR usually set thresholds such as total number of employees, minimum quantity of a pollutant release or transfer which triggers a requirement to report, or minimum throughput of a reportable substance within a facility. Most PRTRs currently in operation collect data from point sources on an annual basis.

In order to take into account diffuse sources, government will almost certainly have to rely upon data from environmental monitoring activities combined with information such as the number of motor vehicles, numbers of each type of farm animal, amounts of fertiliser, pesticides and herbicides spread onto land, fuel mix for each energy source, etc. Governments can use a combination of monitoring data, existing statistical data and emission factors to make estimates of pollutant releases based on activity areas (e.g. calculated standard emission factors). These data are then converted by statistical means into most probable indications of total pollutant releases from the diffuse sources of interest. Both the Canadian and the Netherlands PRTR systems include estimates of releases from diffuse sources.

Clearly, designers of a specific PRTR will want to balance completeness of information with the ability and resources of reporters to provide the data and to develop an estimate of how many potential reporters there would be in order to select thresholds for reporting. Countries may also wish to consider the option of electronic reporting in lieu of paper reporting and what their central collection procedure and loading of data will be. Costs of reporting need to be considered at an early date with a view to keeping costs of reporting as low as practicable, and consistent with the goals of the PRTR. (See Chapter 3 for further discussion of these costs)

Data can be reported in so-called "raw form". This simply means that every generator who must report provides data for releases or transfers per unit of time as the total amount released or transferred of each chemical on The List which he emits. Raw data are said to be very useful to various segments of the public because they allow everyone equal access to the total quantity and type of pollutants being released or transferred in local, regional and national areas. This, in turn, allows the public to participate in policy-making aimed at reducing the pollution burden on the same footing as government and the private sector. An additional reason for collecting raw data is that the total environmental burden over time is very important to track in the case of certain types of pollutants, for example persistent chemicals. This can be done only if raw data are reported to a PRTR.

Reports indicating releases per unit of product sent to market are very useful as well. If economic downturn occurs, some releases or transfers may be curtailed as a result. Later, when the economy recovers, these releases or transfers might rise in total. Releases and transfers per unit of product sent to market or per unit of feedstock entering a plant can give a realistic view of what a firm is doing to cut the pollution burden. Governments that are contemplating developing a PRTR programme could consider asking reporters to provide both raw data plus data about releases and transfers per unit of product sent to market as well as the total quantities of goods. Of course, the confidentiality concerns of the reporters would need to be taken into account.

Every item of data reported to a PRTR is unlikely to be measured discretely; rather, reporters monitor and take periodic measurements of releases and transfers. In turn, these are used by reporters to

develop statistically valid estimates of total releases and transfers of each reportable chemical/species over time. Therefore, when releases and transfers are reported, one needs to know whether they are measured or are statistical estimates. A related issue is whether the PRTR design will allow a reporter to provide data which are aggregated (e.g. lead and lead compounds rather than each lead compound in use).

Since measuring releases and transfers directly to obtain all PRTR data is virtually impossible, decisions need to be taken about what must be measured and what calculational or estimation schemes are appropriate (based on these measurements) to attain consistent PRTR reports. This is an area where government will almost certainly want to consult with representatives of the public and prospective reporters in order to arrive at mutually acceptable procedures. This consultation may point out the need and desirability of classifying various types of sources of pollutants into specific categories, e.g. bulk chemicals, specialty chemicals and energy generation. The reason for this is that the calculation for the PRTR data report is likely to differ from category to category.

B. Basic design and implementation

Numerous issues are associated with designing and implementing a PRTR, but for a useful PRTR system the benefits need to outweigh the costs. There are, however, certain issues governments may wish to address at the design phase of a PRTR. For instance, this is the phase where resources and capabilities of reporters need to be considered, especially those of small- and medium-sized enterprises. In addition, special attention may be warranted when threshold reporting criteria (e.g. number of employees) are used. Sometimes a facility may be required to report because it meets a certain threshold, even though it does not release or transfer any of the pollutants of concern. Special reporting categories can be incorporated into the PRTR to avoid any unnecessary burdens.

Sources of releases and transfers can be required by law to provide reports of releases and transfers, and several countries have already implemented this approach. On the other hand, some sectors of industry have suggested that a voluntary reporting system will not only suffice but could provide a more useful and realistic overview than a mandatory PRTR system. The reasoning is that firms releasing pollutants are well aware of which releases are specific to their operations and that each site is different. Hence, a site-by-site voluntary report for the actual pollutants released or transferred in a given time period may be a more valid indicator than reporting releases and transfers dictated by a pre-ordained list.

A number of multinational firms, mostly in the chemicals sector, have published environmental reports voluntarily which do indicate releases or transfers of various species. But no small- and medium-sized enterprise issues formal reports to the public about operations of any kind; a number of privately-held firms fall into this category. Many non-governmental organisations have thus argued that a voluntary system would not allow interested members of the public to compare data properly among firms or among sectors, or to compile an accurate natural register of discrete sources and total releases and transfers.

Governments contemplating a PRTR will need to decide early about whether to make reporting mandatory, voluntary or some combination of the two. If a decision for an entirely voluntary system is taken, then some form of agreement among reporters and government will be needed as to types of releases and transfers covered, frequency of reporting (e.g. annually) as well as the means and format for reporting. The same is true of a mandatory system, except that government receives the reports and can apply sanctions against non-reporters. How to deal consistently or equitably with non-reporters (or partial reporters) in a voluntary system may be difficult to arrange.

Given that most governments have subscribed to Agenda 21 in which the public right-to-know about risks due to pollution is clearly stated, national governments will probably wish to ensure that any PRTR data are analyzed and placed into a consistent and coherent form for public review. This may be somewhat easier if the data are reported mandatorily in a form which enables government to easily provide

appropriate data to the public. In a mandatory system, claims of business confidentiality by reporters can be handled in terms of national law relating to this topic; for example, in the United States, a generic entry of chemical identity is substituted when a claim of confidentiality is allowed. In that way, the PRTR data are complete and confidentiality is preserved.

The need to be consistent among each category and then to give a summary of all categories to obtain appropriate PRTR results is important in order to take proper measures about possible double counting of releases or transfers. Double counting could occur, for example, if lead and zinc in electric arc furnace steel-making dusts were lumped into the total quantity of materials classed as "wastes" by the steelmaker, but were later recycled by another firm which in turn reported releases of lead and zinc emissions to air and/or solid waste. In this case, nearly 300 kg of lead and zinc per tonne of furnace dusts would be reported to the PRTR by the steelmaker while the recycler might report a further 15 to 30 kg of these metals as released. In reality, after the recycling process, between 270 to 285 kg of lead and zinc per tonne of furnace dusts would have been reconverted to saleable metals. A proper PRTR accounting for the entire situation would be a report by the steelmaker indicating transfer of the recyclable amounts plus unrecyclable wastes. The recycling facility would report actual releases and quantity of material sent to final disposal. And the total reported to PRTR, by both steelmaker and recycler, should not exceed total steel-making dust quantity less recycled content plus any additional releases from the recycling process. This example illustrates the importance of having good clear definitions which help to minimise double counting. It also underscores the necessity to be consistent and transparent in establishing guidelines for reporting requirements.

Grouping various sources of releases and transfers enables a consistent reporting scheme for each to be developed which minimises double counting. Whether transfers of chemical species to products on The List are reportable to the PRTR becomes a key issue in the context of problems arising from double counting as well. If producers are required to report such transfers to products, then the PRTR accounting system becomes more prone to double counting since one firm’s "product" may be a feedstock to another process after its purchase by a second firm.

The entire issue of the relationship of the PRTR to products will require close discussion with producers, consumers, workers and the public in order to arrive at an appropriate course of action. A PRTR will never be a tool to estimate the fate of all species on The List over their entire lifecycle.

The necessity for a step-by-step approach is underscored by the need to ensure transparency, ease of understanding and verification of the completeness and precision of reports of releases and transfers. Unless the recipients of a PRTR, various segments of the public, government at all levels and industry itself are convinced that the data are complete and factual, then the PRTR serves a more restricted purpose. The fact that reporting is mandatory and that data are available freely is said to promote both veracity and confidence in the PRTR.

C. Data verification and transfer to the public

The data received by the PRTR system need to be scrutinised by appropriate authorities in order to obtain an accurate and thorough opinion. They then need to be made publicly accessible in easily understood formats. Designers of a PRTR may wish to consider these formats at an early stage in order to ensure that they are compatible with the ways data are to be reported. Whether the PRTR results will be simply placed "on-file" at some place such as a government office or in a computer data base with access available to persons wishing to see the results, or whether government will actively work to publicise PRTR results and present them to the public, also needs to be decided at an early stage. Most countries that currently operate a PRTR system advocate an active role for government in bringing public attention to PRTR results. (See Chapter 4 for further details.)

This approach can also work in favour of those who report releases and transfers. Clearly, no process is likely to result in zero waste, release or transfer of some pollutants. There is a theoretical minimum of releases for all practical economic processes. The PRTR can be used to show that local, regional or national reporters are approaching this minimum, i.e. that pollution prevention is succeeding as well as it possibly can. The public cannot expect continuous reductions forever from each reporter, but policy initiatives can be directed at reducing the total pollution burden. A PRTR can serve as a good indicator that newer policy directions need to be explored in order to cut total pollution loads.

IV. AGENDA 21: Citizens' Right-to-know, basis for public participation in integrated pollution prevention and control policy-making

"What is the status of the environment in which I live and/or work, and if the quality is insufficient, what should citizens and government and non-government institutions do to prevent or reduce pollution and restore damaged areas?" A properly-implemented PRTR can help national and local governments to answer both parts of this question. The administrative burden of implementing the PRTR should be neither unduly burdensome nor costly.

A goal of every national government is to provide for improving living standards for its citizens. Governments have recognised, though, that economic development at the expense of natural resources and the environment, in general, could ultimately result in national and even global disaster. Hence, governments worldwide endorsed the concept of sustainable development at the UN Conference on Environment and Development held in Rio de Janeiro in June 1992 and adopted a broad manifesto for actions to achieve sustainability known as Agenda 21.

Governments that endorsed Agenda 21 have further agreed that they should act to reduce risks from toxic chemicals (and other pollutants) taking into account entire life cycles of the pollutants. Examples of ways to do this (as cited in Agenda 21) are by promoting technologies for cleaner production and products; product labelling; economic incentives; and limiting use of, phasing out or banning certain products and pollutants that pose an unreasonable and otherwise unmanageable risk to human health and/or the environment.

Agenda 21 provides that environmental issues are best handled with the participation of all concerned citizens and that each individual should have appropriate access to information relating to the environment. It also states that countries shall facilitate and encourage public awareness and participation by making information widely available. [Agenda 21: Principle 10 for sustainable development.}

Balanced with the right-to-know the identity and risks associated with potentially hazardous ingredients is, of course, the right of the private sector to protect confidential business information in accord with applicable national laws.

V. Overview of processes to create a PRTR

The first step is for government to select a set of preliminary objectives for its PRTR. This process may lead to obtaining data about certain releases and transfers and ensuring that they are disseminated to the public. Or, a government may seek to establish environmental monitoring systems to track diffuse sources of releases and to take account of many or all of the benefits available from instituting a PRTR. All countries which have implemented PRTR approaches have moved stepwise and have learned by doing.

The preliminary objectives, as selected by government, become the basis for initial discussion with affected and interested parties such as industry, local government, citizen groups, and government-owned or -operated installations. Unless these "stakeholders" reach agreement on the scope, objectives and details of management, implementing a PRTR successfully is likely to be difficult. Moreover, by involving the the affected and interested parties at an early stage, government will learn quickly what is possible and desirable to achieve from the PRTR process, and can also develop a preliminary schedule for the step-by-step effort to build and maintain the most useful PRTR. Box 1 describes briefly the process used in establishing the Canadian PRTR.

Items that deserve consideration by affected and interested parties and on which they and government ought to try to reach agreement include the broad issues outlined in Section III. This should then be augmented by detailed review and decisions concerning:

(a) What are the goals and objectives;
(b) The list of chemicals[1] to be reported upon;
(c) Who must report and how often;
(d) How any existing reporting requirements could be used to help attain the objectives of the PRTR, e.g. licencing requirements, voluntary company environmental reports;
(e) How reporters can minimise being subjected to duplicative reporting requirements;
(f) Whether large firms having more than one site shall report on a site-by-site basis or on a site-specific, yet firm aggregated, basis;
(g) The contents of the reporting form itself, which ideally should be as simple as possible, needs to indicate chemicals released and transferred, amount of each, medium to which released, name and co-ordinates of reporter including correct geographical descriptors;
(h) What data are to be reported and in what format;
(i) To whom the data shall be reported;
(j) How claims of confidentiality will be handled;
(k) How public sector installations and operations will be taken into account, e.g. some exemptions on the basis of national security considerations might be granted to the military;
(l) How the data will be provided to the public (N.B. This implies that governments may want to consider developing a strong PRTR data analysis capability in order to provide rapid and broad dissemination of PRTR results at low cost to citizens.);
(m) Roles of local government and local citizenry in specific applications of the PRTR, e.g. determining the situation in detail for a local area and/or the use of local PRTR data by local authorities in granting or enforcing licenses;
(n) Whether the PRTR will be mandatory in nature and if so, how its requirements will be enforced. If the PRTR will be entirely or partly voluntary, how it will be monitored; and
(o) How the PRTR will be implemented administratively and by whom, e.g. guidance issued to reporters, inspection capabilities, data reception and analysis.

Once consultations with affected and interested parties are launched, government personnel responsible for instituting the PRTR can develop proposals for what legal authorities, if any, and what financial and human resources will be needed to implement the PRTR (especially in its early stages). Box 2 gives the results of a study to determine ways, means and costs to governments for initially testing a PRTR. It indicates that a few staff plus two microcomputers can be a good start and perhaps manage a simple PRTR system. (Chapter 3 gives more details about costs to governments, reporters and users of PRTR data.)

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[1] For reasons of simplicity the word chemical(s) will be used throughout the document. However, it will mean chemical species. A definition of this term can be found in the Glossary of Terms at the end of this document.

Prior to implementing the PRTR, government may wish to consider training programmes for reporters, for government personnel who will receive reports, and for interested citizens wanting to know about the PRTR and its uses. This training will need to be tailored to the particular PRTR chosen. The investment in training is likely to provide strong benefits to government in the form of more complete and consistent PRTR reports, better data analysis and broad public confidence in the PRTR outcomes.

The remainder of this Guidance Manual deals in more detail with how national governments can approach each of the main issues in designing, negotiating and implementing a successful and affordable PRTR. The United Nations Institute for Training and Research (UNITAR) has implemented pilot training programmes to help interested governments to use the information in this Guidance Manual and other sources to develop appropriate national approaches for a PRTR.

BOX 1

DESIGNING A CANADIAN PRTR

In Autumn 1991, Environment Canada initiated the design of a National Pollutant Release Inventory, the Canadian version of a PRTR. Stakeholders from industry, environmental organisations, labour organisations, provincial government agencies and national government formed a 23 person committee to develop the bases for this PRTR. The Committee set up work groups to study the scope, list of chemicals to be included, sources and reporting thresholds. In 1992, the Committee held a number of information/consultation sessions throughout Canada to obtain additional views.

The Committee achieved consensus that anyone who owns a facility in Canada which manufactures, processes or otherwise uses any of the substances on the Canadian PRTR list in quantities of 10 tonnes or more per year, and that employs 10 or more employees per year, be required by law to report releases/transfers to the Minister of Environment. The Committee agreed on a list of 176 substances as the initial items to be reported; these were drawn from the list used in the United States Toxic Release Inventory but omitted all items not in Canadian commerce. The Committee proposed additional items to update the Canadian list.

The Committee agreed that data be collected electronically on a computerised reporting form. But a paper version is available for reporters not having computer availability. The Committee agreed as well that data be electronically accessible from any part of Canada and that the PRTR present geographic data about releases/transfers.

The Committee completed its work in December 1992 and identified a number of items on which consensus must still be reached such as how to track reductions in the use of toxic chemicals, measuring progress in pollution prevention and use of the PRTR to aid in emergency response planning. There is ongoing discussion about additions to the Canadian list as well. The proposed additions to the list of chemicals and the proposed modifications to the Canadian PRTR are part of the future work for Environment Canada.

Based on the work of the Committee, the Canadian PRTR was established under law incorporating the Committee's recommendations. This PRTR is expected to evolve in future. Stakeholder consultation will continue to play a major role in the further development of the Canadian PRTR.

Source: Canadian presentation to OECD Workshop, 24-26 January 1994.

BOX 2

SUMMARY OF ESTIMATED RESOURCES NEEDED FOR A NATIONAL GOVERNMENT TO ESTABLISH A TOXIC CHEMICAL INVENTORY.

	Country with 150 Facilities Reporting Waste Stream Data an Average of 4 Chemicals Each*		**Country with 1,200 Facilities Reporting Waste Steam and Product Stream Data** on an Average of 8 Chemicals Each**	
First Year	**Subsequent**	**First Year**	**Subsequent**	
Establish inventory on its own	2 microcomputers 4.8-5.1 person-yrs.	2 microcomputers 1.5-1.6 person-yrs.+	2 microcomputers 8.5-8.9 person-yrs.+	2 microcomputers 4.6-4.7 person-yrs.+
Establish the inventory based on an international model and software	1 microcomputer 1.8-2.3 person-yrs.+	1 microcomputer 1.4-.15 persons-yrs.+	2 microcomputers 5.7-6.0 person-yrs.+	2 microcomputers 4.5-4.7 person-yrs.+

* Average number reported in United States of 320 items on list.
** Excluding product stream data would deduct approximately 0.8 person-yrs from the totals.

Source: "The Right to Know: The Promise of Low-Cost Public Inventories of Toxic Chemicals" World Wildlife Fund (1994).

CHAPTER 2

DEVELOPING A LIST OF CHEMICALS FOR A NATIONAL POLLUTANT RELEASE AND TRANSFER REGISTER

I. Setting goals

A PRTR is a tool which can help in attaining a variety of environmental policy goals. These goals need to be clearly set out and understood by all affected and interested parties before work is undertaken to develop criteria and a specific list of chemicals for a PRTR. The process of setting the goals and selecting the list of chemicals should involve affected and interested parties and be transparent. It should also take into account the needs, roles and rules of local, regional, national and even international entities.

Encouraging public awareness through the access to information and citizen participation in accordance with Principle 10 are important factors for the implementation of the recommendations of Agenda 21. One objective in developing a PRTR can be to acknowledge public right-to-know by facilitating access to information on pollutant release and transfers. In keeping with this approach, Agenda 21 at Chapter 19.50 states that industry should be encouraged to "adopt, on a voluntary basis, community right-to-know programmes based on international guidelines, including sharing of information on causes of accidental and potential releases and means of preventing them, and reporting on annual routine emissions of toxic chemicals to the environment in the absence of host country requirements." Another key objective for a PRTR involves its use in promoting reduction of risks of potentially harmful releases and/or transfers. Agenda 21 at Chapter 19.48 calls for, *inter alia*, eliminating "unacceptable or unreasonable risks and, to the extent economically feasible, to reduce risks posed by toxic chemicals...". There are specific goals to which a PRTR could apply, thus contributing to these (and other) tenets of Agenda 21 and to environmental policy in general. These are:

a) Reduction of risks from pollutant releases and transfers to humans and/or the environment while ensuring that sources of pollutant releases are identifiable and accountable;

b) Helping to obtain data so that regulated or controlled chemicals and/or chemicals to be reported under international obligations are monitored in a periodic and consistent fashion;

c) Identifying key environmental burdens and their sources locally and regionally;

d) Reduction of specific environmental burdens, e.g. greenhouse gases, ozone depleters, which have a global impact;

e) Promotion of pollution reduction and prevention as well as transformation toward the use of cleaner technologies, e.g. mandatorily or by voluntary actions on the part of the pollutant sources;

f) Encouraging and monitoring product stewardship by importers, fabricators, and distributors;

g) Promotion of integrated pollution prevention and control efforts, e.g. monitoring of effectiveness of regulatory regimes;

h) Harmonization and rationalisation of existing reporting requirements, e.g. contained in operating licenses and permits so as to improve efficiency and consistency of data collection and management;

i) Broadening of public participation and interest in environmental policy decision-making processes;

j) Dissemination of information concerning potential risks in local, regional or national contexts;

k) Encouraging the incorporation of a pollution prevention ethic within industry as companies realise the economic benefits of reducing the generation of releases and transfers which can require costly control mechanisms as well as treatment and disposal; and

l) Minimising the impact of future environmental liability.

Goal-setting is the first step toward developing and implementing a PRTR. The list of twelve goals can be taken as a starting point for discussions among government and affected and interested parties. Additional goals can be identified depending on circumstances in a given locale or country. In practice, all countries that have implemented a PRTR system have combined a number of these goals in order to increase the benefits of using a PRTR as a tool. In any event, specific goals need to be identified and agreed upon prior to developing specific details of a PRTR since the purpose and scope of a PRTR is set by the goal(s). Table 1 contains some examples of how a PRTR system might be adapted to take into account the tenets of Principle 10 of Agenda 21 and to goal (e) listed above.

II. Issues in selecting a list of chemicals for a PRTR

A. First steps

Once goals have been agreed, the next step is to define terms relevant to any PRTR system, e.g. "emission", "pollutant", etc. At the end of Chapter 5, a glossary of such terms, as proposed by the International Programme on Chemical Safety (IPCS) of the UN, can be found. This glossary includes not only IPCS suggestions but also those of the International Union of Pure and Applied Chemistry, World Health Organisation and the Concise Oxford Dictionary. The term "transfer"[2] is not included in this glossary because in the context of a PRTR, what constitutes a "transfer" can markedly affect the list of chemicals to be included in the PRTR system.

Affected and interested parties should decide how "transfers" will be treated in terms of the goals and implementation of a PRTR system. If a transfer, for example, were taken to mean only the removal of solid, sludgy or liquid wastes from the place of generation to a recovery operation, treatment or storage or disposal facility (off-site), then the PRTR list would properly include a list of such wastes. That is true so long as tracking waste movements has been identified as a goal of a PRTR. But if the meaning of "transfer" were broadened to include potentially harmful chemicals in products such as toluene in paints, nail polish and adhesives or mercury in batteries and fever thermometers, then reporters would need to indicate total quantities of these transfers. In that situation, the PRTR list would have to be drawn up to

[2] The Oxford English Dictionary defines the word *transfer* as: "to convey or take from one place, person, etc. to another; to transmit, transport; to give or hand over from one to another".

include those potentially harmful chemicals found in a variety of commercial products. In addition to these issues, the question of accounting for specific pollutants in case of transfer needs to be settled. The problem here is that if, say 1000 kg of paint wastes containing about 900 kg of toluene are sent to a disposal facility, what should be reported to a PRTR and by whom? Does the generator of the wastes report 900 kg of toluene transferred? And if the disposal facility incinerates the wastes, does it report air emissions containing certain pollutants resulting from the combustion process? These questions need to be resolved before detailed PRTR lists are drawn up.

A useful step after choosing goals and defining terms for a PRTR is to identify criteria associated with the goals as a guide for developing the list of chemicals. The scope of the PRTR will also need careful consideration in light of the goals set. Chemicals on the list must also be clearly delineated, e.g. by their Chemical Abstracts Service (C-A-S) and/or International Union of Pure and Applied Chemistry (IUPAC) descriptors. Insofar as possible, the chemicals should be individual and not grouped together in broad categories on the basis of chemical class, uses or a common adverse effect. Such broad categories could create a difficulty for a reporter in deciding if they must report, measure or calculate releases and keep an accurate track of use. Moreover, a clear definition to distinguish among chemicals, materials in products and mixtures of chemical species is needed. This will help reporters to determine if a substance which has been transformed in processing must be reported upon or not. The reason that broad categories may cause difficulties is that a reporter can have difficulty deciding if he must report, keep accurate track of use and measure or calculate releases.

The next step could then be to identify sources of releases and transfers within the scope of the goals of the proposed PRTR. This activity will provide some concrete ideas about pollutants currently being released and transferred. An additional benefit of this step is that reporters, government and other affected and interested parties can begin to gain hands-on experience with a PRTR system. Certainly the results of this type of experiment will be of use in preparing the list of pollutants for the full PRTR implementation.

Another useful approach at this stage might be one modelled on the 1988 Canadian Environmental Protection Act which required Canadian industries to register all chemicals then currently in use. This information was compiled into a general domestic substance list for all of Canada. Once the list was completed, producers wishing to introduce any "new" chemicals are required to notify authorities. In such an exercise, chemicals should be identified by their Chemical Abstracts Service (C-A-S) number and/or systematic name, e.g. International Union of Pure and Applied Chemistry (IUPAC) unique designators.

If certain chemicals are regulated or their use is severely restricted or banned under national laws or international agreements to which the nation is party, then these chemicals can be considered as prime candidates for inclusion in the list applicable for a PRTR system. Indeed, the national Chemical Release Inventory list in the United Kingdom is based entirely on substances included in the regulatory regime and tied into the licensing mechanism for authorising certain economic activities. Every particular substance regulated under UK law is included in the list. Hence, relevant environmental reporting schemes have been harmonized.

At this point, sources of information should be identified for data collection and reporting for register compilation and consolidation. The process used to develop the data collection criteria should be transparent to affected and interested parties. Here, transparency means that all affected and interested parties understand the process, that they have an opportunity to comment and provide input to ensure that they can see where, when, why and how decisions are taken to address issues raised by any specific party.

The criteria for determining who must report need to be simple to understand and easily applied since all sources need to determine whether or not they must report. For example, if a PRTR requires mandatory reporting of all chemicals on a given list, a facility must first determine if it falls within the

scope requiring it to report. For large facilities, this may mean a site-by-site review. Then those facilities that must determine if it releases and/or transfers any of the chemicals on the list at a level requiring a report. If so, timely and accurate reports must be filed.

At this point, governments may wish to consider whether reporting thresholds will be used, such as the number of employees or the amount of chemicals produced. Deciding this *a priori* can help in formulating the list and can reduce the number of reports expected. A *de minimis* threshold is certainly worth considering to reduce the number of reports or reporting burden without unduly reducing the amount of each substance reported in releases and transfers. Properly defining such a threshold could also serve to help reporters to better comply with other regulatory obligations.

Finally, governments may wish to review applicable regulatory and reporting schemes currently in force. And, if possible, make arrangements so as to avoid the duplication of reporting at the national level.

B. Developing a specific list

According to Chapter 19 of Agenda 21, there are approximately 100,000 chemicals in commerce. Agenda 21 also states that about 1500 specific chemicals are used commercially throughout the world. This number is slowly but steadily increasing with time and has led many countries to require pre-manufacturing notification and testing before any additional chemicals are allowed to enter the marketplace. To date, no operational PRTR has taken the approach of including all the chemicals in the marketplace. Reasons for this vary and include, *inter alia*: administrative and financial burdens to both reporters and competent authorities[3]; certain chemicals are not used in the area covered by the PRTR; there is little or no information about the inherent hazard of most chemicals and the risk to exposed populations if such chemicals are released or transferred.

This situation has led groups trying to develop a PRTR list toward the use of objective scientific criteria as a first step in the process of making listing decisions. For example, the Canadian Province of Ontario, in developing a list of candidates for the phase-out and ban of potentially harmful chemicals, assessed over 1000 substances. They identified a list of chemicals most inherently hazardous due to their persistence in air, sediments, soils or water, their potential to bioaccumulate and their toxicity were identified. Some 27 substances or substance groups were found to meet all three of these criteria. An additional 63 substances were found to exhibit two of the three criteria of persistence, bioaccumulation and toxicity. Annex 1 contains the criteria for preparing these lists and the lists themselves which form the basis for a voluntary Canadian programme entitled Accelerated Reduction/Elimination of Toxics (ARET). The actual list of ARET substances can be found in Annex 2. N.B. See Chapter 4 for more details about ARET.

Certainly additional criteria could be used in considering specific pollutants for a PRTR list. Criteria could be based on the hazard characteristics of the chemical. Systemic effects of chemicals such as carcinogenicity, mutagenicity, reproductive effects, developmental effects and neurotoxicity, and chronic, sub-chronic and acute effects, could be taken into account. In addition, pathways of exposure would play a role in deciding whether or not to list a specific item; ingestion, inhalation and dermal effects are often very different for the same pollutant. The likelihood of exposure of humans, animals and/or environmentally sensitive media also deserves consideration so that reporting and consequent efforts to reduce releases are focused on chemicals that realistically pose a risk considered to be unacceptable (as

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[3] Reporters comment that adoption of a chemicals list which is not based on its potential for harm to human health and/or the environment would incur a substantial burden on them in return for limited benefits.

defined by the government creating the list). This would mean that both route and level of exposure need to be taken into account[4].

The question arises: are there sufficient, critically reviewed quantitative data available for all potential chemicals of interest, e.g. the 1500 or so chemicals in current commercial use? At present, the answer to this question is quite simply "no". Nevertheless, there are many lists which are based on test results and careful evaluation; these lists have been compiled for a variety of purposes such as indicating carcinogens, bioaccumulators, dangerous chemicals in transport, hazardous wastes, etc. Several PRTR lists also exist. Annex 3 contains a "List of Lists" which can be consulted by those interested in compiling a PRTR list.

At this point, those desiring to develop a PRTR list are faced with a dilemma. While scientifically objective criteria are theoretically an excellent means to select a list, data may be sparse and disputes may exist about available data. Existing lists can offer hope that a relatively straightforward selection of pollutants can take place, say depending on scale of use, types of chemicals or species in commerce and potential for exposure. In practice, Canada uses a sub-list of the United States Toxic Release Inventory List -- which itself was originally taken from two lists in use by the States of Maryland and New Jersey.

If one opts for starting to develop a PRTR based entirely on evaluation of criteria, then the criteria of interest and methods (scoring) to select or eliminate a specific potential pollutant should be devised and agreed by all affected and interested parties. This process is likely to be difficult, time consuming and plagued by the lack of critical data in a number of instances. On the other hand, if one opts for examining existing lists of proscribed chemicals, the procedure can be simpler and more rapid. The list(s) of interest are screened to determine what chemicals might be released or transferred within the scope of the PRTR and whether these pose unacceptable risks (as defined by the country); and what exposure data are or are not available. Moreover chemicals which must be reported under national regulations (e.g. for operating licenses) or international agreements and have potential for significant exposure need to be taken into account.

In addition to these considerations, potential burdens on both reporters and report recipients deserve consideration. The larger the list which must be mandatorily reported, the greater these burdens are likely to be. On the other hand, a number of affected and interested parties argue that, except for strictly defined exclusions in respect of confidential business information, potential as well as known problems need to be considered when preparing a PRTR list. This argument takes the position that Agenda 21, the Rio Declaration and the International Labour Organisation Convention on Safety and the Use of Chemicals at Work, all indicate there are no pollutants that people (including workers) do not have the right-to-know about. It argues that pollutant releases and transfers cannot be considered innocent until proven guilty, but rather the reverse.

Differing points-of-view about goals, definition, and scope, combined with technical data gaps concerning candidates for a PRTR list, argue strongly for involving all affected and interested parties in the selection process. Not only representatives of government bodies, the public and the chemical industry may be concerned; but also, those involved in agriculture, transport, energy production, construction, waste management and other economic sectors. One important benefit of a PRTR is to identify and make

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[4] At this stage, governments may wish also to consider low production volume chemicals in those cases where the chemicals are considered to be highly toxic or those which are highly toxic and produced as a by-product as well as considering the lack of information about certain chemicals as a reason to include such chemicals on a PRTR list.

accountable sources of releases and for transfers of chemicals on the PRTR list. Hence, potential sources need to be involved in deciding on these chemicals.

Step-by-step process

Implementing a PRTR system will likely be a step-by-step process where all affected and interested parties will learn by doing. Again, depending on the goals and national objectives, PRTR lists may be developed from established criteria; may be small, medium or large lists of chemicals; and may address point and/or diffuse sources. To some, this suggests starting with a relatively small list of chemicals which tend to be proscribed by many countries, e.g. known carcinogens, cyanidic species, greenhouse gases (if PRTR agreed goals are to include non-point sources as well as point sources) and so on. There is, however, another way to operate in a step-by-step fashion and also compromise well with those who argue about burdens of reporting on chemicals which pose acceptable risks and those who argue that essentially all pollutant releases and transfers may pose unacceptable risks.

If preliminary surveys are made and a domestic substance use list is compiled, e.g. as in Canada, and any regulated, severely restricted or banned chemicals are identified, then a possibility is to include all of these on a general indicative list as being of interest. Moreover, any "new" chemicals subject to pre-manufacturing notices or other registration schemes could be added to this indicative list as and when timely. If a national government does not wish to develop a domestic substance use list, it might consider the entire list of Agenda 21, Chapter 19 substances for its indicative list. Questions now arise; how can such a large indicative list be used in a practical and efficient way? How can a PRTR system proceed in a step-by-step fashion from such a starting point?

Combination approach

An answer to both these questions might be to make a portion of the indicative list subject to mandatory periodic reporting while the remainder of the chemicals released or transferred would be subject to voluntary agreements among government, generators and other affected and interested parties. This combination approach would allow individual facilities to report most releases or transfers of local interest (as has been done by a number of large chemical facilities) on a voluntary basis, while reporting would be mandatory for an agreed set of chemicals. In both cases, active efforts to inform affected and interested parties about releases and/or transfers are necessary. Clearly, if the PRTR implementing authority had evidence that the voluntary reporting approach were not being properly implemented, it could then use its powers to expand the number of chemicals subject to mandatory reporting.

Selection of the initial mandatory reporting list could be carried on by a process of consultation and examination using existing PRTR on other lists, e.g. as was done in Canada (see Chapter 1, Box 1), and for the 1994 expansion of the USA. list or, as was done in the UK, all regulated chemicals could be included. The mandatory list need not be very large. Moreover, in the USA. in 1992 where 338 chemicals (including 20 broad groups of chemicals) were subject to mandatory reporting by each site which manufactured over 11.4 tonnes or processed over 4.6 tonnes of any chemical on the list, 25 chemicals accounted for 69 per cent of all reports and 60 chemicals accounted for 90 per cent of the reports. The other 278 chemicals accounted for ten per cent. On average, in the US about 4 chemical reports per facility are received. Based on this information, it should be borne in mind that a large list does not necessarily mean that an individual facility reports on a large number of chemicals. Reports are submitted only for those chemicals on the PRTR list which are released and/or transferred.

In sum, the mandatory portion of the indicative list should include pollutants known to cause health and/or environmental damage and to which conditions in the PRTR area allow for exposure.

Pollutants that have not been assessed comprehensively[5], but for which exposure can be assessed are also candidates. Depending on the goals selected, pollutants which are ozone depleters, precursors of acid rain, photochemical oxidants and greenhouse gases, could be included. Contaminants in food or potable water are candidates for the mandatory list. Nutrients which cause eutrophication may also be of interest.

As previously mentioned, all chemicals on the indicative list should be uniquely identified by a C-A-S number. If no C-A-S number is applicable, then IUPAC unique identifiers should be used. This is the only way to ensure consistent and comparable data which can be evaluated at local, regional, national and even international levels.

No mandatory (or voluntary) list should be "cast in concrete". It should be reviewed periodically and revised if appropriate. The criteria for listing or de-listing an item may need to change if goals are changed. Moreover, the criteria for listing or de-listing should be equivalent, e.g. if the item fails criteria for listing it could be a candidate for removal from the list, or for not being included in the first place. Development of mechanisms for listing or de-listing should include all affected and interested parties.

C. Possibilities for a basic international core list

Some parties have advocated efforts to develop a basic internationally acceptable core list of PRTR pollutants. This would provide a basis for consistent international coordination for data collection and reporting. The main advantages of such a core list would be that countries would have a common basis for beginning to develop PRTR systems and that international comparisons of PRTR data would, in principle, have common and consistent datum. The main drawbacks are that getting consensus on such a list may be very difficult and time consuming. Moreover, no list is likely to be all inclusive whatever its size; "new" chemicals and waste mixtures appear nearly daily. One of several possible options is to start with a smaller list and phase-in or add chemicals as appropriate.

In the development of national PRTR lists, chemicals for a list could be screened according to a specified criteria. For illustrative purposes only, the following comments suggest one of many possible approaches toward a way to derive a basic core list. First, a series of general categories of chemicals to be monitored by a PRTR can be set out. Then specific chemicals can be listed under each of these. Choosing specific chemicals could be done based on criteria such as carcinogenicity, persistence, etc. and/or from existing lists such as the International Register of Potentially Toxic Chemicals (IRPTC) Legal File, the UN Recommendations on Transport of Dangerous Goods, the seventh amendment to EC Directive 67/548 published as Directive 92/32, the International Labour Organisation consolidated list, etc. (see Annex 3).

A possible list of general categories is included in Table 2-A as a possible list of activities which may generate releases and/or transfers of specific chemicals of these categories. (Table 2-A is based upon OECD Council Decision C(88) 90 (Final) of 27 May 1988 which deals with transfrontier movements of hazardous wastes). With this as a starting point, efforts could be made by affected and interested parties to set out detailed lists of specific chemicals under each of the general categories. Examples of possible detailed lists under the rubric of "ethers" and isocyanates" are shown in Table 3 which is based on the UN Recommendations for Transport of Dangerous Goods. Table 4 contains the minimum list of substances in the German Emission Inventory. Tables 5 and 6 contain lists suggested in Japan and Australia respectively.

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[5] The OECD Joint Chemicals Group and Management Committee has begun efforts to organise screening of the 1500 high production volume chemicals that have not been previously assessed. Data are expected to be forthcoming which can aid in selection of PRTR candidates.

The activities list shown as Table 2-B could enable governments to identify sources of releases and transfers by requiring all firms in a given activity to report chemicals used, imported, manufactured and distributed in order to develop a domestic use list with identified and so potentially accountable sources of releases and transfers. This list would also enable individual governments to identify chemicals not on the core list for possible monitoring under the national programme and likewise indicate that some chemicals on the core list were not of interest nationally. Another method used for screening chemicals is the Sunset Project screening process developed by Sweden. Chemicals from 70 different lists of potentially harmful substances were input into a database. A programme was designed so as to sort chemicals according to different criteria. Once the chemical substances were sorted, scores were assigned based on a set of criteria to identify multi-problem chemicals in Sweden.

In sum, this section offers some illustrative material concerning possibilities for a PRTR core list. If governments agreed that such a core list should be developed, an international expert body comprised of representatives of affected and interested parties from participating countries would need to be convened in order to develop proposals. This could be done under the aegis of an international organisation or body. In all probability the work would require extensive activity for two to three years if previous experience of preparing analogous lists, e.g. Basel Convention Waste List, is any indicator. The approach illustrated here could also be used by individual countries in developing a national list.

III. Summary

A broadly applicable approach toward developing a list of chemicals for a PRTR system includes the following steps:

(a) Set goals with all affected and interested parties participating in the discussion. Results enable the group to decide where a PRTR is a useful tool to achieve these goals;
(b) When and where the PRTR approach is selected, determine pollutants of potential interest and their sources;
(c) Once step (b) is completed, a list of chemicals to match the goals can be devised with the active participation of affected and interested parties;
(d) Proceed to build the PRTR system on a step-by-step basis (learn by doing). As noted by some observers, the first step need not necessarily be small;
(e) Ensure that the PRTR list can be reviewed and altered to remain consistent with the goals; and
(f) Select candidates for the list based on specific chemicals. Grouping elements and their compounds does not encompass potentially different effects of different chemicals within such a group.

In addition to this broadly applicable approach, some parties advocate development of an agreed international core list to form the foundation for PRTR systems in many countries. There is precedent for developing analogous international lists, but a decision to proceed, how to do so and participants in the process would require agreement by national governments and probably an international body to act as Secretariat for preparation of the list. A number of developing countries have expressed interest in the PRTR approach as evidenced by their attendance at the OECD Workshop and participation in the UNITAR pilot projects aimed at PRTR implementation in developing countries. While exhaustive examination of the issue associated with preparing a list in developing countries occurred during the OECD workshop, Box 1 contains the main issues discussed at the Workshop entitled "PRTR: Developing a List of Chemical Species".

BOX 1

PRTR LISTS IN DEVELOPING COUNTRIES

A PRTR, as noted in Chapter 1, can be a relatively inexpensive means for a country to pursue both economic development and environmental goals. A system that tracks use and release of materials, water, and energy can help a country both make the most efficient use of its resources and protect the environment. As pointed out by UNIDO, however, while the usefulness of a PRTR is widely recognized, the priority of many developing countries is development in general and industrial development in particular. Often very limited resources will be available in these countries for development of a PRTR system and collecting and processing data from the system.

In view of this situation, one possible approach would be to enlist the aid of multi-national firms who are doing business in the country to help develop a basic PRTR list and the PRTR system itself. The Czech Republic is following this course and is looking to begin pilot work on its PRTR system with large firms with a view to expanding coverage at a later time.

UNIDO has indicated that it could co-ordinate and assist in data collection from industries in developing countries. According to UNIDO representatives, the wide range of information already available within UNIDO from past and ongoing work in virtually every industrialised sector in many developing countries could be used to derive industry specific factors for estimating industrial pollutant releases and transfers in developing countries. One caveat pointed out by UNIDO is that collecting PRTR data from unorganised small firms (informal sector) will be very, very, difficult.

In preparing PRTR lists in developing countries, UNIDO recommends that the affected and interested parties:

- clearly define the goals and use of the PRTR system;
- consider the role of transboundary pollution and transboundary movement of chemical wastes;
- consider and plan how to take into account possible difficulties with data collection, management and dissemination;
- enlist the aid of locally operating multinational enterprises and international bodies in developing the PRTR system; and
- proceed in a step-by-step fashion, i.e. learn by doing. For example, all chemicals of the London Guidelines could be included in the initial list.

A number of activities are underway concerning PRTR adoption in developing countries. UNITAR, UNEP/IRPTC and UNIDO are taking leading roles in the UN system. Some OECD governments have sponsored training courses dealing with PRTRs in developing countries. Non-governmental organisations have also been active from local to national levels. Implementing successful PRTR systems in developing countries is plausible. This encouraging trend will need to be maintained and supported to increase the probability that a number of developing countries will be able to implement and obtain the benefits of a PRTR at affordable costs.

TABLE 1

A. ADAPTING PRTR TO THE GOAL OF PUBLIC RIGHT-TO-KNOW

GOAL	PUBLICLY AVAILABLE, READILY ACCESSIBLE INFORMATION ON CHEMICAL USE, RELEASE, TRANSFER AND DISPOSAL
MEANS TO ACCOMPLISH GOAL	MAKE EXISTING INFORMATION IN GOVERNMENT FILES PUBLICLY AVAILABLE AND READILY ACCESSIBLE PRTR REPORTING OF REMAINING DATA SET BY ALL CHEMICAL USERS, MANUFACTURERS, IMPORTERS, PROCESSORS, AND DISTRIBUTORS
MEASURE OF PROGRESS	SURVEY TO DETERMINE AMOUNT OF DATA PUBLICLY AVAILABLE AND READILY ACCESSIBLE (e.g. BARRIERS TO DATA AND OUTREACH TO POTENTIAL USERS)
INFORMATION REPORTED	ALL ACTIVITIES (e.g. MANUFACTURE, IMPORTATION, USE, AMOUNT OF SUBSTANCE INCORPORATED IN PRODUCT, SOLD, RELEASED, TRANSFERRED, DISPOSED, ETC.)
FREQUENCY OF REPORTING	AT LEAST ANNUALLY; PERPETUAL REPORTING
SUBJECT CHEMICALS AND EXCLUSIONS	ALL CHEMICALS, ALL INFORMATION THAT IS PUBLICLY AVAILABLE
OBLIGATION OF COMPETENT AUTHORITY	ENFORCEMENT; ENSURE DATA QUALITY AND AVAILABILITY; EDUCATE POTENTIAL USERS OF THE DATA; ADVERTISE AVAILABILITY

Source: Business & Industry Advisory Committee (BIAC) Presentation, OECD Workshop June 1994, as amended by OECD.

TABLE 1

B. ADAPTING PRTR TO THE GOAL OF PROMOTION OF POLLUTION REDUCTION AND PREVENTION

GOAL	A VOLUNTARY REDUCTION OF ENVIRONMENTAL RELEASES AND CERTAIN TYPES OF TRANSFERS OF CERTAIN CHEMICALS BY CERTAIN INDUSTRIES
MEANS TO ACCOMPLISH GOAL	OBTAIN VOLUNTARY AND PUBLIC COMMITMENTS OF RELEASE AND TRANSFER REDUCTIONS FROM THE TARGETED INDUSTRIES
MEASURE OF PROGRESS	REQUIRE ANNUAL PRTR REPORTING ON THE RELEASE AND TRANSFER OF THESE SUBSTANCES FROM THE TARGETED INDUSTRIES
INFORMATION REPORTED	RELEASE AND TRANSFER DATA
FREQUENCY OF REPORTING	ANNUAL REPORTING UNTIL COMMITMENT HAS BEEN MET OR OVERALL NATIONAL GOAL ACHIEVED
SUBJECT CHEMICALS AND EXCLUSIONS	TARGET SUBSTANCES ONLY; TRACKING INFORMATION ALREADY COLLECTED; SMALL SOURCE EXCLUSION.
OBLIGATION OF COMPETENT AUTHORITY	OBTAIN COMMITMENTS; ENFORCE REPORTING REQUIREMENT; ENSURE DATA QUALITY

Source: BIAC Presentation, OECD Workshop June 1994, as amended by OECD.

TABLE 2

A. EXAMPLE LIST OF GENERAL CATEGORIES FOR A PRTR LIST

Category:

Acidic solutions oracids in solid form
Antimony; Antimony compounds
Any material contaminated with any congener of polychlorinated dibenzo-p-dioxin
Aromatic compounds; polycyclic and heterocyclic organic compounds
Arsenic; Arsenic compounds
Asbestos (dust and fibres)
Azides
Barium; Barium compounds; excluding barium sulphate
Basic solutions or bases in solid form
Beryllium; beryllium compounds
Biocides and phyto-pharmaceutical substances
biphenyls (PBB's)
Cadmium; cadmium compounds
Chlorates
Cobalt compounds
Copper compounds
Creosotes
Ethers
Halogenated organic solvents
Hexavalent chromium compounds
Hydrocarbons and their oxygen, nitrogen and/or sulphur compounds not otherwise taken into account in this Table
Infectious substances
Inorganic sulphides
Inorganic flourides compounds excluding calcium fluoride
Inorganic cyanides
Isocyanates, thiocyanates
Lead; lead compounds
Mercury; mercury compounds
Metal carbonyls
Nickel compounds
Organic solvents, excluding halogenated substances
Organic nitrogen compounds; especially aromatic amines
Organic cyanides
Organic nitrogen compounds; especially aliphatic amines
Organic phosphorous compounds
Organohalogen compounds, excluding inert polymerized materials and other substances already referred to in this Table.
Perchlorates
Peroxides
Pharmaceutical or veterinary
Phenols; phenol compounds including chlorophenols

TABLE 2 (continued)

Polychlorinated biphenyls (PCB's) and/or polychlorinated terphenyls (PCT's) and/or polybrominated
Selenium; selenium compounds
Silver compounds
Substances of an explosive character
Sulphur organic compounds
Tellurium; tellurium compounds
Thallium; thallium compounds
The following alkaline or alkaline earth metals; lithium, sodium, potassium, calcium, magnesium in uncombined form
Tin compounds
Vanadium compounds
Zinc compounds

TABLE 2

B. ACTIVITIES WHICH MAY GENERATE POLLUTANTS SUBJECT TO A PRTR SYSTEM

Agriculture - Farming Industry

A100 Agriculture, forest management
A101 Cultivation
A102 Animal husbandry
A103 Forest management and forest exploitation (lumbering)

A110 Animal and vegetable products from the food sector
A111 Meat industry, slaughterhouses, butchery
A112 Dairy industry
A113 Animal and vegetable oil and grease industry
A114 Sugar industry
A115 Others

A120 Drink Industry
A121 Distillation of alcohol and spirits
A122 Brewing of beer
A123 Manufacture of other drinks

A130 Manufacture of animal feed

Energy

A150 Coal industry
A151 Production and preparation of coal and coal products
Al52 Coking operations

A160 Petroleum industry
A161 Extraction of petrol and natural gas
A162 Petroleum refining
A163 Storage of petroleum and products derived from refining of natural gas

A170 Production of electricity
A171 Central thermal facilities
A172 Central hydraulic facilities
A173 Central nuclear facilities
A174 Other central electricity facilities

AI8O Production of water

Metallurgy - Mechanical and Electrical Engineering

A200 Extraction of metallic ores

A210 Ferrous metallurgy
A211 Cast iron production (coke oven)
A212 Raw steel production (pig iron)
A213 Primary steel transformation (rolling mills)

A220 Non-ferrous metallurgy
A221 Production of alumina
A222 Aluminium metallurgy
A223 Metallurgy of lead and zinc
A224 Metallurgy of precious metals
A225 Metallurgy of other non-ferrous metals
A226 Ferro-alloy industry
A227 Manufacture of electrodes

A230 Foundry and metalworking operations
A231 Ferrous metal foundries
A232 Non-ferrous metal foundries
A233 Metalworking (not including machining)

A240 Mechanical, electrical and electronic construction
A241 Machining
A242 Thermal treatment
A243 Surface treatment
A244 Application of paint
A245 Assembly, wiring
A246 Production of batteries and dry cells
A247 Production of electrical wires and cables (cladding, plating, insulation)
A248 Production of electronic components

Non- Metallic Minerals - Construction Materials - Ceramics - Glass

A260 Mining and quarrying of non-metallic minerals

A270 Construction materials, ceramics, glass
A271 Production of lime, cement and plaster
A272 Fabrication of ceramic products
A273 Fabrication of products containing asbestos-cement
A274 Production of other construction materials
A275 Glass industry

A280 Building, building sites, landscaping

Primary Chemical Industry

A300 Production of primary chemicals and chemical feedstocks
A301 Chlorine industry
A351 Fertilizer fabrication
A401 Other manufacturing generators of primary inorganic industrial chemicals
A451 Petroleum and coal industry
A501 Manufacture of basic plastic materials
A551 Other primary organic chemical manufacture
A601 Chemical treatment of fats; fabrication of basic substances for detergents
A651 Fabrication of pharmaceuticals, pesticides, biocides, weed killers

A669 Other manufacture of finished chemicals

Industries producing products based upon primary chemicals

A700 Production of inks, varnish, paints, glues
A701 Production of ink
A702 Production of paint
A703 Production of varnish
A704 Production of glue

A710 Fabrication of photographic products
A711 Production of photosensitive plates
A712 Fabrication of products for photographic treatments

A710 Perfume industry and fabrication of soap and detergent products
A721 Fabrication of soap products
A722 Fabrication of detergent products
A723 Fabrication of perfume products

A730 Finished rubber and plastic materials
A731 Rubber industry
A732 Finished plastic materials

A740 Fabrication of products based upon asbestos

A750 Production of powders and explosives

Textiles and Leathers - Various Wood Based and Furniture Industries

A760 Textile and clothing industry
A761 Combing and carding of textile fibres
A762 Threading, spinning, weaving
A763 Bleaching, dyeing, printing
A764 Clothing manufacture

A770 Leather and hide industry
A771 Tanneries, tanning
A772 Fur trade
A773 Manufacture of shoes and other leather products

A780 Wood and furniture industry
A781 Sawmills, production of wood panels
A782 Manufacture of wood and furniture products

A790 Various related industries

Paper - Cardboard - Printing

A800 Paper and cardboard industry
A801 Fabrication of paper pulp
A802 Manufacture of paper and cardboard
A803 Finished goods of paper and cardboard

A810 Printing, publishing, photographic laboratories
A811 Printing, publishing
A812 Photographic laboratories

Commercial Services

A820 Laundries, bleaching services, dyers

A830 Business enterprise

A840 Transport, automobile dealers and repair facilities
A841 Automobile dealers and automobile repair facilities
A842 Transportation

A850 Hotels, cafés, restaurants

General Services

A860 Health
A861 Health (Hospitals, medical centres, nursing homes, laboratories)

A870 Research
A871 Research (including research laboratories)

A880 Administrative activities, offices

Households

A890 Households

Pollution Control - Waste Disposal

A900 Cleaning and maintenance of public areas

A910 Urban water treatment facilities

A920 Urban waste treatment

A930 Treatment of industrial effluents and wastes
A931 Incineration
A932 Physico-chemical treatment
A933 Biological treatment
A934 Solidification of wastes
A935 Collection and/or pretreatment of wastes
A936 Landbased disposal above, on or below the surface

Regeneration - Recovery

A940 Regeneration activities
A941 Regeneration of oils

A942 Regeneration of solvents
A943 Regeneration of ion exchange resins

A950 Recovery activities

TABLE 3

A. EXAMPLE OF POSSIBLE DETAILED LIST OF ETHERS FOR A PRTR

Identifier

2-Bromoethyl ethyl ether
Alkyl ethyl ether
Alkyl glycidyl ether
Butyl methyl ether
Butyl vinyl ether, inhibited
Chloromethyl ethyl ether
Diallylether
Dibutyl ethers
Diethyl ether (ethyl ether)
Diisopropyl ether
Dimethyl ether
Dipropyl ether
Divinyl ether, inhibited
Ethyl propyl ether
Ethyl butyl ether
Ethyl methyl ether
Ethylene glycol monobutyl ether
Ethylene glycol diethyl ether
Ethylene gycol mono methyl ether
Methyl propyl ether
Methylchloromethyl ether
Vinyl methyl ether, inhibited
Vinyl isobutyl ether, inhibited
Vinyl ethyl ether

TABLE 3

B. EXAMPLE OF POSSIBLE DETAILED LIST OF ISOCYANATES FOR A PRTR

Identifier

3-Cholo-4-methylphenyl-isocyanate
Alkyl isothiocyanate, inhibited
Cyclohexyl isocyanate
Dichorophenyl isocyanates
Diphenylmethane - 4,4 - diisocyanate
Ethyl isocyanate
Isobutyl isocyanate
Isophoronedrisocyanate
Isopropyl Isocyanate
Methoxymethyl isocyanate
Methyl isothiocyanate
Methyl isocyanate or Methyl isocyanate solutions
n-Butyl isocyanate
n-Propyl isocyanate
Phenyl isocyanate
Tert-Butyl isocyanate
Toluene diisocyanate

TABLE 4

A. Groups of Substances in the Minimum List for Reporting Under German Law

- Ammonia
- Asbestos
- Benzene
- Cadmium and inorganic cadmium compounds
- Carbon monoxide
- Carcinogenic substances
- Chlorine and gaseous inorganic compounds
- Diesel particles
- Dust
- Fluorine and gaseous inorganic fluorine compounds (as F^-)
- Lead and inorganic lead compounds (as Pb^-)
- Nitric oxides (as NO_{2-})
- Polycyclicals and other aromatics (as industrial substances)
- Sulphur dioxide
- 2,3,7,8 - tetrachlorodibenzo-p-dioxin (TCDD)
- Thallium and inorganic thallium compounds

B. Sectors of the Economy Which Must Report Under German Law

- Heat generation, mining, energy
- Non-metallic minerals, glass, ceramics, construction materials
- Steel, iron and other metals including metalworking
- Chemical products, pharmaceuticals, mineral oil refining and further processing
- Surface treatment with organic substances, manufacture of sheet material made of plastics, other processing of resins and plastics
- Wood, pulp
- Food, luxury foods and feedstuffs, agricultural products
- Recovery and removal of residual materials and wastes
- Storage, loading and unloading of substances and preparations

Source: German Federal Ministry for Environment, Nature Conservation and Nuclear Safety (Bonn)

TABLE 5

SELECTED JAPANESE CHEMICALS FOR JAPANESE CHEMICAL INDUSTRY ASSOCIATION (JCIA) RELEASE SURVEY

ORGANIC HALOGENATED SUBSTANCES 13

- CARBON TETRACHLORIDE
- CHLOROFORM
- CHLOROMETHYL METHYL ETHER
- 4.4'-DIAMINO-3,3'-DICHLORO-DIPHENYLMETHANE
- DICHLOROETHANES
- DICHLOROMETHANE
- EPICHLOROHYDRIN
- 1.1.2.2-TETRACHLOROETHANE
- TETRACHLOROETHYLENE
- TRICHLOROETHANES
- TRICHLOROETHYLENE
- VINYL CHLORIDE
- VINYL BROMIDE

ORGANIC NON-HALOGENATED SUBSTANCES 28

- ACETALBEHYDE
- ACETONITRILE
- ACETONE
- ACRYLONITRILE
- BENZENE
- CYCLOHEXANE'.
- 4,4'-DIAMINODIPHENYLKETHANE
- DIETHYL SULFATE
- DINETHIL SULFATE
- 1,4-DIOXANE
- ETHYLBENZENE
- ETHYLENE-GLYCOL
- ETHYLENE OXIDE
- FORMALDEHYDE
- HEXANES
- ISOPHORONE
- HETHYLALCOHOL
- METHYL BUTYL KETONES
- METHYL ETHYL KETONE
- NAPHTHALENE
- NITROBENZENE
- PHENOL
- PROPYLALCOHOLS
- PROPYLENE OXIDE
- STYLENE OXIDE
- TOLUENE
- VINYL ACETATE
- XYLENES

OTHERS 14

- CADMIUM
- CHROMIUM
- MERCURY
- SELENIUM
- LEAD
- NICKEL
- ARSENIUM
- MANGANESE
- CARBON DISULFIDE
- CYANIDE COMPOUNDS
- NITRIC ACID
- CARBONYL SULFIDE
- SULFURIC ACID
- PHOSPHORUS COMPOUNDS

Source: Japanese Chemical Industry Association (June 1995)

TABLE 6

POLLUTANTS BEING EXAMINED IN THE PRTR TRIAL IN AUSTRALIA

Emissions from biogenic, transportation, residential activities as well as from industrial sources are being considered. The pollutants being examined in the trial are listed below:

Acrylonitrile
Arsenic
Benzene
1,3,-Butadiene
Cadmium & compounds
Carbon monoxide
Chromium and compounds
1,4-Dichlorobenzene
Dichloromethane
Dioxins
Fluorides
Formaldehyde
Lead and compounds
Mercury and compounds
Methyl ethyl ketone
Methyl isobutyl ketone
Nickel and compounds
Nitrogen oxides
Non-methane hydrocarbons
Particulate matter (PM_{10})
Pesticides
Polycyclic aromatic hydrocarbons (PAHs)
Phosphine
Styrene
Sulfur dioxide
Tetrachloroethylene
Toluene
Toluene diisocyanate
Vinyl chloride
Xylene

(N.B. Ultimately, it is anticipated that the final list will contain 60 to 150 chemicals. This would ensure that key emissions of community concern are covered, that sufficient emissions posing a threat to the environment are highlighted and that costing for resources can be more accurately calculated.

Source: Environment Protection Authority (Melbourne, Victoria, Australia) August 1995.

ANNEX 1[6]

PROTOCOL FOR SELECTING CANDIDATE SUBSTANCES FOR BANS, PHASE-OUTS OR REDUCTIONS

I. Background

In June 1991 the Ontario Ministry of the Environment's Hazardous Contaminants Branch and Water Resources Branch were directed to establish a list of candidate substances to be considered for banning, phasing out or use/release reductions. The results were: (i) a process for selecting the substances, (ii) primary and secondary lists of substances for consideration, (iii) a review of the data on loadings of the primary list substances to receiving waters from industrial and municipal direct point source dischargers, (iv) a hazard evaluation of industrial and municipal effluents monitored under MISA and (v) a review of the receiving water impacts, including sediment and biota impacts, attributable to point and non-point source inputs of substances on the Primary List.

Il. Selection protocol

A substance was placed on the Primary List on the basis of the following criteria:

A. Persistence

A substance is considered to be persistent if its half-life in air, water, sediment or soil exceeds 50 days. Sludge may be used as a surrogate for sediment. Metals are considered to be persistent in all media. The 50-day trigger is based on the UC's definition of persistence, i.e. half-life of $\geq$ weeks.

B. Bioaccumulation

A substance is considered bioaccumulative if its freshwater fish bioconcentration factor (BCF) exceeds 500 or if its log Kow exceeds 4. This is based on the bioaccumulation trigger value for the Ontario Effluent Monitoring Priority Pollutants List.

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[6] Paper presented at OECD Workshop on "PRTRs: Criteria for Selecting Chemical Species", (Ottawa, Canada, 14-16 June 1994) by Adam C. Socha, Standards Development Branch, Ontario Ministry of Environment and Energy, Toronto, Ontario, Canada.

C. Toxicity

A substance is considered toxic if it is a human or animal carcinogen or if it is one of the most potent 10-15% of substances for each of the following effects: acute lethality, chronic/subchronic toxicity (including phytotoxicity) and teratogenicity. Specific criteria are as follows:

a) Acute Lethality

Aquatic LC_{50}	$\leq$0.1mg/L, or
Oral LD_{50}	$\leq$0.5mg/kg, or
Dermal LD_{50}	$\leq$0.5mg/kg, or
Inhalation LC_{50}	$\leq$1.5mg/m^3

b) Chronic/Sub-chronlc Toxicity

Aquatic Biota: EC_{50} $\leq$0.02mg/L, or
MATC $\leq$O.002mg/L, or
NOAC $\leq$0.0002 mg/L,
in different genera

Terrestrial Non-Mammals:
Subchronic Exposure: effects at $\leq$/1mg/kg/day, or
Chronic Exposure: effects at $\leq$0.5mg/kg/day,
in different genera

Mammals: Exposure $\geq$ 90 days: oral NOAEL $\leq$0.1mg/kg/day or
inhalation NOAEC $\leq$0.3mg/mg^3; or

Exposure 28 <90 days: oral NOAEL $\leq$1mg/kg/day, or
inhalation NOAEC $\leq$0.3mg/mg^3

Plants Aqueous medium:
NOAEL or $\leq$5% effect @<0.001 mg/L;
EC_{50} > 5-50% effect @<O.01mg/L;
>50% effect @ <0.1mg/L;

Air medium:
NOAEL or $\leq$5% effect @ <0.01mg/m^3
EC_{50} or > 5-50% effect @ <0.1mg/m^3;
> 50% effect @ < 1mg/m^3;

Soil medium:
NOAEL or $\leq$5% effect @ < 0.01 mg/kg;
EC_{50} or > 5-50 % effect @ < 0.1mg/kg;
> 50% effect @ < 1 mg/kg.

c) Teratogenicity

Teratogenic effects observed without overt maternal toxicity at maternal exposures ≤O.1mg/kg/day (or equivalent inhational or dermal dose) during organogenesis.

d) Carcinogenicity

Human or animal carcinogen according to IARC or US EPA classification, i.e. classified by IARC as a Group 1, 2A or 2B carcinogen or by the US EPA as a Group A, Bl or B2 carcinogen.

A Secondary List was also created, composed of substances that are toxic and either persistent or bioaccumulative (Group A), are persistent and bioaccumulative but somewhat less toxic than those on the Primary List (Group B), or are persistent or bioaccumulative but somewhat less toxic than those on the Primary List (Group C). This list is recommended as a "second tier" set of substances.

The substance selection protocol and data used for substance selection are fully documented in the report entitled "Candidate Substances for Bans or Phase-Outs", available through the Ontario Ministry of Environment and Energy’s Public Information Centre, 135 St. Clair Avenue West, Toronto, Ontario M4V IP5 Canada, order code PIBS 2709.

ANNEX 2

ARET CANDIDATE SUBSTANCES LIST

The following is the ARET list of candidate substances for action. These substances have been selected from a list of chemicals detected in the Canadian environment. There is evidence that these substances: 1) have the potential to have harmful effects on human, animal, or plant life; 2) tend to degrade very slowly in the environment; and/or 3) tend to accumulate in living organisms.

This listing is meant as a preliminary guide to priorities, and is not meant to imply that actual harm is currently being caused by these substances. Decisions concerning priority for action will be made by the managers of emitting facilities based on additional criteria specific to each situation.

Property	**List A-1**	**List A-2***	**List B-1**	**List B-2**	**List B-3**
Toxicity	Yes	Yes	Yes	Yes	Yes
Bioaccumulation	Yes	Yes	Yes	No	No
Persistence	Yes	Yes	No	Yes	No

*ARET consensus was not reached.

The substances have been categorized by chemical grouping and are accompanied by Chemical Abstract Service Registry Number (CASRN) for ease of use with WHMIS (Workplace Hazardous Materials Information System) and the NPRI (National Pollutant Release Inventory) data management systems.

Substance Review Process

Scientific, information on substances is continuously being improved. Any new information on an ARET substance may be provided to the Secretariat for co-ordination of a review of the substance's classification. The Secretariat will provide the information to the ARET substance section subcommittee members. Based on that information, they will prepare a recommendation to the ARET committee for a decision on whether the substance listing should be modified.

At this time, three substances or groups are being reviewed:

1.4 dichlorobenzene:

-- a request has been made that the listing be reconsidered based on:
- bioaccumulation (ARET used worst-case scoring for all substances)
- toxicity (ARET used the IARC classification of possible human carcinogen)

PAHs:

-- a request has been made to move this group to list B-2 based on the relevance of the species used to score PAH data on bioaccumulation

4.4'-methylenebis(2-chloroaniline):

-- a general request for review has been received. The Secretariat is waiting for information to be provided.

Further Information

The Secretariat invites any new information on ARET substances. Each ARET progress report will provide updates of substance review activities. A more detailed description of the criteria and process for selecting these substances is available from the ARET Secretariat at (1) 819-953-9086, or by fax at (1) 819-953-7970.

LIST A-1 (meet or exceed criteria for toxicity, bioaccumulation and persistence)

ARET's vision for substances on this list is the virtual elimination of discharges into the environment from human activities. The short-term goal is for significant reduction in discharges.

	CASRN
Polychlorinated Biphenyls (PCBS)	
Polycyclic Aromatic Hydrocarbons (PAHs) as a group	
(The following specific PAHs met or exceeded the criteria for List A-1.)	
Benz(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(e)pyrene	192-97-2
Benzo(b)fluoranthene	205-99-2
Benzo(j)fluoranthene	205-82-3
Benzo(k)fluoranthene	207-08-9
Benzo(g,h,i)perylene	191-24-2
Chrysene	218-01-9
Dibenz(a,h)anthracene	53-70-3
Dibenzo(a,i)pyrene	189-55-9
Dibenz(a,j)acridine	224-42-0
7H-dibenzo(c,g)carbazole	194-59-2
Fluoranthene	206-44-0
lndeno(1,2,3-c,d)pyrene	193-39-5
Perylene	198-55-0
Phenanthrene	85-01-8
Pyrene	129-00-0

	CASRN
Nitro-PAHs	
1,6-dinitropyrene	42397-64-8
1,8-dinitropyrene	42397-65-9
Metal compounds	
*Methyl mercury	22967-92-6
Tributyltin	688-73-3
Chlorinated organics	
Hexachlorobenzene	118-74-1
alpha-hexachlorocyclohexane	319-84-6
gamma-hexachlorocyclohexane	58-89-9
4,4'-methylenebis(2-chloroaniline)	101-14-4
Octachlorostyrene	29082-74-4
Pentachlorophenol	87-86-5
2,3,7,8-tetrachlorodibenzofuran	51207-31-9
2,3,7,8-tetrachlorodlibenzo-p-dioxin	1746-01-6

*For prevention/control actions, mercury should be addressed (see List B-2)

LIST A-2 (ARET members were unable to agree on the appropriate vision and resulting reduction targets for these substances)

ARET's goal for substances on this list is for the reduction of discharges to levels that are insufficient to cause harm. The short-term goal is for significant reductions in discharges.

		CASRN
*	1,4 dichlorobenzene	106-46-7
**	Cadmium compounds (respirable & soluble inorganic forms)	

* The toxicity criterion was met for possible carcinogenicity by accepting International Agency for Research on Cancer (IARC) classification of "possible human carcinogen".

** The selection process was unable to take into account specific metal compounds, and therefore scores for metals were based on a composite score for several metal species. For cadmium, actions may be tailored to such compounds as CdCO3, Cd(OH)2, CdCI2, CdO, and CdSO4. The concept of virtual elimination of discharges for metals is under discussion and was not resolved by ARET.

LIST B

For the List B substances, the vision is reduction of discharges to levels that are insufficient to cause harm. The short-term goal is for significant reductions in discharges.

LIST B-1 (meet or exceed criteria for toxicity & bioaccumulation)

	CASRN		CASRN
PAHs with data screened in this category:		**Chlorinated organics**	
Anthracene	120-12-7	3,3' dichlorobenzidine	91-94-1
7,12-dimethylbenz(a)anthracene	57-97-6	Hexachlorocyclopentadiene	77-47-4
Dimethylnaphthalene	28804-88-8	2,4,6-trichlorophenol	88-06-2
Other			
bis(2-ethylhexyl)phthalate	117-81-7		
*Tetraethyl lead	78-00-2		

*Degrades to lead, which is persistent (see List B-2).

LIST B-2 (meet or exceed persistence & toxicity criteria)

	CASRN		
PAHs with data screened in this category		**Other**	
Benzo(a)fluorene	238-84-6	o-anisidine	90-04-0
Benzo(b)fluorene	30777-19-6	Cyanides	57-12-5
Dibenz(a,h)acridine	226-36-8	4,6 dinitro-o-cresol	534-52-1
Chlorinated organics		1.4 dioxane	123-91-1
alpha-chlorotoluene	100-44-7	Ethylene oxide	75-21-8
bis(2-chloroethyl)ether	111-44-4	2-naphthylamine	91-59-8
Bromodichloromethane	75-27-4	2-nitropropane	79-46-9
Carbon tetrachloride	56-23-5	Thiourea	62-56-6
Chloroform	67-66-3		

PAHs (cont'd)	
Chlorodibromomethane	124-48-1
1,2 dichloroethane	107-06-2
Methylene chloride	75-09-2
1,1,2,2,-tetrachloroethylene	127-18-4
2,3,4,6-tetrachlorophenol	58-90-2
Metal compounds	
Arsenic (inorganic)	N/A*
Asbestos	1332-21-4
Beryllium	7440-41-7
Chromium (Cr6+)	N/A*
Cobalt (inorganic salts)	N/A*
Nickel (inorganic, respirable, soluble)	N/A*
Silver (soluble, inorganic salts)	N/A*
Uranium (inorganic,respirable,soluble)	N/A*
Zinc (inorganic, respirable, soluble)	N/A*
Cobalt (inorganic salts)	N/A*
Copper (inorganic salts)	N/A*
**Lead (all forms except alkyl	N/A*
***Mercury (elemental & inorganic)	N/A*

* CASRN not applicable. The selection process was unable to take into account specific metal compounds, and therefore scores for metals were based on a composite score for several metal species.

** See also Tetraethyl lead on List B-1

*** See also Methyl mercury on List A-1

LIST B-3 (meet or exceed toxicity criterion)

	CASRN		CASRN
Chlorinated organics		**Aromatics**	
bis(chloromethyl) ether	542-88-1	4-aminoazobenzene	60-09-3
Epichlorohydrin	106-89-8	4-aminobiphenyl	92-67-1
1-bromo-Z-chloroethene	107-04-0	Aniline	62-53-3
1-chloro-4-nitrobenzene	100-00-5	Benzene	71-43-2
1,2-dibromo-3-chloropropane	96-12-8	Benzidine	92-87-5
1,2-dichlorobut-3-ene	760-23-6-6	Dimethylphenol (mixed isomers)	1300-71-6
2,4-dichlorophenol	120-83-2	2,6 dimethylphenol	576-26-1
1,3 dichloropropene	542-75-6	2,4 dinitrotoluene	121-14-2
1,1,2-trichloroethylene	79-01-6	2,6 dinitrotoluene	606-20-2
		1,2 diphenylhydrazine	122-66-7
Nitrosamines		2-methylpyridine	109-06-8
N-nitrosodimethylamine	62-75-9	Phenol	108-95-2
N-nitrosodiphenylamine	86-30-6	Toluene diisocyanates	26471-62-5
N-nitroso-di-n-propylamine	621-64-7		
Other		**Other (cont'd)**	
Acetaldehyde	75-07-0	Ethylene thiourea	96-45-7
Acetamide	60-35-5	Formaldehyde	50-00-0

Other (cont'd)

Acrolein	107-02-8	Hydrazine	302-01-2
Acrylamide	79-06-1	Hydrogen sulphide	7783-06-4
Acrylonitrile	107-13-1	Methyl isobutyl ketone	108-10-1
1,3 butadiene	106-99-0	4-nitrosomorpholine	59-89-2
Chlorine dioxide	10049-04-4	Quinoline	91-22-5
n-dodecane	112-40-3	Tetramethylthiuram disulphide	137-26-8
Ethanol	64-17-5	Vinyl bromide	593-60-2
Ethylene dibromide	106-93-4		

ANNEX 3

LIST OF LISTS

1. Health and Environmental Hazards

A. Risk Reduction

1. North Sea Conference: Priority Hazardous Substances
2. North Sea Conference: Most Hazardous Pesticides
3. HELCOM: Priority Harmful Substances
4. Substances that Deplete the Ozone Layer (European Union)
5. Carcinogenic and Sensitizing Substances regulated under Ordinance (AFS 1990:13) on Swedish Occupational List values (Sweden)
6. Risk Reduction Chemical (Sweden)
7. Toxic Chemicals Initiative List (USA)
8. Risk Reduction Programme (OECD)
9. Lists of Examined Existing and Classified New Chemical Substances: Class I Specified Substances (Japan)
10. Initial List of Prior Informed Consent (PIC) Chemicals (FAO/UNEP)
11. Risk Assessment of Air Pollutants (Sweden)

B. Carcinogenicity

1. Carcinogenic Substances in the EC List of Dangerous Substances (European Union)
2. International Agency for Research on Cancer (IARC): Carcinogens
3. USEPA Human Health Assessment Group List (USA)
4. National Chemicals Inspectorate's List of Carcinogenic Substances (Sweden)
5. NTP - Sixth Annual Report on Carcinogens (USA)

C. Neurotoxicity

1. Neurotoxic Substances in the Working Environment (Danish ad hoc list)

D. Reproductive Toxicity

1. Reproductive Toxicants in the Working Environment (Denmark)
2. Teratogenic Substances in the EC: List of Dangerous Substances (European Union)

E. Allergenicity

1. National Chemical Inspectorates List of Allergenic Substances (Sweden)
2. Sensitizing Substances in the EC: List of Dangerous Substances (European Union)
3. Nordic Allergy Project (Nordic Council of Ministers)

F. Global Warming, Air pollutants

1. Greenhouse Gases (IPCC WMO/UNEP)
2. Ozone Depleting Substances and Substitutes (UNEP)

G. Priority Substance Lists

1. UK Red List (United Kingdom)
2. List of Priority Substances (Netherlands)
3. CEPA Priority Substances List (Canada)
4. Canadian Priority and Candidate Chemicals List (Canada)
5. Commission of the European Communities List 1 Chemicals (European Union)
6. Clean Water Act Section 307: Priority Pollutants (USA)
7. National Pollutant Release Inventory (Canada)
8. BUA List of Existing Chemicals of Environmental Relevance, including 1st, 2nd Priority and 3rd Priority Lists (Germany)

H. Hazardous Substances/Wastes

1. CERCLA Hazardous Substances (USA)
2. SARA TITLE II Section 302, Extremely Hazardous Substances (USA)
3. SARA TITLE II Section 313, Toxic Chemicals (USA)
4. Environmentally Hazardous Substances in Wastes (Sweden)
5. Priority Chemicals in Hazardous Wastes (WHO)
6. United Nations Recommendations on Transport of Dangerous Goods (UN)

General

1. UNEP List of Environmentally Dangerous Chemical Substances Harmful at the Global Level (update)
2. International Programme on Chemical Safety Health and Safety Guides (IPCS)
3. Environmental Pollutants (Norway)
4. North Sea Conference Reference List
5. Catalogue of Substances Hazardous to the Aquatic Environment (Germany)
6. Substances with High Aquatic Toxicity: Selected from the Register of Environmental Properties of Chemicals: Substance List I (Finland)
7. Persistent Bioaccumulators (USA)
8. List of Examined Existing and Classified New Chemical Substances: Substances Confirmed to be Accumulated on a High Level (Japan)
9. Canada's Workplace Hazardous Materials Information System and Environmental Protection Act lists (Canada)
10. Candidate Substances List for Bans or Phase-out (Ontario, Canada)
11. Clean Air Act 112, Statutory Air Pollutants (USA)
12. List of Examined Existing and Classified New Chemicals Substances: Class 11 Specified Substances and Designated Substances (Japan)

13. WMS Scoring System (Netherlands)
14. NCF Research Priority List of Organic Compounds (USA)
15. HELCOM: Waiting list
16. Rippen List of Chemicals of Environmental Relevance (Germany)
17. IMO-GESAMP List of Substances Carried by Ships
18. IMO-GESAMP Evaluation of 2,500 Chemicals
19. UN List of Products Banned, Withdrawn, Restricted or Not Approved
20. International Labour Organisation - International Occupational Safety and Health Information Service (70,000 Chemical Safety Data Sheets)
21. WHO Environmental Health Criteria Programme List
22. WHO Joint Expert Committee on Food Additives - 200 "Pesticide" Active Ingredients
23. WHO/FAO Data sheets on Pesticides
24. IRPTC List, IRPTC Legal File
25. IPCS - International Chemicals Safety Cards
26. Biodegradation and Bioaccumulation. Data of Existing Chemicals based on the CSCL (MITI, Japan)
27. The seventh amendment to EC Directive 67/548 published as Directive 92/32
28. EC Directive 67/548 List of Dangerous Substances
29. "Chemical Substance Lists - A Guide to the Lists Used in the Swedish Sunset Project" KemI Report No. 1. 10/94, 1994.

Exposure

A. High Production Volume

1. The OECD Representative List of High Production Volume Chemicals
2. The Commission of European Communities High Volume List
3. Swedish High Volume Chemicals (Sweden)

B. Chemicals Found in the Environment, in Humans or in Other Organisms

1. Chemicals in the Environment (Japan)
2. Great Lakes Chemicals (IJC)
3. Organic Micropollutants in the European Aquatic Environment (COST)
4. National Human Adipose Tissue Survey (USA)
5. Identifications of Volatile Compounds in Mother’s Milk (USA)

C. General

1. Toxic Release Inventory (USA)
2. Priority Toxic Pollutants in Sludge from Publicly Owned Treatment Works (USA)
3. Hazardous Substances in Sewage Sludge (Sweden)
4. United Kingdom - Chemical Release Inventory List (UK)
5. National Pollutant Release Inventory (Canada)NNNN

CHAPTER 3

DATA MANAGEMENT AND REPORTING FOR A NATIONAL POLLUTANT RELEASE AND TRANSFER REGISTER

I. Scope of Chapter 3

Before the basic PRTR information management system can be designed, decisions must be taken about: a) the goals of a PRTR; b) who reports, how often; c) what portion of the PRTR list must be reported mandatorily; d) which data elements to include; and e) whether the PRTR system will include information about chemicals arising from sources of concern other than individual reporters. In order to provide as complete guidance as possible, this Chapter will deal with PRTR information management systems assuming both individual reporters and a PRTR component involving other sources of concern. This latter component is of importance because both the Canadian and Dutch PRTR systems include releases from diffuse sources. Both PRTRs clearly show that these sources are major contributors to pollution loads.

Once a list of chemical species has been selected for a PRTR system, the next step is to collect information about releases of each item on the list over a given time period. If releases of some (or all) chemicals on the list are mandatorily reported, governmental entities are the usual data recipients. If some items are reported voluntarily, then the reporters are the agents who collect the data and report upon releases. For mandatory reporting, government authorities are in a position to require that release data be reported in a uniform and consistent fashion. In cases of voluntary reporting, governments can arrange to confer with reporters and other interested and affected parties in order to promote uniformity and consistency of reporting. Unless national government acts to ensure that it is able to receive uniform and consistent data for all items on the PRTR list, data reported voluntarily are less likely to be submitted in a uniform manner.

In this chapter, information management system design, data management and resources needed to operate a PRTR system will be considered. The issues of thresholds for reporting, the role of small- and medium-sized enterprises (SMEs), claims of data confidentiality by reporters and voluntary versus mandatory requirement will also be considered. For PRTR type information from sources other than industrial reporters, the types of data needed and how they can be handled will be addressed.

II. PRTR information management: the case of individual reporters

A. Basic building blocks

To date, national governments who have implemented mandatory PRTR systems use them as one important way to obtain and disseminate information about pollutant releases, transfers and chemicals in use. The data elements for the PRTR must be clearly defined so that reporters understand exactly what data need to be submitted. In particular, the list of chemicals to be reported, the thresholds requiring a report for a given chemical, and the specific classification of facilities who must report need to be stated in unambiguous terms. As noted in Chapter 2, this means that chemicals on the list need to be identified as uniquely as possible, e.g. by C-A-S or IUPAC designation. It also means that for the private sector, industrial classification schemes such as the ISIC (International Standard Industrial Codes) or SIC (Standard

Industrial Codes) need to be used to designate those operations required to submit reports. (N.B. Table 2-B of Chapter 2 provides an example of a classification approach) Moreover, a decision must be taken concerning publicly-owned and/or operated facilities. For a PRTR to be more complete, these types of facilities must be included.

Thresholds

The threshold or threshold conditions chosen for triggering a report is a key parameter. The major portion of the costs for a reporter arise from the time and effort required to track and collect information to determine whether the facility releases any PRTR-listed chemicals meeting the threshold for the reporting period. Large firms suggest that over 75 per cent of their costs of compliance in the first year of operation of a PRTR can be attributed to identifying listed PRTR chemicals and determining if they exceed threshold requirements.

The US Toxic Release Inventory system requires reporting for each site which manufactures or processes more than 11.4 tonnes or processes more than 4.6 tonnes of any chemical on its list. This approach means that even if no release occurs, but manufacturing or processing above the limits has taken place, a report of "no release" must be filed. On the other hand, the United Kingdom requires a report for all chemicals which are regulated under United Kingdom law regardless of the characteristics of individual reporters. Hence, no threshold is needed. For toxicity thresholds, more potent chemicals such as dioxin or PCBs could have a lower threshold than say CO_2. The objective of thresholds is to obtain reports of releases and transfers while keeping the burden on reporters as light as possible and consistent with the goals of the PRTR system.

One approach toward this objective is to try to cooperate with reporters in setting up a test study designed to suggest a set of threshold criteria. On a volunteer basis, for chemicals on a PRTR list, reports of releases to all media, quantities processed, manufactured, full-time employees, wastes generated and amount of chemical in products (by type) shipped from facility could be obtained for a given test period. Costs to reporters of obtaining and reporting these data could also be provided. Then, the basis for an empirical approach to setting threshold values would exist. All interested and affected parties could be consulted in the decision-making process. This sort of empirical testing of a PRTR can provide a great deal of insight about how to set up and perhaps operate the data management system itself.

Common set of data elements

A review of national programmes suggests a common set of data elements which must be incorporated into a PRTR information management system which requires reports from individual facilities.[7]

This set which was reviewed by participants at OECD Workshop 3 (Basel, 1995) includes:

(a) Name and address of reporting facility and mailing address if different;
(b) Latitude and longitude of reporting facility;
(c) Activity identifier, e.g. SIC or four digit ISIC (N.B. Reporters can include industrial facilities, government facilities, public services such as power stations and so on.);
(d) Chemical name and identifier, i.e. C-A-S, IUPAC;

[7] A benchmark for reporting about processes on-site which may release chemicals covered by a PRTR system has been proposed by the World Wildlife Fund in conjunction with the Hampshire Research Institute. This benchmark, reproduced as Exhibit 1, is **one** example of all possible kinds of data a PRTR system might call upon reporters to provide. At present, as shown by Exhibit 2, no existing PRTR system attempts to obtain information for all of the data categories listed.

(e) In agreed units:
-- amount released to air, to soil, to water;
-- amount transferred (see Chapter 2);
-- total amount released and transferred;

(f) Period covered by report, number of hours of process operation, date submitted; and

(g) Are any data claimed as confidential by the reporter: If so, which? What generic data can be proved (if any) to make the PRTR results as meaningful as possible while still protecting proprietary information?

In addition to this basic common set of elements, three supplemental items are considered to be very important by many observers. These include:

(a) Name of parent firm, if applicable. For example, a state-owned enterprise should have the state identified as the parent. This helps to avoid double-counting and to identify sites belonging to one parent firm;

(b) A unique facility identification number (and if applicable for the parent firm as well), which stays with the facility as long as it operates no matter who owns the site. This helps minimize confusion with each site which releases listed items and the information reported from each site's parent firm. It also clarifies whom to contact in the case of data inconsistencies, omissions or errors and greatly facilitates year-to-year comparisons and linkages to other databases; and

(c) Name and details of how to reach a contact person at the facility and signature of an authorised official to verify who filled out the form. This needs to be provided so that any questions about reported data and information can be resolved.

If the common set of data elements plus the supplemental items are to form the basic building blocks for a national PRTR information system, then report forms can be designed to include these terms. These elements would appear to be the basic information a report form might require. On the other hand, some governments require additional information depending on the goals of their PRTR as shown in Exhibit 2. Therefore, some national report forms call for considerable additional information; in Germany for example, certain reporters must provide data about aggregate conditions of each of its releases, its concentration in mg/m^3, mass flow, total release in kg/yr and maximum concentration in mg/m^3. But for purposes of testing and initially implementing a PRTR system, the basic common set, plus the three supplemental items, may be sufficient in many countries.

B. Claims of data confidentiality

Confidentiality issues need to be considered early on. Clear and concise guidance must be provided to reporters, e.g. concerning thresholds, definitions, units of reportage, frequency of reports and conditions for claiming some data as confidential. The issue of confidentiality claims needs to be carefully considered prior to testing or implementing a PRTR data system. A number of OECD countries have developed criteria for dealing with such claims. For example, if a claim of confidentiality for data is made in Sweden, the claimant must indicate the information that is commercially sensitive and provide evidence that its disclosure might cause the claimant industrial or commercial harm.

Under the law governing the US Toxic Release Inventory, reporters can claim confidentiality only for chemical identity; information must be submitted to substantiate a trade secret claim, and a highly ranked corporate official must sign the claim. The US Environmental Protection Agency can levy penalties

on corporate officials if the claims are deemed to be false. When confidentiality claims are allowed[8], the PRTR database is filled in with generic information related to the data points held as confidential. The United Kingdom avoids the confidentiality issue in practice because reports are required for all regulated chemicals. Where national laws or regulations already govern how confidential business information is to be handled, these should be applied if and when a PRTR is to be implemented.[9]

Affected and interested parties should participate in recommending how confidentiality claims are to be handled consistent with the goals of the PRTR system chosen. If some or all of the PRTR reporting is to be done on a voluntary basis, then any data reporters view as confidential will probably not be reported. There seems no way to estimate how much information would be lost to the PRTR in this situation since no one will have an aggregate view of what data were withheld.

C. PRTR data quality: government and reporters

Government quality assurance and quality control

In this context "data quality" means the precision and accuracy of the figures submitted by reporters combined with administrative quality assurance and quality control (QA/QC). Reporters are responsible for the former; receivers of the reports are responsible for the latter. Here, administrative QA/QC means ensuring that reported data are entered fully, consistently and accurately into the main PRTR database (QA) and that some means exist to identify data outliers, e.g. a missed decimal point or a report in "tonnes" when "kilograms" is meant; and to query such outliers (QC).

Administrative QA/QC is always very important for the integrity of the PRTR. This is especially true if raw data are reported to decentralised collection points such as local or regional authorities and then aggregated into a national PRTR database. In such instances, the national authorities need the legal authority to obtain the data from the decentralised collectors either in raw form, e.g. as originally submitted, or there must be a uniform and verifiable QA/QC scheme for each data collection centre so that the national database is internally consistent. Details of the QA/QC methodology used by Canadian and United States officials are included in Annex 1 of this chapter.

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[8] In the United States, confidentiality claims may not be made if: 1) the company has already disclosed the data or has not taken reasonable precautions to protect it; 2) other laws require its disclosure; and 3) it is readily discoverable through reverse engineering. The company must also show that such a disclosure is likely to harm its competitive position. On the other hand, US law presumes that production capacity, process information used in the manufacture, processing or use of a chemical and results of research are indeed confidential and proprietary data. In practice, the US has created two parallel PRTR data bases, one with both confidential and non-confidential data which is used by the authorities to aggregate both types of data to provide the publicly available PRTR outputs which then do contain the total accurate amounts of each item on the list.

[9] Where no national law or regulations are in place concerning trade secrets, national governments may wish to:

(a) Require substantiation of confidentiality claims at the time they are submitted with PRTR reports;
(b) Limit the length of time for which a claim of confidentiality is made for an item to be reported to the PRTR database without resubstantiation of the need for confidentiality;
(c) Establish procedures for dealing with wilful or knowing false filing of confidentiality claims; and
(d) Require reporting facilities to suggest generic information for each item claimed as confidential.

If a facility submits a PRTR form which does not have the required information, or if QA/QC procedures suggest errors in reporting, then procedures must be available for the authorities to contact the reporter in order to correct the deficiency. In some cases, the reporter may be required to resubmit the report or corrected information. A time limit should then be set for the resubmission. In addition, the administrative QA/QC system must be able to discard the faulty report and/or information and properly incorporate the new report into the PRTR database.

Reporter quality assurance and quality control

So far as accuracy and precision of the data submitted by reporters are concerned, a recent example involving a large multinational firm is instructive. This firm decided voluntarily to publish its key releases to air, water and soil. Headquarters requested data from each of the firm's sites as to chemicals released, quantity released and whether it was to air, water or soil. The firm selected reporting thresholds for releases to air and water but required sites to report all releases to soil (no threshold). Headquarters then attempted to set up a uniform, computerised data collection and management system to handle the reports from each site. The outcomes were not entirely expected with respect to data transmission and consistency.

The lessons learned by the multinational firm which was seeking to obtain PRTR type data from all of its activities included the following ten key points:

-- Some site managers elected to report to headquarters by means of hard copy (paper) rather than setting up an electronic reporting mechanism which can be highly prescriptive and not easy to adapt to changed requirements, especially in areas which lack computer expertise.

-- The data from individual sites could be reported to the public separately so that PRTR type data for the local area would be available.

-- Specific computer software should not be mandated; rather, the method of reporting should be fairly flexible.

-- Expertise is needed, especially at headquarters level, in order that incoming data from each site can be correctly and coherently aggregated into a firm-wide database; training in database manipulation is needed to ensure that all PRTR results are properly and consistently accounted, i.e. in-firm QA/QC procedures need to be developed and implemented.

-- A decision must be taken at the outset as to what operational units must report; in other words, what is a facility, a site, a plant and who is responsible for reporting from each?

-- Clear guidelines must be given to all reporters about exactly what is meant by releases. For example, the firm in the example chose to exclude on-site recycling and transfers.

-- The issue of thresholds is difficult. For example, should transient intermediates, intermediate process steps, by-products of wastewater treatment, etc., be counted toward thresholds even if these species exist only briefly during processing? (N.B. If transients are included, then reporter's accounting systems become much more complex.)

-- The accuracy of reports from each site concentrated on how the release was determined e.g. by measurement mass balance, engineering judgement or other means (such as emission factors). Headquarters estimates accuracy at roughly plus or minus fifteen per cent on average relative to the reported figure. In other words, if a site reported a release of 100kg of a listed item, then headquarters estimated the true release to lie between 85 and 115kg after analysing

factors associated with obtaining the data. (The questionnaire used by the firm is reproduced as Annex 2.)

-- Appropriate guidance is crucial to precision and consistency of data reporting. The information being requested must be very clearly delineated to reduce confusion by reporters.

-- The exercise of obtaining the data certainly raised the awareness of managers and others throughout the firm about releases and wastage of materials. In turn, this is leading to reductions of releases.

These outcomes are instructive for governments who are considering instituting a PRTR system. The data reporting, collection and management system chosen by the authorities needs to be sufficiently powerful, and flexible to accommodate all parties involved. In particular, flexibility in receiving data in paper form or electronically, performing QA/QC on these data and ensuring consistent entry into the central data base is crucial.

The PRTR data collection and management system should allow reporters to design their own systems providing that the basic data elements requiring reporting are met and reported in a standardised form using a common identifier. It should be noted that where electronic systems are feasible to use, considerable resources and time can be saved. In addition, electronic reporting improves accuracy by avoiding common errors associated with data entry by the recipient.

A "site" often contains many separate sets of unit operations or "plants" producing marketable products using various processes. In real terms, release data arise at "plant" level. Then, each "plant's" data must be aggregated consistently to produce the data for a site. Finally, all data from all sites need to be correctly and consistently aggregated to produce a set of reportable PRTR data from the firm. Thus, firms must themselves develop a PRTR data collection and management system in order to properly report releases on a company-wide basis.

D. Small- and Medium-sized Enterprises (SMEs)

Inclusion of releases from SMEs deserves to be considered in a PRTR system; otherwise key information will almost certainly be lost. For example, about twenty per cent of total industrial CO_2 emissions in the Netherlands in 1992 arose from SMEs. Moreover, in local areas where SMEs predominate, they constitute the source of most releases: therefore taking them into account when establishing a PRTR is important. The majority of business ventures, within the OECD and beyond, are SMEs; for example nearly seventy per cent of German firms are so classified. In developing countries, SMEs frequently constitute 80 to 90 per cent of all industrial establishments. India has about 2 million SMEs employing 11 million people and accounting for nearly half the total industrial output of the country. In the "formal sector" in twelve large Latin American countries, there are 1.2 million SMEs with 21 million workers (65 per cent of all employment) which generate 38 per cent of GDP and account for 96 per cent of all manufacturing businesses.

These firms play an important role in the industrial fabric of all countries. They are engines for job creation and for technological innovation. Frequently, they can respond to changing conditions more rapidly and flexibly than large firms. But, as shown by a case study of Danish firms prepared for the OECD Technology and Environment Programme (1991), SMEs lack information and resources (money and people) to monitor and report PRTR type data and to invest in cleaner technologies to reduce pollution at the source. SMEs also lack access to finance, technological and/or managerial know-how, or access to outlets for their products such as export markets or government procurement. For many, it is difficult enough to ensure that marketable goods are available for sale on a daily basis and that there is sufficient cash flow.

Some countries may conclude that specific PRTR reports from all SMEs are likely to be difficult to obtain for a variety of reasons including lack of resources, inability to estimate releases and even lack of knowledge of what specific chemicals are in their feedstocks, products and releases. Still, a number of actions can be taken to help SMEs respond to PRTR objectives and also to reduce releases: these usually tend to be relatively costly since the most effective means to inform SMEs about environmental management issues (such as PRTR, technologies for cleaner production and products, etc.) appears to be through consultants who can work directly with SMEs and often in them. A number of OECD countries have established mechanisms to do this. Some countries have a well established network of trade associations that are available to provide assistance and training to SME members. Sometimes large industry will also provide assistance.

In the United States and Canada all firms with ten or more full-time employees who meet other threshold requirements must report. In the European Union, over 90 per cent of all firms have less than 50 employees. The real issue for reporters is level of expertise and ability to report - not size per se. And for PRTR system designers, an important issue is to balance the benefits of receiving reports from SMEs with the costs to reporters and the authorities.

At the outset of designing a PRTR data management and information system, a clear indication of thresholds identifying which individual facilities must report is needed to achieve PRTR goals in a cost-effective way. This can be set in terms of employees, turnover (sales per unit time), inputs to the facility (amounts processed), amounts manufactured, etc.

Clearly, the issue is not SMEs per se, but threshold values. If thresholds are set which require most SMEs to report individually, then the authorities would seem obligated to provide some form of assistance to aid such individual reporters. Some ways to engage SMEs in the PRTR process might include:

-- ensuring that any proposed government rules and regulations are developed with aid and advice from SME representatives. When these proposals are published, they must be in concise language which can be clearly understood by SME managers;

-- development of training programmes -- funded at government expense -- for SME personnel concerning the PRTR and its requirements;

-- provision of concise (one or two pages) information concerning the PRTR system proposed;

-- requiring a specific sample of SMEs to report yearly so each SME would only have to report directly, say every five years. Government could then use the sample results to estimate total releases and transfers from each industry classification of interest;

- free consulting for a few days perhaps sponsored by government or large industry;

- low interest loans to help SMEs prepare for PRTR reporting;

- direct aid and advice from large industry;

-- having governments provide means of estimating releases for various types of SMEs;

- using the proceeds of "green taxes" to help SMEs participate; and

- deploying industry-government assistance teams who at the request of the SME might act as "free" consultants to assist in reporting by suggesting pros and cons of environmentally-

friendly technologies in specific cases. (N.B. The liability of such teams would have to be waived probably, i.e. the SME operator could not sue them.)

Another SME reporting option concerns those reporters who have only one site. In this case, a simple reporting form can be considered[10], i.e. to include only the common set of data elements. Since few SMEs are likely to have more than one site, then SME reporters would almost all be eligible to use this form. Governments could then determine the minimum data requirements for reports to be submitted.

In sum, a complete PRTR needs release data from SMEs. The question is what is the best way to capture this information. The need for release data needs to be weighed against the costs of data reported by SME's. In practice, the thresholds chosen for triggering individual reports will determine who must report. If decisions are taken by PRTR designers to limit the number of SME reporters, estimates of releases from SMEs need to be developed.

E. Reporting forms

Countries which have implemented PRTR systems each have developed a reporting form. Exhibit [2] indicates what each of these requires. Exhibit [3] contains a list of items the Czech Republic has decided to include on its reporting form. Exhibit [4] contains a section of a form advocated by the Japanese Chemical Industry Association; this portion of the form indicates how that Association believes releases and additional reference data, e.g. calculated amount manufactured, etc., should be reported. Note the item for release per unit of manufacture. This measure gives a valuable means to track pollution release reduction over time in terms of production volumes. As an example, Exhibit [5] shows US releases per unit of manufacturing value added for 37 industrial classes for 1988.

An important issue for reporters and in designing report forms is the potential issue of double counting. This problem tends to arise for reporters that have multiple facilities. For example, if one facility in a firm transfers wastes containing a chemical on the PRTR list to another facility of the same firm for treatment or disposal, the shipping facility reports a transfer on its form. But the receiving facility also counts the chemical on its form if any is released during waste treatment operations. Thus, the authorities can receive reports including some double counting of the chemical.

In any event, when report forms are designed, clear guidance as to how such overcounting should be addressed is needed. One (complicated) way to try to minimize or eliminate this problem is to require the transferring facility to send a copy of a PRTR report form to the receiving facility. In this way the receiving facility could indicate on the report form what portion of the amount received was released to which media. The data management system used by the authorities could then be programmed to partition the transfer and release based on the forms received.

III. PRTR information management: the case of calculated results

A PRTR can contain a section documenting releases from individual reporters plus a section dealing with releases from other sources. The Netherlands and Canadian PRTR systems include both approaches. In the case of releases of PRTR listed species which are not taken into account in the data reported by facilities, statistical data and emission factors are used to estimate releases, e.g. from the transport sector. If this approach is included as part of a PRTR, the authorities are likely to be responsible for developing and maintaining the data estimation system.

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[10] Under the United States Toxic Release Inventory programme, a short form has been developed for those cases when the facility meets a threshold for reporting but has low volumes of the reportable chemical in waste.

For example, Table 1 contains a comparison of releases of 21 substances from the 1993 Canadian PRTR; data from releases of mobile sources and fuel distribution are contrasted with data provided by 1466 individual facilities. Results show that total releases from mobile sources and fuel distribution are more than seven times the total releases of the 21 substances as reported by individual facilities throughout Canada. Indeed, total releases from mobile sources and fuel distribution exceed total releases of the entire Canadian PRTR list of 178 substances as reported by all 1466 facilities by about 20 per cent.

Governments may elect to use emission factors or other statistically based calculated methods to estimate releases of certain chemicals on the PRTR list which are not reported by individual (point) sources. Data must then to be collected -- probably under government aegis -- in order to support this activity. For example, if NO_x emissions from transport activities are of interest to the government, then the number of vehicles (on and off-road types) and NO_x emissions characteristics of this fleet per kilometre travelled need to be estimated or extrapolated from other data sources.

Data from individual reporters appear to be necessary for estimating releases for governments seeking to encompass whole economic sectors. In other words, a PRTR does benefit from an individual reporting section even if releases from many other sources are calculated. One reason is that -- if it is available -- information from individual reporters can be used to provide an empirical basis for statistically estimating releases from each economic sector of interest. Thus, a reality check on the calculated scheme is provided by the reported data.

In a calculated scheme, the authorities will need to obtain data about such things as population density, traffic intensity, employees per enterprise in various economic sectors, land use, manufacturing value added, emissions per vehicle-km travelled 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 total releases of pesticides by the agricultural community, still another total No_x from transport activities.

The calculated scheme can be used, say, to estimate releases from SMEs by economic sector if it is decided not to have all SMEs submit individual reports. This approach is especially appealing if the SMEs in a given area operate in the so-called informal sector, i.e. are not officially registered businesses. In the Dutch approach, releases from SMEs are estimated based on number of employees. This approach is said to be a good one where the activities in question call for very similar processing methods, e.g. printing or dairy operations. Chemical companies unit processes are so varied that using number of employees is not valid for estimating releases.

For activities with a variety of processing methods (unit operations), models have been developed which estimate releases based on production data. The World Health Organisation (WHO) has been applying such a model; WHO provides a guidebook and training in its use. (N.B. The WHO model is not chemical specific.) The World Bank also has a similar model. Any such model must seek to estimate statistically valid releases taking into account process methods. Data from individual reporters are important in helping to devise these statistical models and to improve their validity.

If a PRTR is to include a section involving data from sources other than individual reporters, the authorities will almost certainly need to devise, test, operate, maintain and update computer models for analysing input data and estimating releases. Such a system needs to be linked to the data management system for receiving reports from individual facilities in order to provide some empirical basis for checking the validity of the model and its calculated estimates. Some international organisations and countries do have computer approaches already in use for this purpose.

While more complex than simply requiring individual facilities to report, a dual PRTR system (individual reports plus statistically estimated releases) can provide a great deal of information about the state-of-the-environment, who the key polluters are and how the situation varies with time. For example,

greenhouse gases or ozone depleters can be tracked in line with national obligations under international agreements such as the Framework Convention on Climate Change or the Montreal Protocol.

IV. Resource needs and PRTR information systems

Resources -- people, money, electronic devices -- are needed in order to initiate a PRTR system, design it, set up and operate the data collection scheme, maintain it and to disseminate results. (N.B. Further information concerning resources for information disswmination is in Chapter 4). Reporters also must use resources to report in accordance with agreed requirements or voluntary approaches. Resource requirements will vary depending upon the PRTR goals and system selected. If existing data reporting channels can be used to service the PRTR, then costs may be relatively low; the UK system which calls for reports on items already subject to licensing requirements is an example. If firms are already obtaining certain data for their own use, costs may be held down as well.

When new approaches to a PRTR are taken, resource needs for both reporters and the authorities should be considered and if possible estimated. A clear understanding of user needs and PRTR goals is essential to this process. Creative design of the PRTR system can limit total resource requirements, but start-up and first-year costs are likely to be higher than subsequent years.

For the authorities, resources needed can include:

-- Costs of developing, testing and implementing the PRTR system;

-- Costs of software and hardware for the information management system including selection and testing;

-- Data base development and maintenance or adapting a system currently in operation;

-- Training;

-- Preparing and distributing report forms -- electronic distribution is likely to conserve resources;

-- Validation of incoming data (QA/QC);

-- Updating of data;

-- Modelling and statistical evaluation if a calculated component is included in the PRTR;

-- Analysing and interpreting data;

-- Data entry and any subsequent data handling;

-- Dissemination of outputs; and

-- Aiding the public (including the media) in interpreting the data.

For reporters, resources needed can include:

-- Training;

-- Identifying PRTR listed chemicals (determining the chemical composition of feedstocks and products may be difficult);

-- Determining whether threshold quantities of listed chemicals are used;

-- Calculating or monitoring of releases and/or transfers;

-- Avoiding double counting;

-- Reviewing PRTR data (QA/QC);

-- Record keeping and documentation;

-- Submission of PRTR forms;

-- Compliance assurance and remedies in mandatory PRTR systems; and

-- Perhaps, setting up a computerised PRTR response system in-house to perform some of the above functions. (One large firm spent $1 million to do this.)

If significant changes to a PRTR system are made, costs may increase or may decrease, e.g. if simplifications are introduced. Ultimately, the resource implications of a PRTR system might be compared and aggregated with other environmental data gathering approaches such as licensing system requirements. Opportunities for efficiency might then be identified and adopted. Estimates exist suggesting that start-up and operational costs to authorities need not be prohibitive; Chapter 1, (Box 2), contains some examples. Finally, the authorities can recover costs of the PRTR if they choose through different methods; a portion of United Kingdom licence fees is used for this purpose. Some examples of costs are available from the US experience. There, the US General Accounting Office estimates that about $10 million per year ($0.04 per person) are spent by the national government to collect and process data reported by individual facilities. Large US firms indicate that the major part of their costs for participating in the PRTR comes from the time and effort associated with internal tracking and information collection activities required to determine if they must report; the US Chemical Manufacturers Association estimates that a US facility uses an average of 91 hours to complete and submit all of the information called for by the US PRTR system.

V. Steps toward achieving harmony in PRTR data collection and management systems

As countries adopt PRTR systems, compatible data and system standards should be considered as an important means to promote information sharing and integration. Objectives for promoting harmonisation could include:

-- Harmonisation of conceptual data handling modules and an organisational data flow model;
-- Design of a broadly acceptable logical data model;
-- Adherence to UN Electronic Data Interchange (EDI) standards;
-- Linkage to other chemical databases; and
-- Use of international identifiers and other parameters for harmonization.[11]

[11] For example, the United Nations Environment Programme's International Register of Potentially Toxic Chemicals (UNEP-IRPTC) is developing a Global Information Network on Chemicals, a computer network using client-server architecture and harmonized formats for the exchange of data; a guidance document for this system has been developed.

Use of EDI standards should be considered when any PRTR data management system is being designed. If a common set of EDI standards is acceptable, then interfacing costs between reporters, local governments, and national governments can be reduced dramatically. Moreover, this approach forces all parties to consider compatibility of computerised systems at an early date. Hence, situations, say, where data are reported to local authorities but cannot be easily transferred from them to national authorities due to computer incompatibility can be avoided.

The PRTR data management system first must be created in accordance with the goals of the PRTR. The next step is to develop and test preliminary computer design and data handling options. This is followed by "final" data handling system design, development and management. Here software configuration which allows for compatible information exchange is of importance along with the commonality of elements. OECD common phrases for computer compatibility could be one means to provide for commonality in setting up national PRTR data management tools.

In order to promote possibilities for data exchange, one option would be for countries to consider harmonised data collection approaches for PRTR systems. Coupled with national inventories of existing chemicals in commerce, data would then be available about production sites, volumes and releases. Compatibility of systems could be achieved by developing common elements for the organisation and flow of PRTR data into a data management system logical model and a "final" data dictionary (exactly what data are in the system). These common data elements could then be melded with the UN Electronic Data Interchange for Administration, Commerce and Trade (UN-EDIFACT) standards in order to allow for future data exchange among PRTR information systems in different countries. (N.B. UNEP-IRPTC has proposed a conceptual model for this process based upon Exhibit [1].)

Given that a number of national governments may wish to implement PRTR systems at roughly the same time, cooperative efforts to devise flexible and broadly applicable software (and perhaps hardware) for PRTR data collection and management systems would appear to have some merit. The UN system has declared itself ready to participate in such activities; countries and the private sector may wish to cooperate in working toward a compatible, affordable and user friendly approach toward a broadly applicable PRTR data handling and information model.

VI. Getting started

A. PRTR test studies

Test studies can enable all affected and interested parties to understand what a proposed PRTR could achieve and might require in terms of resources. Moreover, test studies can help identify interested parties and strongly raise awareness about the entire PRTR process itself. Test studies can point out key needs for refining PRTR design and operation emphasising objectives, scope, data collection, management and dissemination. Indeed, test studies are either ongoing or have been completed in several areas including Sweden, Finland, Australia, the Czech Republic, Mexico and Egypt. Test studies are just that - test studies; they do not replace or pre-empt a full PRTR eventually being implemented.

Some results of test studies from Australia, Sweden and Finland provide insights for getting a PRTR started. Australia found that unless the proposed PRTR approach is seen as relevant at local levels, then citizen support may be lacking. In other words, people want to know what releases might affect them directly. Hence, Australia’s PRTR will be built strongly on a local basis and then the national PRTR results will be aggregated from these local areas, i.e. a "bottom up" rather than "top down" approach. This type of local level approach can help strengthen the aggregation of data at the national level. Australian authorities have concluded that a legislatively mandated system rather than a voluntary one will be necessary in order to meet the PRTR goals advocated by many citizens.

Many local areas in Australia indicated that they preferred to minimise the role of their own local authorities in collecting and disseminating PRTR data. Therefore, private sector and NGO groups are being considered to take up this crucial role. Data collection and management systems will need to be strongly harmonized across all data collectors in order that both local and ultimately the national PRTR outcomes are on a comparable basis. This requirement points up the need for developing, testing and eventually adopting a common data collection and information management approach at the outset and requiring all data collectors to use it.

Sweden ran a test study in one county in 1994. Potential reporters, both manufacturers and users of chemical products, were selected by the local authorities; one hundred firms were chosen comprising about 10% large, 45% medium and 45% small. They were asked to report on a limited list containing 28 chemicals on a voluntary basis; each was provided with a report form and some guidance to help them complete the form. Firms were not informed about the exercise until they received the report form and a request to complete it voluntarily. About half the firms sent back completed report forms.

Guidance was given about each of the 28 chemicals on the list, e.g. synonyms of names, areas of use, content of components in compounds, etc. This was done so that reporters could more easily identify releases of specific chemicals on the list. Reporters were asked to provide:

a) Amount of each chemical used in 1993;
b) Emissions to air, water (discharges) and in waste (to disposal or treatment); and
c) Quantities of each listed item in products sent to market (minus that exported).

Data could be measured or estimated. No threshold values were used.

Some 70 report forms were received from about 50 firms. Every one of these was carefully examined by the authorities. Conclusions were that:

-- Only about 25 per cent of the 70 reports were considered to be fully correct;

-- Some firms reported only some chemicals and not all they were using (some reported no chemical use even though this was obviously not so);

-- Problems arose because often only a portion of the requested information about releases was reported.

One additional test study involves SMEs in the Kymi province of Finland. In 1994, a test study was carried out on a voluntary basis; SMEs reported on the use and release of some 20 compounds and compound groups including organic chemicals and certain heavy metals. Through this study Finland found that actual or measured data concerning releases were rarely reported. In fact they found that estimating releases is a difficult task for most SMEs. It was then necessary to ask for additional information concerning the total amount of a chemical used and a brief description of processes and unit operation. From this additional information, estimation methods could be used to determine releases.

According to Swedish officials, lessons learned from their test study were:

-- A voluntary system does not seem to work if a broad range of different production activities is involved. A voluntary approach might be useful for a PRTR system but only when there is a common understanding between different partners about what exactly has been agreed upon and what is to be reported;

-- The reporting form must be as simple as possible. A diskette containing the reporting form with instructions for completion might facilitate matters for everyone involved. An example of a properly completed form should be provided for guidance;

-- The medium and smaller sized companies are not used to providing this kind of information and they usually do not have persons experienced to do so. In order to get good results, strong efforts must be devoted to publish simple and instructive guidance on how to complete the form, how to calculate emission data, etc.; and

-- A major problem seems to be the knowledge about chemicals/chemical products in use. Firms very often buy complex mixtures to be used in a certain process where the composition of the product is not known to the user. Even for a manufacturer, it might be difficult to specify, for example, a specific phthalate in a mixture containing different phthalates.

According to Australian officials, some lessons learned as a result of their efforts are that:

-- The scope of the PRTR should be extensive and include data about diffuse sources as well as from individual reporters;

-- So far as thresholds are concerned, these should be a function of the criteria used to select chemicals for the list; for example, using number of employees as a cut-off is inappropriate; and

-- Data collection and management systems should be locally placed, results from local areas be disseminated and then a national PRTR overview obtained by aggregating the local results.

Broadly speaking, test study activities are likely to increase their chances for success if:

-- The sponsor of the test study consults with potential reporters and other interested and affected parties in the test study area prior to initiating the study, e.g. to agree on objectives, decide what guidance is needed, select a list of chemicals for the test study and so on;

-- Clear concise guidance is provided for reporters; and

-- Reporting forms to obtain the data called for by the goals of the PRTR are simple and easy to complete.

Test studies can also be run concerning sources of information other than those from individual reporters. In this case, authorities will probably be involved in developing estimation schemes which are statistically valid. Objectives and approaches for such test studies should also be selected in consultation with interested and affected parties.

Test studies offer an excellent opportunity for developing, testing and selecting PRTR data collection and management systems. Reporters and government authorities at all levels from local to national have an opportunity to work together to try to put into place a data collection and management system (including QA/QC functions) which enables PRTR information to be obtained and handled as desired according to PRTR objectives in the most cost effective fashion possible. Moreover, if at the outset, attention is paid to the possibility of making PRTR systems as compatible with one another as is feasible, then the data collection and management systems can incorporate such items as standard phrases (say as issued by OECD) and UN Electronic Data Exchange Standards.

B. Summary for designers of PRTR data collection and management systems

The following are key points to be borne in mind when developing PRTR data collection and management systems:

-- Data management approaches are what make PRTR unique as a tool for public right-to-know, promoting pollution prevention, identifying polluters under the scope of the PRTR and what is being released and/or transferred.

-- The audience/users for the data must be taken into account at the outset.

-- Existing data, e.g. from operating licenses and data collection methods from local to national level, need to be taken into account.

-- Avoid collecting redundant release and transfer data.

-- Very clear definition is needed of all terms, e.g. releases, transfers, accidental releases, wastes and the differentiation of wastes from products.

-- What data are needed at the outset must be clearly delineated. (N.B. The types of data desired will affect the number of claims of confidentiality by reporters.)

-- Thresholds must be clearly indicated.

-- Confidentiality criteria need to be set, and the data management system must be able to deal with confidential data.

-- Administrative QA/QC procedures must be implemented for data checking (See Annex 1, for examples.)

-- Report forms need to be concise, comprehensive and simple.

-- How to include modules for releases not reported by individual facilities, e.g. NO_x from transport, greenhouse gases from agriculture, etc., if these items are part of the PRTR.

-- How to ensure availability, compatibility and consistency of data moving from local to national level and perhaps to international levels.

-- How to ensure that data are understandable, and when disseminated, are useful to a variety of audiences.

-- Identify means for regular documentation of data and ensure that it is built into the system at the start.

-- Provide assistance and training to reporting facilities along with ongoing support to help answer questions and problems with reports.

Test studies can help immensely in pointing out specific issues to designers of a PRTR data collection and management system. Local government involvement may be crucial to ensure that national aggregation is precise and accurate. PRTR data collection and management systems are "living" entities requiring careful nurturing and updating. These systems should be discussed with interested and affected parties in order to get results consistent with PRTR objectives in a cost effective and user friendly fashion.

TABLE 1

RELEASES OF TWENTY-ONE SUBSTANCES ON THE CANADIAN PRTR LIST FROM MOBILE SOURCES AND FUEL DISTRIBUTION, AS COMPARED TO RELEASES OF THE SUBSTANCES REPORTED BY INDIVIDUAL FACILITIES

SUBSTANCE	1993 TOTAL CANADIAN RELEASES FROM MOBILE SOURCES & FUEL DISTRIBUTION (tonnes)	1993 TOTAL CANADIAN RELEASES REPORTED BY INDIVIDUAL FACILITIES (tonnes)	RATIO OF COLUMN 2 TO COLUMN 3
Ethylene	78 494	3565	22.0
Toluene	38 967	7342	5.31
Xylenes (mixed Isomers)	35 809	8625	4.15
Propylene	30 004	1278	23.5
Benzene	29 269	2928	10.0
Formaldehyde	12 714	479	26.5
Trimethylbenzene 1,2,4-	12 388	434	28.5
Ethylbenzene	8 571	622	13.8
Butadiene 1,3-	7 711	317	24.3
Acetaldehyde	3 912	197	19.9
Styrene	3 092	1942	1.59
Naphthalene	2 291	146	15.7
Cyclohexane	2 006	3449	0.58
Acetone	1 100	3342	0.33
Propionaldehyde	950	NA	—
Butyraldehyde	173	NA	—
Manganese	118	2053	0.06
m-Xylene	88	74	1.19
O-Xylene	68	58	1.17
P-Xylene	34	116	0.29
Phenol	33	212	0.16
TOTALS	**267 792**	**37 179**	**7.20**

(N.B. Total 1993 Canadian releases of 178 substances on PRTR list were 227 683 tonnes as reported by 1466 individual facilities)

Source: Data were obtained from *The 1993 National Pollutant Release Inventory, Summary Report* (Appendix 5, Table 26), Environment Canada.

EXHIBIT 1

PROPOSED BENCHMARK FOR REPORTING ON CHEMICALS AT INDUSTRIAL FACILITIES: THE KEY DATA ELEMENTS FOR EACH CHEMICAL

Type	Primary Data Categories	Specific Data Elements
Identification	Facility	Facility name and address Technical/public contact person Industrial classification (e.g. Standard Industrial Classification code) Latitude and longitude Related permits Facility identification number
	Parent Company	Name of parent company Parent company identification number
	Trade Secret	Notification of omitted data Company's justification of the need for confidentiality Signature of company official documenting need
	Reporting Year	Year for which data are being reported/submission date Indication if plant began or ceased operation in that year
	Chemical	Chemical name Chemical identification number (e.g. Chemical Abstracts Service number)
	Data Precision and Units	Units of measurement/roundoff (significant figures)
	Related Production	Amount/units
	Worker Exposure	Number of workers exposed Duration and level of exposure
Energy and Water Use	Energy Use Water Use	BTUs per year Litres per year
Releases and Transfers of Chemical in Waste Stream	Environmental Releases	Releases to air, water, and to land, by type Basis of estimates of releases
	One-time Non-Production Releases	Remedial actions Fires, floods, earthquakes
	Off-site Transfers in Waste	Amount of off-site recycling, by location and method Amount used for energy recovery off site, by location Amount of waste treated off site, by location and method Amount of off-site disposal, by location and method
	On-site Transfers in Waste	Amount of on-site recycling by method Amount used for energy recovery on site Amount of waste treated on site by method
	Total Non-product Releases and Transfers	Sum of environmental releases, off-site transfers of waste, and on-site transfers of waste
	Source Reduction Actions	Amount of reduction due to each practice: Changes in operating practices Inventory control Spill and leak prevention Raw material modification Product modifications Process changes Cleaning practice changes
Transfers of Chemical in Product Stream	Use/Production	Amount brought on site/physical state for each different use Amount produced on site Amount consumed on site Amount in product (by type) shipped from facility
	Inventory	Maximum amount of substances on-site Amount at start and end of inventory period Average daily inventory

Source: World Wildlife Fund-US and Hampshire Research, 1994.

EXHIBIT 2

BENCHMARK DATA ELEMENTS COMPARED TO DATA ELEMENTS REPORTED IN EXISTING SYSTEMS AND REPORTS

Type	Primary Data Categories	Specific Data Elements	Canada	Comments	Massachusetts	Comments	Netherlands	Comments	New Jersey	Comments	Sweden	Comments	UK	Comments	USA	Comments	Dow 1993	Comments	Kenkel 1994	Comments	ICI 1993	Comments
Identification	Facility	Facility name and address	●		●		●		●		●		●		●		●	25	●	25	●	28
		Technical/public contact person	●		●		●		●		●		●		●		●					
		Industrial classification (e.g. Standard Industrial Classification code)	●		●		●		●		●		●		●							
		Latitude and longitude	●				●		○	30					●							
		Related permits	●				●		●						●							
		Facility identification number	●		●		●		●						●							
	Parent Company	Name of parent company	●				●								●	1	●		●		●	
		Parent company identification number													●	1						
	Trade Secret	Notification of omitted data		13	●		●		●						●							
		Company's justification of the need for confidentiality			●		●		●						●							
		Signature of company official documenting need			●		●		●						●							
	Reporting Year	Year for which data are being reported/submission date	●		●		●		●						●		●		●		●	
		Indication if plant began or ceased operation in that year	●		○	9	●												●			
	Chemical	Chemical name			○		○		○				○		○		○				○	
		Chemical identification number (e.g. Chemical Abstracts Service number)	●		●		●		●				●		●		●					
	Data Precision and Units	Units of measurement/roundoff (significant figures)	●	2	●	2	●	2	●	2	●	2	●	2	●	29	●	2	●	2	●	2
	Related Production	Amounts/units	○	15	○	10	○	3	●						○	3				20		
	Worker Exposure	Number of workers exposed																				
		Duration and level of exposure																				
Energy and Water Use	Energy Use	BTUs per year															●				●	26
	Water Use	Litres per year																				
Releases and Transfers of Chemical in Waste Stream	Environmental Releases	Releases to air, water, and land, by type	●		●	10	●		●		●		●		●		○	17	●	21	●	
		Basis of estimates of releases	●	9	○	11			●						●							
	One-time Non-Production Releases	Remedial actions	●		○	12				7					○	4						
		Fires, floods, earthquakes																				
	Off-site Transfers in Waste	Amount of off-site recycling, by location and method	✡		○	10			●		●				●		●	18	○	22		
		Amount used for energy recovery off-site, by location	✡		○	10			●		●				●		●	18				
		Amount of waste treated off-site, by location and method	●		○	10	●	19	●				●	19	●		●	18				
		Amount of off-site disposal, by location and method	✡		○	10			●		●				●		●	18	○	22		
	On-site Transfers in Waste	Amount of on-site recycling by method							●	31					●	5	●	18	○	22		
		Amount used for energy recovery on-site							●	31					●	5	●	18				
		Amount of waste treated on-site by method	✡						●	31	●				●	5	●	18	●		●	27
	Total Non-product Releases and Transfers	Sum of environmental releases, off-site transfers of waste, and on-site transfers of waste	○	14	○	32			●						✡		✡	18	●		●	
	Source Reduction Actions	Amount of reduction due to each practice					✡	27														
		Changes in operating practices	○	15	○	10			●							6			○	23		
		Inventory control			○	10			○							6			○	23		
		Spill and leak prevention			○	10			●							6			○	23		
		Raw material modification			○	10			●							6			○	23		
		Product modifications			○	10			●							6			○	23		
		Process changes			○	10			○							6			○	23		
		Cleaning practice changes			○	10			●							6			○	23		
Transfers of Chemical in Product Stream	Use/Production	Amount brought on-site/physical state for each different use					●		○													
		Amount produced on site			●	16	●		●													
		Amount consumed on site					●		●										●	24		
		Amount in product (by type) shipped			●	8	●		●	8	●											
	Inventory	Maximum amount of substances on-site							●		●				●							
		Amount at start and end of inventory							●													
		Average daily inventory							●													

EXHIBIT 2 (continued)

BENCHMARK DATA ELEMENTS COMPARED TO DATA ELEMENTS REPORTED IN EXISTING SYSTEMS AND REPORTS

Symbols

● Data element included in reporting system/corporate report
○ Data element available in some form
☼ Data element can be calculated from other data

Comments

1 There are issues with the parent company information for as many as 30 per cent of reporting TRI facilities.
2 Units of measurement only.
3 Production or activity index reported.
4 Non-production related waste reported as single number regardless of how managed.
5 Total quantity and methods reported but not quantity by method.
6 Methods undertaken but not total quantity or quantity by method.
7 Included in waste generation
8 Amount shipped as product is facility-wide, not product specific.
9 Facilities may explain if any chemicals reported the previous year are not reported in current year.
10 Some TRI Form R data provided. There is a process-level ratio of emissions releases plus off-site transfers) to base year emissions. A similar ratio is reported for waste, although actual amounts of emissions and reductions in waste by source reduction cannot be calculated. The process-level ratio for waste is intended to reflect per cent reduction by source reduction only.
11 Facility must indicate if change of basis of estimate has changed quantity.
12 Included in waste generation, facilities may describe events.
13 Facilities indicate confidentiality on form.
14 Releases and off-site transfers only.
15 Facilities must explain changes in amounts of releases and off-site transfers which include changes in production and estimation methods; source reduction activities may be listed voluntarily.
16 Also report amount processed and otherwise used.
17 Media per centages for global emissions, also global emissions by chemical by SARA 313 and 33/50 programme chemicals.
18 Total for SARA 313 chemicals.
19 POTWs.
20 Sales per cent by product sector, plus total production units.
21 SO_2, NO_x air emissions; Ni, Cu, Cr releases to water.
22 Total of on-site and off-site activities.
23 Specific project descriptions.
24 Solvents and chlorinated hydrocarbons.
25 Some facility names given.
26 Efficiency.
27 Amount only.
28 Company also provides individual facility reports with facility-specific data.
29 Units of measurement only, some range code reporting.
30 New Jersey locator data given.
31 Total amount regardless of method.
32 On-site transfers to recycling not included.

EXHIBIT 3

PRTR INFORMATION TO BE REQUIRED BY THE CZECH REPUBLIC

Facility identification
- Facility name and address
- Technical/public contact person
- Standard Industry Classification code
- Latitude and longitude
- Related permit number(s)
- Facility identification number (Trade register)

Parent company identification
- Name and address of parent company
- Parent company identification number (Trade register)

Identification of confidential information
- Notification of omitted data
- Company's justification of the need for confidentiality
- Signature of company official documenting need

Reporting year
- 1 year for which data are being reported/submission date
- Identification if plan began or ceased operation in that year

Chemical Identification
- Chemical Identification
- CAS number

Data Precision and Units
- Units of measurement/roundoff

Releases into the environment
- Amount released to air, water and land
- Basis of estimates of releases

Transfers to off-site locations
- To recycling/treatment/disposal facilities
- To other countries

Waste management
- Type of waste treatment, recycling, and energy recovery used
- Amount used for energy recovery on-site/off-site
- Amount of on-site recycling by method/off-site recycling
- Amount of waste treated on-site by method/treated off-site

One-time non-production releases
- Remedial actions
- Fires, floods, earthquakes

The primary data categories and specific data elements listed above are supposed to be reported from the beginning of the PRTR programme. The following set of data elements should be included during the following period of the PRTR programme extension:

Source reduction actions
- Amount of reduction due to:
- changes in operating practices
- inventory control
- spill and leak prevention
- raw material modification
- product modifications
- process changes
- cleaning practice changes

EXHIBIT 3 (continued)

PRTR INFORMATION TO BE REQUIRED BY THE CZECH REPUBLIC

Inventory
- Maximum amount of substances on-site
- Beginning and end of year inventory
- Average daily inventory

Chemical Use
- Substances produced on-site/amounts
- Substances purchased or brought on-site/amount/physical state
- Substances sold/amounts
- Substances made as byproduct or impurity/amounts
- Substances sold as co-product/amounts
- Other process on-site uses/amounts by use
- Energy consumed
- Water used

Related Production
- Amount/units

Reporters will be firms based upon those included in the list in Table 2-B of Chapter 2.

EXHIBIT 4

CHEMICAL RELEASE RECORD FORM 1
(IN CASE OF MANUFACTURING)

Chemical Name:_____ CAS No._____

Period (one year): from _____ to _____

Manufactured Volume: tonne/year

	Volumes (tonne)	Methods
Releases to Air:		
Stack/Point		
Storage/Handling		
Fugitive		
Spills		
Other Non-Point		
Releases to Surface Waters:		
Direct Discharge		
Spills		
Release to Land:		
Landfill		
Landfarm		
Spills/Leaks		
Total	(tonne)	

Reference:

1. Calculated Volume to be Manufactured
2. Treated Volume in the Facility
   Incineration
   Chemical Treatment
   the Others
3. Transferred Volume out of the Facility (waste)
   Landfill
   Incineration
   the Others
4. Release per Unit Manufacturing (released volume/manufactured volume)

Source: Japanese Chemical Industry Association Submission to OECD Workshop 3, Basel 1995.

EXHIBIT 5

POTENTIALLY TOXIC RELEASES FROM 37 MANUFACTURING SUB-SECTORS - UNITED STATES 1988 UNITS ARE TONNES/MILLION DOLLARS OUTPUT (GRAMS/DOLLAR OUTPUT)

ISIC code*	
3510	********** 23.71 - "other" industrial chemicals
3511	********** 14.63 - basic industrial chemicals
3230	********** 6.98 - Leather-products
3513	********** 6.35 - Synthetic resins
3560	********** 4.23 - Plastic products
3720	********** 4.23 - Non-ferrous metals
3410	********** 3.97 - "other" paper products
3710	********** 3.47 - Iron and steel
3420	********** 3.41 - Printing and publishing
3411	********** 2.82 - Pulp; paper
3320	********** 2.43 - Furniture; fixtures
3810	********** 2.08 - Metal products
3310	********** 2.00 - Wood products
3522	********** 1.80 - Drugs and medicines
3690	********** 1.75 - Non-metal products (m.l.c.)
3530	********** 1.71 - Petroleum refineries
3610	********** 1.64 - Pottery, china, etc.
3520	********** 1.62 - "other" chemical products
3210	********** 1.59 - "other" textile production
3211	********** 1.41 - Spinning and weaving
3550	********** 1.33 - Rubber products
3900	********** 1.23 - "other" industries
3841	********** 1.16 - Shipbuilding; repair
3540	********** 1.15 - Petroleum and coal products
3240	********** 1.03 - Footwear
3832	********** 0.82 - Radio, television
3830	********** 0.815 - "other" electrical machinery
3220	********** 0.792 - Wearing apparel
3820	********** 0.724 - "other" machinery (m.l.c.)
3620	********** 0.672 - Glass and products
3840	********** 0.457 - Transport equipment
3850	********** 0.403 - Professional goods
3110	********** 0.355 - Food products
3843	********** 0.303 - Motor vehicles
3140	********** 0.272 - Tobacco
3825	********** 0.138 - Office and computing machinery
3130	********** 0.093 - Beverages

* ISIC = International Standard Industrial Code

Source: OECD, presentation at Workshop 3, Basel 1995.

ANNEX 1

A. QUALITY ASSURANCE FOR CANADA'S NATIONAL POLLUTANT RELEASE INVENTORY

The quality of data provided is especially important in programmes which provide publicly accessible information on pollutant releases and transfers from specific facilities. Environment Canada has taken a number of steps to ensure that the information contained in the database accurately reflects the information provided and that the information provided by facilities is as accurate as possible.

Assistance to facilities

Facilities were provided assistance in several ways. Detailed reporting instructions were provided in both reporting manuals and on the reporting software. Both the manuals and software included a listing of offices across the country which could be contacted to respond to questions and assist in competing the reporting forms. In addition, a number of training sessions were organised and held by Environment Canada's regional offices. On request, special sessions were organised for specific industry associations.

Consistency in responding to questions from industry was ensured through a training at the beginning of the reporting year and regular telephone conferences between NPRI headquarters and NPRI regional offices.

NPRI data accuracy

For the first reporting year (1993), Environment Canada received 5 248 substance reports, a number consistent with the size of its industrial manufacturing base. The number of reports is expected to gradually increase in future years.

Over 70% of reports were received in electronic form and were loaded directly to the NPRI database, thus avoiding the possibility of transcription errors. The simplicity of the reporting form and "user friendliness" of the reporting software encouraged this high rate of returns on disk.

Verification reports were printed from the database and sent to facilities for a final review of accuracy. At this stage, Environment Canada highlighted to facilities the most common reporting errors and allowed facilities to submit corrections. A final verification report was issued to facilities which provided corrections as a result of the verification phase. Updates and corrections provided by facilities, not directly associated with the verification phase, were also accepted.

Of the 30% of reports submitted on paper from, most contained reporting errors. (A feature in the reporting software prevented facilities from being able to create disks for mailing to Environment Canada, if reports contained serious omissions or reporting errors). The relatively few numbers of reports allowed for follow up by phone with facility contacts by NPRI staff to review omissions or reporting errors. Facilities were requested to formally submit corrections to their reports.

Environment Canada intends to review and formalise its procedures for modification of technical errors.

Source: Environment Canada, 1995.

ANNEX 1

B. QUALITY ASSURANCE PROGRAMME FOR THE US TOXIC RELEASE INVENTORY

Since the first US Toxic Release Inventory (TRI) report's were received in 1988, US EPA has made it a high priority to ensure the accuracy and validity of reported data. There are three aspects to US EPA's TRI quality assurance programme. First, the US EPA helps facilities to understand reporting requirements and report accurate data. Second, the US EPA ensures that the data is accurately entered into the TRI Information System (TRIS). Third, the data is evaluated to ensure consistency.

Below is a summary of the steps taken to attain a high level of data quality.

Assistance to Facilities

The US EPA provides guidance directly to reporting facilities and works with trade associations to hold training sessions. Information available includes detailed reporting instructions, a question-and-answer document, instructions for reporting on magnetic media, general technical guidance and 16 industry specific guidance documents. A toll-free hotline is maintained to answer questions from reporting facilities.

A compliance programme is part of the effort to maintain quality reporting. Inspections are conducted to identify facilities who are required to report but have not done so, or have not reported all the required chemicals. These inspections are conducted by a US EPA regional inspector either through site visits, telephone audits. A detailed guidance manual has been developed to help determine if a facility has identified all reportable chemicals and provided reasonable release estimates. Data reported are then compared to individual states with those reported to the national programme to identify discrepancies.

TRIS Data Accuracy

The US EPA, receives about 100,000 TRI forms every year. About one-half of these forms are received electronically. The remainder are received on paper. The paper forms are entered into the computer by data entry operators. The electronic forms are loaded directly into the computer. The US EPA randomly reviews three per cent of all forms to verify that the data has been accurately transferred from the form to the computer. The level of accuracy is consistently above 99%.

Reports of releases and transfers also are produced which are mailed to the reporting facilities. The facilities are asked to verify the accuracy of the data and to report any discrepancies.

EPA provides submitters with a computer programme to enter data electronically. There is an automated error identification feature within the programme to identify invalid data and generate submitters which explain why an error has occurred and how to correct it. As a result, electronic reporting reduces the opportunity for facilities to submit invalid data.

Data Consistency

The US EPA conducts several activities to ensure that data in the computer system is consistent. All facilities report a TRI facility identification number (TRIFID) on their form. That number is then checked against other facility identification information (e.g. facility name and address) to ensure that the facility is accurately identified. City and county names, and abbreviations (e.g. Corp. for corporation) are standardized. The latitude and longitude are checked to be sure that they are reasonable. Finally, the Chemical Abstract Service (CAS) numbers are checked for correctness.

ANNEX 1-B (continued)

Several kinds of reports to facilities are issued when errors are identified. First, is the "Notice of Data Change" (NDC) is issued when the error is obvious and can be corrected by the US EPA (e.g. transposed digits in the CAS number). The facility is given the opportunity to disagree with the change.

Second, is the "Notice of Technical Error" (NOTE). This is sent to the facility when there are errors on the form which do not prevent the data from being processed but can result in misleading or inaccurate information if not corrected.

Third, is the "Notice of Significant Error" (NOSE) which is issued when the form contains major errors that prevent the data from being processed. Errors in this category include missing information or unrecognizable chemical identification. A "Notice of Noncompliance" (NON) is issued if the facility does not correct the error within 21 days.

A NON is a legal document sent by the US EPA's enforcement office and can be used for enforcement purposes. If the error is not corrected in 21 days, EPA can take enforcement action.

The US EPA consistently adheres to the data quality procedures outlined in this paper. As a result, the TRI has a high level of data quality and serves as a useful and reliable information source for the public.

ANNEX 2

WASTE REPORTING SURVEY USED BY ONE LARGE FIRM

To complete this questionnaire please follow the steps given below:

1) Identify the waste stream (this could be a gas stream to atmosphere, a liquid stream to controlled waters or a solid waste in a road tanker or skip, for example). The streams should be identified with reference to the 1992 actual reported emissions.

2) Assess how the stream is quantified. Is it:

   a) by mass balance, where other streams are measured and the waste stream is determined by calculation on the other streams e.g. 3 input and 2 output streams are known on a reactor; the difference is a gaseous waste vent stream;

   b) direct measurement, e.g. weight in road tanker, flow-meter reading of pure component waste or measured flow rate multiplied by measured concentration;

   c) indirect measurement (or inferential measurement), e.g. temperature of gas stream is measured, vapour pressure of component in gas stream is calculated, composition calculated, multiplied by flow-rate of stream to give discharge rate. Or measure sulphur content of combustion fuel and calculate sulphur dioxide discharge;

   d) estimated or guestimated, e.g. some notion of what is produced in reactor and all of the component is vented to atmosphere; perhaps corrected for variations in plant output; or quantity estimated at by skip load;

   e) historical measurement, e.g. one-off measurement some years ago that is corrected for changes, such as output, that have occurred since then;

   f) other.

3) For each of these methods of quantification there is a separate sheet of the questionnaire. Please complete the relevant sheet for that waste stream.

4) Identify all other waste streams within your area that were submitted as part of the 1992 report.

5) Repeat steps 2) to 4) for these waste streams.

6) When complete, please return to:

7) Many thanks for your cooperation in this project.

A) STREAMS THAT HAVE BEEN QUANTIFIED BY MASS BALANCE APPROACH

WASTE STREAM															
EMISSION TO (Tick box)	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND
COMPONENTS OF STREAM AND TONNES EMITTED (FROM 1992 DATA)	COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES	
ESTIMATE ACCURACY OF EMISSION FIGURES (Tick box)	0-10%			0-10%			0-10%			0-10%			0-10%		
	10-25%			10-25%			10-25%			10-25%			0-10%		
	25-50%			25-50%			25-50%			25-50%			25-50%		
	50-75%			50-75%			50-75%			50-75%			50-100%		
	75-100%			75-100%			75-100%			75-100%			75-100%		
	>±100%			>±100%			>±100%			>±100%			>±100%		

SHEET COMPLETED BY: TEL EXTENSION: DATE: LOCATION:

B) STREAMS THAT HAVE BEEN QUANTIFIED BY DIRECT MEASUREMENT

WASTE STREAM				
EMISSION TO (Tick box)	AIR / WATER / LAND	AIR / WATER / LAND	AIR / WATER / LAND	AIR / WATER / LAND
HOW IS THE WASTE STREAM MEASURED? (Tick boxes)	FLOWRATE / CONCENTION; WEIGHED / BATCH VOL; OTHER (specify)	FLOWRATE / CONCENTION; WEIGHED / BATCH VOL; OTHER (specify)	FLOWRATE / CONCENTION; WEIGHED / BATCH VOL; OTHER (specify)	FLOWRATE / CONCENTION; WEIGHED / BATCH VOL; OTHER (specify)
IF FLOWRATE IS MEASURED, WHAT METHOD IS USED?	ORIFICE PLATE/ VORTEX METER; EM METER / VENTURI; ROTAMETER / OTHER	ORIFICE PLATE/ VORTEX METER; EM METER / VENTURI; ROTAMETER / OTHER	ORIFICE METER/ VORTEX METER; EM METER / VENTURI; ROTAMETER / OTHER	ORIFICE METER/ VORTEX METER; EM METER / VENTURI; ROTAMETER / OTHER
COMPONENT & TONNES EMITTED FROM 1992 EMISSION DATA?	COMPONENT / TONNES	COMPONENT / TONNES	COMPONENT / TONNES	COMPONENT / TONNES
HOW OFTEN IS THE WASTE STREAM MEASURED? (Tick box) See Key below	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F
WHAT IS THE ACCURACY OF STREAM MEASUREMENT? (Tick box)	± 0-10% / ±10-25%; ± 25-50% / ±50-75%; ±75-100% / =>100%	± 0-10% / ±10-25%; ±25-50% / ±50-75%; ±75-100% / =>100%	± 0-10% / ±10-25%; ±25-50% / ±50-75%; ±75-100% / =>100%	± 0-10% / ±10-25%; ±25-50% / ±50-75%; ±75-100% / =>100%
HOW OFTEN IS THE STREAM MEASUREMENT CALIBRATED? (Tick box)	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F
HOW OFTEN IS THE CONCENTRATION OF COMPONENTS MEASURED? (Tick box)	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F
HOW OFTEN IS CONCENTRATION MEASUREMENT CALIBRATED?	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F	A / B / C; D / E / F
WHAT IS THE ACCURACY OF CONCENTRATION MEASUREMENT?	± 0-10% / ±10-25%; ± 25-50% / ±50-75%; ±75-100% / =>100%	± 0-10% / ±10-25%; ±25-50% / ±50-75%; ±75-100% / =>100%	± 0-10% / ±10-25%; ±25-50% / ±50-75%; ±75-100% / =>100%	± 0-10% / ±10-25%; ±25-50% / ±50-75%; ±75-100% / =>100%

KEY: A-Less than once/yr; B-between 1/year & 1/month; C-1/month - 1/week; D- 1 week-1/day; E-more frequently than 1/day, but not continuously; F-continuously

SHEET COMPLETED BY: TEL EXTENSION: DATE: LOCATION:

C) STREAMS THAT HAVE BEEN QUANTIFIED BY INDIRECT MEASUREMENT

WASTE STREAM												
EMISSION TO (Tick box)	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND
COMPONENT & TONNES EMITTED FROM 1992 EMISSION DATA?	COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES	
WHAT IS THE PRIMARY INFERRED MEASUREMENT (Tick box)	TEMP	COMPOSITN		TEMP	COMPOSITN		TEMP	COMPOSITN		TEMP	COMPOSITN	
	OTHER (SPECIFY)			OTHER (SPECIFY)			OTHER (SPECIFY)			OTHER (SPECIFY)		
WHAT OTHER FACTORS ARE USED TO ESTIMATE EMISSION	FLOWRATE	WEIGHT		FLOWRATE	WEIGHT		FLOWRATE	WEIGHT		FLOWRATE	WEIGHT	
	BATCH DURATION	OTHER (Specify)		BATCH VOLUME	OTHER (Specify)		BATCH VOLUME	OTHER (Specify)		BATCH VOLUME	OTHER (Specify)	
HOW OFTEN IS THE PRIMARY MEASUREMENT MADE? (Tick box) See key below	A	B	C	A	B	C	A	B	C	A	B	C
	D	E	F	D	E	F	D	E	F	D	E	F
WHAT IS THE ACCURACY OF MEASUREMENT? (Tick box)	± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%	
	±25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%	
	±75-100%	±>100%		±75-100%	±>100%		±75-100%	±>100%		±75-100%	±>100%	
HOW OFTEN IS THE PRIMARY MEASUREMENT CALIBRATED? (Tick box)	A	B	C	A	B	C	A	B	C	A	B	C
	D	E	F	D	E	F	D	E	F	D	E	F
HOW OFTEN ARE THE OTHER FACTORS MEASURED/ ASSESSED? (Tick box)	A	B	C	A	B	C	A	B	C	A	B	C
	D	E	F	D	E	F	D	E	F	D	E	F
WHAT IS THE ACCURACY OF OTHER FACTORS MEASUREMENT/ ASSESSMENT?	± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%	
	±25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%	
	±75-100%	±>100%		±75-100%	±>100%		±75-100%	±>100%		±75-100%	±>100%	

KEY: A=Less than once/yr; B=between 1/year & 1/month; C=1/month - 1/week; D= 1/week-1/day;
E=more frequently than 1/day, but not continuously; F=continuously

SHEET COMPLETED BY: TEL EXTENSION: DATE: LOCATION:

D) STREAMS THAT HAVE BEEN ESTIMATED OR GUESTIMATED

WASTE STREAM												
EMISSION TO (Tick box)	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND
COMPONENTS & TONNES EMITTED (FROM 1992 WASTE WASTE DATA) (Tick box)	COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES	
IS THE WASTE STREAM BATCH OR CONTINUOUS? (Tick box)	BATCH	CONTINUOUS		BATCH	CONTINUOUS		BATCH	CONTINUOUS		BATCH	CONTINUOUS	
BRIEFLY DESCRIBE THE BASIS OF THE ESTIMATE												
ASSESS THE ACCURACY OF THE ESIMATE (Tick box)	± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%	
	±25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%	
	±75-100%	±>100%		±75-100%	±>100%		+/5-100%	±>100%		±75-100%	±>100%	
WHEN WAS THE METHOD OF ESTIMATION LAST REASSESSED?	<1 YEAR	1-2 YEARS		<1 YEAR	1-2 YEARS		<1 YEAR	1-2 YEARS		<1 YEAR	1-2 YEARS	
	2-3 YEARS	>3 YEARS		2-3 YEARS	>3 YEARS		2-3 YEARS	>3 YEARS		2-3 YEARS	>3 YEARS	

SHEET COMPLETED BY: TEL EXTENSION: DATE: LOCATION:

E) STREAMS THAT ARE BASED UPON HISTORICAL MEASUREMENTS

WASTE STREAM												
EMISSION TO (Tick box)	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND
COMPONENTS & TONNES EMITTED (FROM 1992 WASTE WASTE DATA) (Tick box)	COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES		COMPONENT	TONNES	
IS THE WASTE STREAM BATCH OR CONTINUOUS? (Tick box)	BATCH	CONTINUOUS		BATCH	CONTINUOUS		BATCH	CONTINUOUS		BATCH	CONTINUOUS	
WHAT WAS THE MEANS OF HISTORICAL MEASUREMENT (Tick box)	ORIFICE PLATE FLOW			ORIFICE PLATE FLOW			ORIFICE PLATE FLOW			ORIFICE PLATE FLOW		
	VENTURI FLOW METER			VENTURI FLOW METER			VENTURI FLOW METER			VENTURI FLOW METER		
	ROTAMETER			ROTAMETER			ROTAMETER			ROTAMETER		
	EM METER			EM METER			EM METER			EM METER		
	RADIOACTIVE TRACER			RADIOACTIVE TRACER			RADIOACTIVE TRACER			RADIOACTIVE TRACER		
	OTHER TRACER TEST			OTHER TRACER TEST			OTHER TRACER TEST			OTHER TRACER TEST		
	CONCENTRATION MEASUREMENT			CONCENTRATION MEASUREMENT			CONCENTRATION MEASUREMENT			CONCENTRATION MEASUREMENT		
	TEMPERATURE MEASUREMENT			TEMPERATURE MEASUREMENT			TEMPERATURE MEASUREMENT			TEMPERATURE MEASUREMENT		
	BATCH VOLUME MEASUREMENT			BATCH VOLUME MEASUREMENT			BATCH VOLUME MEASUREMENT			BATCH VOLUME MEASUREMENT		
	BATCH WEIGHT MEASUREMENT			BATCH WEIGHT MEASUREMENMENT			BATCH WEIGHT MEASUREMENT			BATCH WEIGHT MEASUREMENT		
	OTHER (SPECIFY)			OTHER (SPECIFY)			OTHER (SPECIFY)			OTHER (SPECIFY)		
HOW LONG AGO WAS THE LAST MEASUREMENT MADE? (Tick box)	<1 YEAR	1-2 YEARS		<1 YEAR	1-2 YEARS		<1 YEAR	1-2 YEARS		<1 YEAR	1-2 YEARS	
	2-3 YEARS	>3 YEARS		2-3 YEARS	>3 YEARS		2-3 YEARS	>3 YEARS		2-3 YEARS	>3 YEARS	
ESTIMATE ACCURACY OF MEASUREMENT (Tick box)	± 0-10%	±10-25%		= 0-10%	±10-25%		± 0-10%	±10-25%		= 0-10%	±10-25%	
	= 25-50%	±50-75%		±25-50%	±50-75%		±75-50%	±50-75%		+25-50%	±50-75%	
	±75-100%	±>100%		±75-100%	=>100%		±75-100%	±>100%		+75-100%	±>100%	

SHEET COMPLETED BY: TEL EXTENSION: DATE: LOCATION:

F) STREAMS THAT HAVE BEEN QUANTIFIED BY 'OTHER' MEANS

WASTE STREAM												
EMISSION TO (Tick box)	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND	AIR	WATER	LAND
HOW IS WASTE STREAM ASSESSED (Give brief description)												
GIVE INDICATION OF ACCURACY OF ASSESSMENT	± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%		± 0-10%	±10-25%	
	± 25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%		±25-50%	±50-75%	
	±75-100%	±>100%		±75-100%	±>100%		±75-100%	±>100%		±75-100%	±>100%	

SHEET COMPLETED BY: TEL EXTENSION: DATE: LOCATION:

CHAPTER 4

DISSEMINATION AND USE OF PRTR DATA AND RESULTS

I. Basic issues

When a government elects to institute a national PRTR system, deciding how to provide the PRTR data and results to affected and interested parties is of major importance. Indeed, once the goals of a national PRTR system have been selected, perhaps the next most important action is for affected and interested parties to agree about how the PRTR data and results will be made accessible. Then, together with government, affected and interested parties can prepare a PRTR dissemination outreach plan. It should be borne in mind that PRTR type data will almost always be collected and collated by government entities. In addition, private sector firms may report, on a voluntary basis[12], a variety of environmental performance data including information about releases and transfers of certain chemical species relevant to the operations of the reporter.

Government must be expected to take a leading role to ensure that affected and interested parties are provided access to information on an equal and equitable basis. There are a number of factors that need to be considered in developing a PRTR data dissemination outreach plan:

(a) The customer or target audiences, e.g. the public, environmental groups, trade associations, unions, local community, etc.;

(b) The objective/purpose for disseminating PRTR data and how it relates to the goals of the PRTR programme;

(c) The size of the data base;

(d) Technological and resource capabilities of the nation and the customers or target audiences for using the outcomes to attain the PRTR goals;

(e) The needs of local, regional and international interests;

(f) The relationship between PRTR outcomes and national environmental policy objectives and the need for appropriate coordination of local, regional and international needs concerning PRTR outcomes;

(g) Realisation that the entire PRTR system is an iterative process which permits built-in review and analyses allowing for continual evolution and where indicated, appropriate adjustments and changes;

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[12] For example, through company environmental reports, or through the "Responsible Care" programme, etc.

(h) The need to address confidentiality issues, i.e. protection of private sector proprietary information where appropriate while still providing generic input to the PRTR database;

(i) The need to provide the PRTR outcomes in a timely and useful manner, e.g. hard copies, electronic media, electronic access (dial-fax, internet, etc.);

(j) Ability to use the PRTR database interactively with other data sets and systems, e.g. universe of regulated chemicals, severely restricted or banned chemicals, customs lists, etc.,

(k) Means to actively engage users with different levels of skills and with varying pollution prevention agendas, e.g. approaches that may be suitable for urban areas may not be useful in rural areas;

(l) Means to educate the customer or target audiences by disseminating information about the goals of the PRTR programme, the scope of the data collection, the context of the data, any data uncertainties, etc.;

(m) Frequency of dissemination; and

(o) Costs for carrying out the outreach plan.

Given these factors, government is faced with the issue of making the PRTR outcomes "available" or making them "accessible" to affected and interested parties. The word "available" in this context implies a rather passive approach in that the data are placed in a repository of some kind and interested parties can come and examine them or act to order the data. The word "accessible" implies a more active approach in terms of the "capability" to obtain and use data. Exhibit (1) indicates for the 50 US States how information can (or cannot) be obtained by interested parties. The federal government provides a national picture and data for each state. This is usually about six to ten months after the data are submitted.

There are several considerations as far as the manner in which the PRTR outcomes are released. As suggested by a major chemical manufacturer, PRTR outcomes should ideally be made available to all affected and interested parties at the same time in order to maintain a level of trust between those providing the information, those agencies disseminating the information and those using the information. Not only must PRTR outcomes be provided in a user-friendly and useful manner, but in a timely fashion as well. As for local communities, information compiled about releases should be provided to them as soon as reasonable.

II. Use of PRTR results

There are many potential uses for PRTR outcomes. Table 1 contains a listing of a number of ways in which PRTR data are currently being used. In the US, the private sector most frequently uses PRTR results to promote pollution prevention and source reduction efforts, to develop company release profiles[13] and to educate citizens about risks from releases and transfers. A major UK firm has found that the main audience for its environmental release data appears to be its own employees who seek to

[13] Company release profiles enable management to determine release by the main unit operations of the firm. Since pollution releases waste feedstocks and can harm company image, the profiles provide a way for management to set internal priorities to cut releases in an economically effective way.

understand occupational risks. Also, since employee families often live close to the plant, the quantity and type of releases to which their community is exposed is of great interest to the employees**.**

Environmental NGOs use PRTR data to approach individual facilities and firms to reduce or minimize releases, to make the general public aware of potential consequences of various releases and transfers and suggest legislative or regulatory changes which promote pollution prevention. An example on this last point is the instance in which PRTR data identified the US state with the highest total of releases in the country. These results were used to help enact a new Air Toxics law in that state which required 50 per cent reductions of such toxic releases by 1995.

Government officials, especially at regional or local levels, often use PRTR results to identify facilities for special attention or conditions. If limits are set for releases for certain chemicals, PRTR data can be used to inform governments about which facilities have exceeded those ceilings. The PRTR data from similar facilities can be compared in order to judge whether a certain facility might be a candidate for inspection. Officials utilise PRTR results to promote pollution prevention among releasers, e.g. by publishing lists of major releases by firm. In one case, regional officials linked PRTR data to the taxes imposed on firms in the area; a poor record means higher taxes.

PRTR data provide the press with a valuable information tool to inform the public about pollution, who is generating it and its potential hazards. To share this information properly, journalists need appropriate background material on the PRTR data. Health effects analysis, for instance, can be used to identify carcinogens or whether a certain chemical is more or less toxic than another. Likewise, trend analysis can tell whether the releases of a chemical are increasing or decreasing over time.

Appropriate PRTR data can also provide private sector firms with information which helps them to identify priority areas for pollution prevention, source and waste reduction. For example, a large manufacturer of farm and construction equipment has used PRTR data to devise an internal scoring system that measures releases and transfers per unit of production. Weighted against these measures are the relative risks associated with these processes and options for implementing prevention, treatment and disposal actions. An appropriate PRTR dissemination outreach plan should encourage firms, especially SMEs, to set priorities for pollution prevention and waste reduction so as to reduce releases and improve profitability.

In the financial arena, investment analysts and insurers examine PRTR results as indicators of potential environmental liabilities of a firm and to compare firms for clients wishing to invest in "green" companies. Such actions combined with the public availability of PRTR results has prompted many firms to pledge voluntary reductions in pollutant releases. Table 2 indicates some voluntary pledges by US firms for reducing pollutant releases. Figure 1 shows reduction targets pledged by 138 firms in various industrial sectors in Canada to cut releases of persistent, broaccumulative and toxic substances. The use of PRTR data by a type of interested party, of course, is not rigidly confined. In North America there is an example in which the press used PRTR outcomes for financial purposes. A major investment oriented publication evaluated 130 North American manufacturers' environmental performance. Key categories given most importance in this ranking were the quantity of a firm's PRTR releases adjusted for sales and its per centage of reduction of those releases over time. Whether the firm participated in PRTR voluntary reduction efforts, i.e. US EPA 33/50 Programme, also was of importance.

Public interest groups and NGOs provide an important information bridge between the government and the private sector to ensure that citizens-at-large receive and understand PRTR results. These groups often receive requests for help from individuals who might otherwise not easily have access to PRTR data directly, or who might have difficulty in fully understanding the implications of PRTR data. Public interest groups and NGOs have, for example, used PRTR results to focus attention onto certain classes of facilities such as largest releasers, to indicate emissions which may have consequences for nearby residents of facilities.

In one instance, an NGO uses PRTR results to alert neighbourhoods near local releasers about known potential human and environmental effects of the releases in their area. The importance of pollution prevention actions to reduce such releases is stressed, and technical assistance is provided in order that local citizens can work with facilities, in a positive and cooperative way, to intensify pollution prevention actions.

Public interest groups and NGOs are thus a main point of access for PRTR information for individuals who either cannot directly obtain or fully interpret PRTR outcomes or who may never have heard of a PRTR. They can play an important role in acting as "bridges" to help individuals and neighbourhoods understand how a PRTR might apply to their concerns and how it can be used. Public interest groups and NGOs want a PRTR system to provide information about specific facilities, pollution prevention and waste reduction efforts and especially about potential health effects and environmental impacts of releases and transfers documented by PRTR results.

In addition to the utility of public interest groups and NGOs, government and reporters themselves play a role in getting PRTR information to the public in a comprehensive and/or summary format. Governments use different media to relay PRTR information to the public. For example, Environment Canada produces a summary report and has developed on-line access to the raw data. Reporters themselves distribute PRTR type information through company reports. Established private sector programmes like "Responsible Care" distribute this type of information to the public via their citizen advisory panels. (To illustrate the functioning of The Responsible Care programme, "Key Principles" can be found in Box 1.)

Spokespersons for private sector firms who report to PRTR systems in the OECD area indicated that PRTR outcomes and information transfer should focus on "the fundamental goal of reducing risks to human health and the environment". They further suggest that a PRTR system should ensure that the data which are collected and disclosed to the public "convey accurate and meaningful risk information in a useful and understandable form". This means that PRTR outcomes should be presented in a way that users of the information can understand and compare the magnitude, likelihood and urgency of various risks so that threats to a local community can be addressed. Furthermore, the PRTR data collection and disclosure system should seek to avoid duplication of existing information gathering and dissemination activities as well as the release of proprietary information.

Clearly, PRTR results are used by a wide variety of parties who have disparate interests as well as common ones. Different parties use PRTR outcomes to pursue various objectives such as identification and reduction of risks from releases and transfers, promotion of pollution prevention and waste reduction, "absolute" reduction of potentially hazardous releases and transfers and comparing releases from facilities. Dissemination of PRTR results needs to take into account these factors as much as possible. An appropriate role for government is to facilitate PRTR results dissemination and to ensure that these results are of high quality and are issued in a timely fashion.

III. Making PRTR outcomes accessible and usable

The dissemination process must actively engage users of PRTR outcomes who have different levels of skills and different agendas. Reasonable objectives for useful PRTR data dissemination include:

-- Access by any person;

-- Appropriate means to allow searches of the database;

-- Assist in accessing and understanding PRTR results for non-technical users; and

-- Aid to users in analysing the content of the information, e.g. allowing reporters to indicate what is being done to reduce various potential risks as part of the data provided.

Active dissemination of PRTR results -- as contrasted with passive availability at some repository -- calls for an outreach plan including such approaches as wide publication, news releases, information hotlines, electronic bulletin boards, public education programmes and worker training. In other words, if government elects to disseminate PRTR results actively, a marketing approach is the suggested method for developing and implementing the outreach programme. When disseminated, the PRTR results need to be readable, intelligible, and consistent. This means that the format for publicising the information needs to be designed to meet these requirements. Exhibit 2 contains the format used in Canada concerning facility identification and substance-specific release information.

Several means of disseminating PRTR outcomes are in use in the countries which have instituted PRTR systems, e.g. national reports, regional reports available in paper or "hard" copy as well as on CD-ROM disks, personal computer diskettes, on-line data-bases, assisted data searches, magnetic tape, microfiche, etc. Exhibit 3 contains a listing of eleven dissemination mechanisms and their advantages and disadvantages.

Surveys of PRTR data users indicate that a majority prefer hard copy or personal computer compatible data. Microfiche seems to be the least preferred and used approach. The CD/ROM, a new technology, is preferred by about ten per cent of PRTR users in the United States.[14] However, in Australia, citizens want PRTR information on CD/ROM to be placed at all local libraries, universities, and state and local government offices. Both, hard copy information and internet (on-line) access to the PRTR database are wanted by most users. Geographical presentation (based on the geographic information system) can provide information on the distribution of substances, activities releasing PRTR listed items, and locality distribution of releases and transfers: Australia and the Netherlands are providing this while the US presents data on a state-by-state, county, city and zip code basis. Canada provides information on a province-to-province basis. Finally, a dedicated free call-in facility for interactive PRTR information exchange is desired by users. Direct oral discourse, in the primary languages of the public, is said to be an indispensable means to provide opportunities for public understanding of PRTR results.

The PRTR dissemination or outreach plan needs to include a means to make potentially affected and interested parties as well as the general public aware of the PRTR, its benefits and its limitations. Training for those persons responsible for responding to enquiries from various PRTR data users also needs to be arranged to ensure that users receive accurate and consistent replies to enquiries.

Training and technical support systems, along with an educational programme, can aid various PRTR audiences to better understand and use PRTR outcomes. These systems should be founded upon established social bases, e.g. urban and rural issues may call for different approaches. If government acts to augment and facilitate uses of PRTR outcomes, then more potentially affected parties can and probably will become part of the process which calls for economic development and as limited risk to human health and the environment as is practical.

Arranging for satisfactory dissemination of PRTR outcomes requires an outreach plan which seeks to provide PRTR audiences with clear, concise, accurate and consistent information. This is neither easy nor is it cost free. Governments should convene interested and affected parties early in the PRTR development process in order to draft an outreach plan and estimate its costs over time. The process of developing the outreach plan might include:

-- Consultations with potential users, e.g. using PRTR outcomes to educate local citizens about potential risks of releases in their area and/or meeting with private sector firms (especially

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[14] Lynn, Frances M. et al, "The Toxics Release Inventory: Environmental Democracy in Action", USEPA, Jan. 1992, pg. 3.

SMEs) to indicate how PRTR data might be useful in determining which releases or waste streams to give high priority for prevention or reduction measures;

-- Consideration of how to link PRTR outcomes with other data sets and systems so as to maximise benefits of the information without duplicating cost, e.g. potential human health and environmental effects of items on the PRTR list, demographic information; limits of releases or transfers as defined by the licence or permit of a facility, etc.;

-- How to explain clearly the scope and nature of the PRTR data collection and database, e.g. data thresholds, how confidential data are treated, if non-point source emissions were estimated, how this was done, etc.; and

-- Estimates of the costs of each element of the outreach plan.

This latter point leads to the issue of fees for disseminating the data as a means to recover public costs. The laws of a number of countries require that public expenditures for providing items such as CD/ROM disks, tapes, hard copy, etc. be recovered from the requesters. Such fees may discourage many individuals from obtaining the PRTR results. Governments may wish to consider waiving these fees for individuals or charging certain business sectors who use the information for commercial purposes. The US has the largest PRTR programme at present; cost of PRTR results dissemination to the federal government is estimated at about $8 million annually. If this figure is doubled to include costs to state governments in the US, then governmental dissemination costs are roughly $16 million per year. This amounts to about $0.07 per person. From this, one may estimate that total public sector costs to make PRTR data fully accessible will probably be on the order of $0.03 to $0.07 per capita.

Yet another issue which must be taken into account by the PRTR dissemination outreach plan concerns administrative rules and procedures and the physical location of the information. If people near a facility must apply, say, to a somewhat distant state capital to obtain data from that facility, they may not obtain the information they need and want on a timely basis. Moreover, administrative requirements for requesting or obtaining PRTR information may also present significant obstacles. According to one NGO, certain states (Länder) only provide data collected under the German Federal Emissions Control Act of 1992 when directly requested to do so.

Providing relevant information to potential users, in turn, raises the issue of how PRTR results can be reported so as to satisfy the needs of disparate audiences. If only so-called raw data are included, i.e. total releases or transfers of items on the PRTR list, then information about potential risks to humans and/or the environment may not be apparent. This situation could arise if, say, relevant toxicological information is not used in analysing PRTR results. Releases of relatively non-toxic species might be reduced by significant amounts while certain highly toxic compounds were not. Net risks to human health and the environment might not decrease therefore, even though progress to reduce PRTR releases in general had been made. The PRTR dissemination outreach plan needs to take into account precisely which PRTR outcomes will be provided and if, and how, issues such as hazard indicators might be included. For example, releases of "highly toxic" species are only first estimates with respect to potential risks since transport and exposure factors are not precisely known or included in any currently operating PRTR systems. Recently, the Japanese Chemical Industry Association proposed that government monitor concentrations of releases and develop dose-response relations for public use.

One example of an approach which deals with potential risks of total on-site releases is a voluntary industry programme in Canada entitled "Accelerated Reduction/Elimination of Toxics" (ARET). This programme seeks to virtually eliminate emissions of 14 persistent, bioaccumulative and toxic substances with 90 per cent reduction (from 1988 levels) by year 2000. For 87 less hazardous - but toxic or persistent or bioaccumulative -- substances, ARET seeks reductions in releases to levels that are insufficient to cause harm with 50 per cent reduction by year 2000. Progress to date has been good; 138

firms and 7 government departments have cut releases of ARET chemicals by about 70 per cent since 1988. Each firm submits an Action Plan -- which is publicly available -- listing ARET chemicals used and released, proposed reductions and optionally how these reductions are to be achieved. (N.B. see also Chapter 2, Annex 1 and 2.) Figure 1 shows results from 1988 through 1993 and plans up to the year 2000 for ten sectors of the Canadian economy. In order to ensure consistency in reporting, Canada requires reporters to indicate reasons for changes in quantities released or transferred (see Exhibit 2, elements 4 and 6).

When a PRTR deals with transfers of solid, sludgy and liquid wastes, the public often may be unaware of whether such transfers pose uncontrolled risks or whether they are directed to licensed and inspected recovery, treatment, storage or disposal operations -- where presumably risks are managed. Hence, the PRTR outreach plan needs to clearly allow for differentiation of which waste transfers are directed to fully licensed environmentally sound operations and which are not.

IV. Summary elements for a PRTR dissemination outreach plan

The outreach plan needs to realise that the application of PRTR results can be used to help protect human health and the environment while yielding economic benefits to firms and communities on a local, regional, national and perhaps even on an international basis. Some reasonable goals for the outreach plan are:

-- Seeking to link and integrate PRTR results with programmes aimed at demonstrating risk reduction and proper management of chemicals,[15] e.g. by means of introducing pollution prevention actions, cleaner technologies, etc., throughout the entire life cycle;

-- Seeking to extend understanding and awareness of factors affecting pollutant releases and transfers and the potential consequences of human and environmental exposure to chemicals by linking PRTR outcomes with programmes dealing with: worker right-to-know, consumers, citizens nearby facilities which release PRTR chemicals, encouraging private sector firms to prevent pollution and reduce wastes and so on; and

-- Providing time series tracking of releases and transfers.

Because PRTR audiences vary greatly and have very disparate wants and needs, the outreach plan is perhaps the most crucial element of the PRTR system once the goals of the system have been selected. Hence, affected and interested parties should be brought together -- probably under government aegis -- at a very early date in order to develop a draft outreach plan including an estimation of its costs. The essence of this exercise is to ensure that PRTR results are accessible and usable by all audiences and that access is affordable by all.

There are many specific possibilities for providing PRTR results (see Exhibit 3), but developers of the outreach plan need to allow for the fact that information transfer is an iterative process. Hence, the outreach plan needs to allow regular assessment, refinement and incremental adjustment. In addition, the outreach plan should include provisions for a mechanism to receive feedback from users of PRTR outcomes in order to ensure that the dissemination effort is useful to its various audiences. Soliciting feedback from

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[15] In publishing PRTR results, government has an obligation to both the public and to reporters of data to try to make the information reflective of relative risks to populations and eco-systems exposed to releases and transfers. Open dialogue between reporters and other affected and interested parties could help build trust among these parties and help prevent misunderstandings concerning the use of PRTR data.

reporters to see how the outreach plan relates to or compliments their information dissemination efforts can also be useful when evaluating dissemination efforts.

Key elements of the outreach plan include:

-- The definition of goals of the outreach plan;

-- The definition of desired outcomes of the outreach plan;

-- Explaining clearly the nature of the PRTR database, e.g. thresholds, how confidential data are handled, if non-point source emissions are included, how these were estimated, etc.;

-- Timeliness;

-- Ease of understanding by all users;

-- Relatable to local sites (releasers);

-- Geared toward a variety of audiences, e.g. private sector, government officials, individual citizens, unions, local groups, consultants, financial sector, etc.;

-- Selecting of target audiences/type of customer;

-- Taking into account which data need to be provided to satisfy disparate audiences, e.g. raw data such as total releases over time only, or raw data plus toxicity and/or other intrinsic hazard information;

-- Choosing appropriate delivery mechanisms to reach various audiences;

-- Estimating costs and how these costs will be met and by whom;

-- Training of both disseminators and user groups;

-- Technical support services;

-- Identify how the plan will be implemented;

-- Mechanisms for user feedback and incremental change of the outreach programme in response to this;

-- Accessible to all interested and affected parties with a minimum of administrative and bureaucratic difficulty; and

-- A marketing plan for the PRTR system.

The appropriate dissemination of PRTR data would seem to be a responsibility of national government or at least national government oversight. This is key to ensuring that PRTR results are presented in an intelligible and consistent format over time and among all administrative levels of government from local to national. This seems the best route to ensure:

-- Immediate, sustained, inexpensive, comprehensive and consistent access to PRTR results;

-- Availability of suitable tools to aid in analysing PRTR results;

-- Coherency with existing regional, national and international laws, e.g. in the EU, coherency with the Directive on Integrated Pollution Prevention and Control;

-- Direct and user-friendly access to government employees concerning the PRTR database, e.g. via a telephone hotline, on-line database, telefax, etc.; and

-- Sustained interest in utilizing the PRTR as one tool in understanding and managing releases and transfers so as to reduce risks from them and in defining environmental quality objectives and policies now and in the future.

TABLE 1

REPRESENTATIVE USES OF PRTR DATA

Pressure facilities for change	Educate citizens
Lobby	Assess existing laws
Emergency planning	Effect source reduction
Epidemiological studies	Raise funds
Compare similar facilities	Identify hotspots
Compare to permits (licenses)	Prepare litigation
Prepare company profile	Spur direct citizen/industry negotiation
Prepare recommended legislation/regulation	Inform workers
Screen for socially responsible investment	Promote use of cleaner technology
Conduct commercial marketing studies	Adjust tax rates
	Estimate risks in local areas
	Estimate releases from non-point sources, e.g. transport, farms, etc.

Source: Lynn, FRANCES M. et al, "The Toxics Release Inventory: Environmental Democracy in Action", US EPA, Jan. 1992, pg. 3.

TABLE 2

SELECTED EMISSIONS REDUCTION GOALS

Company	Goal	Years	Media	Chemicals Covered
AT&T	50%	1987-1993	Air	TRI Chemicals
"	95%	1987-1995	Air	TRI Chemicals
"	100%	1987-2000	Air	TRI Chemicals
Dow Chemical	50%	1988-1995	Air	TRI Chemicals
Du Pont	60%	1987-1993	Air	TRI Chemicals
"	90%	1987-2000	Air	TRI Chemicals
"	100%*	1987-2000	Land	TRI Chemicals
"	35%	1990-2000	All	All Hazardous Waste
GE Plastics	75%	1987-1992	All	TRI Chemicals
Merck & Co.	90%	1987-1991	Air	TRI Carcinogens
"	100%*	1987-1993	Air	TRI Carcinogens
"	90%	1987-1995	All	TRI Chemicals
3M	70%	1987-1993	Air	All Toxic Chemicals
"	90%*	1987-2000	All	All Toxic Chemicals
Monsanto	90%	1987-1992	Air	TRI Chemicals
"	70%	1987-1995	All	TRI Chemicals
Occidental Chem	10%	Each year	Air	TRI Chemicals
Upjohn	90%	1987-1992	All	TRI Chemicals

* = qualifications apply.

Source: US National Wildlife Federation

EXHIBIT 1

State Government Reports UNITED STATES

Columns 1-4 use the state's most recently available written TRI report. Columns 5-7 are derived from a national survey conducted by the National Conference of State Legislators (NCSL) for the Forum on State and Tribal Toxics Action.

KEY TO CHART

Y = Yes N = No P = Partial

Paper report contains:
1. Facility discharge data - totals
2. Facility discharge data by media
3. Facility waste management data by method
4. Chemical toxicity information

Computer access includes:
5. State provides customized reports (from state database)
6. State computerizes facility release data
7. State computerizes facility waste management data

	1	2	3	4	5	6	7
ALABAMA (205) 260-2717							
No report					Y	N	N
ALASKA (907) 465-2630							
No report					N	N	N
ARIZONA (602) 204-4205							
"Toxic Data Report Summary 1991"	Y	Y	Y	N	Y	Y	Y
"1992 Arizona Toxic Chemical Release Inventory Report Summary"	Y	Y	Y	N	Y	Y	Y
ARKANSAS (501) 682-4541							
"[Year] Arkansas Toxics Release Inventory"	Y	Y	N	Y	N	Y	N
CALIFORNIA (916) 327-1848 or (916) 324-9924							
No info.					Y	Y	Y
COLORADO (303) 692-3309							
"Pollution Prevention Priorities: A Study of Priorities for Pollution Prevention Activities in Colorado"*	—	—	—	—	N	N	N
CONNECTICUT (203) 566-4856							
"1991 Toxic Release Inventory Information Packet"	Y	N	N	P	Y	Y	Y
DELAWARE (302) 739-4791							
"State of Delaware: 1990 Toxic Chemical Release Inventory Summary"	Y	Y	N	N	Y	Y	Y
FLORIDA (904) 488-1472							
No info.					Y	Y	Y
GEORGIA (404) 656-6905							
"Toxic Release Inventory Report, [Year]"	Y	Y	Y	N	Y	Y	Y
HAWAII (808) 586-4249							
No report					N	N	N
IDAHO (208) 334-0502							
No report					N	N	N
ILLINOIS (217) 782-3637							
"[First - Sixth] Annual Toxic Chemical Report"	N	N	N	Y	Y	Y	Y
INDIANA (317) 233-5686							
"1994 Annual Report on Pollution Prevention in Indiana"	Y	N	P	N	?	N	N
IOWA (515) 281-8852							
No report					N	N	N
KANSAS (913) 296-1690							
"Right-to-Know Program Annual Report 1992" (with supplemental volumes)	Y	Y	N	P	Y	Y	Y
KENTUCKY (502) 564-2150							
"[Year] Toxic Chemical Release Inventory Report"	Y	Y	N	N	Y	Y	Y
LOUISIANA (504) 765-0648							
"Louisiana Toxic Release Inventory [Year]"	Y	P	N	Y	Y	Y	Y
"Corporate Response Challenge [Year]"	Y	Y	N	N	Y	Y	Y
"The Louisiana Air Toxics Annual Emissions Report"	Y	Y	N	N	Y	Y	Y
MAINE (207) 287-4080							
No report					N	N	N
MARYLAND (410) 631-3800							
No report					Y	Y	Y
MASSACHUSETTS (617) 556-1029							
No info.					Y	Y	Y
MICHIGAN (517) 373-8481							
"Toxic Chemical Release Inventory: Summary Report for Michigan [Year] Data"	N	Y	N	N	N	Y	N
MINNESOTA (612) 643-3000							
"[Year] Toxic Chemical Release Inventory" (Volumes I and II)	Y	Y	Y	N	Y	Y	Y
MISSISSIPPI (601) 352-9100							
No report					N	Y	N
MISSOURI (314) 751-7929							
No report					N	N	N
MONTANA (406) 444-3948							
No report					N	N	N
NEBRASKA (402) 471-4230							
No report					Y	Y	Y
NEVADA (702) 687-4670							
No report					Y	Y	N
NEW HAMPSHIRE (603) 271-2231							
No report					N	N	N
NEW JERSEY (609) 292-6714							
"Community Right-To-Know Annual Report [for Survey Year]"	Y	Y	Y	Y	Y	N	N**
NEW MEXICO (505) 827-4350							
No report					N	N	N
NEW YORK (518) 457-4107							
"New York State [Year] Toxic Release Inventory (TRI) Review"	Y	Y	?	P	Y	Y	N
NORTH CAROLINA (919) 733-4984							
No report					N	N	N
NORTH DAKOTA (701) 224-4589							
No report					N	N	N
OHIO (614) 644-4830							
"[Year] Toxic Release Inventory Annual Report"	Y	Y	N	N	Y	Y	Y
OKLAHOMA (405) 271-8062							
No report					Y	Y	Y
OREGON (503) 378-2885 or (503) 373-1540							
"[Year] Toxic Chemical Release Information"	Y	Y	N	N	Y	Y	Y
PENNSYLVANIA (717) 783-2071							
"Hazardous Material Emergency Planning and Response Act: Annual Report [Years]"*	P	P	N	N	Y	N	N
RHODE ISLAND (401) 277-2808							
No report					N	Y	N
SOUTH CAROLINA (803) 734-5200							
No report					Y	Y	Y**
SOUTH DAKOTA (605) 773-3153							
No report					Y	Y	Y
TENNESSEE (800) 258-3300							
No report					N	N	N
TEXAS (512) 463-7830							
No report					Y	N	N
UTAH (801) 536-4100							
"Utah Toxic Release Inventory: Summary Report [Year]"	Y	P	N	N	Y	Y	Y
VERMONT (802) 865-7730							
No report					N	N	N
VIRGINIA (804) 225-2513							
"Virginia Toxic Release Inventory (TRI) Summary Report"	Y	Y	Y	N	Y	Y	Y
WASHINGTON (800) 633-7585 or (206) 407-6721							
"Washington State Toxic Release Inventory: Summary Report [Year]"	P	Y	N	N	Y	Y	Y
WEST VIRGINIA (304) 348-5380							
No report					N	Y	Y
WISCONSIN (608) 266-2621							
"1992 SARA 313 Data Summary" Toxic Release Inventory"	Y	P	N	N	Y	Y	Y
WYOMING (307) 777-4900							
No report					N	Y	Y

* Not primarily a TRI report

** Corrected from NCSL survey

Source: "Working Notes on Community Right-to-Know, July-Aug. 1994

Exhibit 2

Recommendation of the Canadian Multi Stakeholder Advisory Committee (MSAC): NPRI Data Elements

Part A: Facility Identification

1.0 Company name

2.0 Facility identification and address
- 2.1 Facility name
- 2.2 Street address
- 2.3 City
- 2.4 Lot number
- 2.5 Concession number
- 2.6 Township
- 2.7 County
- 2.8 Province
- 2.9 Postal code

3.0 Facility contact
- 3.1 Name
- 3.2 Position
- 3.3 Telephone number
- 3.4 Facsimile number

4.0 Number of employees at the facility

5.0 Mailing address (if different from above)
- 5.1 Street address
- 5.2 P.O. Box number
- 5.3 City
- 5.4 Province
- 5.5 Postal code

6.0 Facility location
- 6.1 Latitude: degrees, minutes, seconds
- 6.2 Longitude: degrees, minutes, seconds

7.0 SIC codes (enter Canadian or U.S.)
- 7.1 Canadian SIC code(s)
- 7.2 U.S. SIC code(s)

8.0 Residual Discharge Information System Number

9.0 Domestic Substances List Number

10.0 Provincial operating permit number (if required by province)

11.0 Parent company information
- 11.1 Name of parent company
- 11.2 Street address
- 11.3 Box number
- 11.4 City
- 11.5 Province
- 11.6 Postal code

12.0 Approval for release to Environment Canada
- 12.1 Executive contact name
- 12.2 Position
- 12.3 Signature
- 12.4 Date

Part B: Substance-specific Release Information

1.0 Substance identity
- 1.1 Chemical Abstracts Service Registry Number
- 1.2 Substance or substance category

2.0 Utilization of the substance at the facility
- 2.1 Manufacture the substance:
  - a) Produce
  - b) Import

  If produce or import:
  - c) For on-site use/processing
  - d) For sale/distribution
  - e) As a byproduct
  - f) As an impurity

Source: Summary Report of the 1993 NPRI - Canada

Exhibit 2 (continued)

2.2 Process the substance:
- a) As a reactant
- b) As a formulation component
- c) As an article component
- d) Repackaging only

2.3 Otherwise use the substance:
- a) As a chemical processing aid
- b) As a manufacturing aid
- c) Ancillary or other use

3.0 On-site releases of the substance to the environment

Report the basis of estimate code and the releases in tonnes for the following:

3.1 Air releases
- 3.1.1 Stack/point
- 3.1.2 Substance storage/handling
- 3.1.3 Fugitive
- 3.1.4 Spills
- 3.1.5 Other non-point

3.2 Underground injection

3.3 Releases to surface waters
- 3.3.1 Direct discharges
- 3.3.2 Spills
- 3.3.3 Leaks
- 3.3.4 Receiving streams and water bodies codes from item 7

3.4 Releases to land
- 3.4.1 Landfill
- 3.4.2 Landfarm
- 3.4.3 Spills
- 3.4.4 Leaks
- 3.4.5 Other

3.5 Total releases

3.6 Seasonal breakdown of releases by percentage in each quarter. (To be completed if, in a quarter, releases amount to less than 15% or greater than 35% of the total released).

4.0 Progress in reduction of releases

4.1 Total releases
- a) Input total from 3.5

4.2 Releases reported in previous year
- a) Input previous year's total from 3.5

4.3 Reasons for changes in quantities released:
- a) Changes in production levels
- b) Changes in estimation method
- c) Pollution prevention and abatement
- d) Other (e.g. accidents, spills or breakdowns)
- e) No significant change
- f) Up to 10 lines of text to more fully describe the reasons for a change in quantities released (optional)

4.4 Anticipated releases for the next three reporting years

5.0 Transfers of the substance in waste to off-site locations

5.1 Total quantity of substance transferred (tonnes)

5.2 Destiny of the substance (report percent of 5.1 and location code(s) from item 8)

5.2.1 Recovery/reuse/recycle
- a) Material recovery/recycle
- b) Burning/energy recovery

5.2.2 Destruction
- a) Incineration
- b) Bio-oxidation

5.2.3 Municipal sewage treatment plant

5.2.4 Containment
- a) Landfill
- b) Underground injection
- c) Other storage

6.0 Progress in reduction of transfers

6.1 Total transfers
- a) Input total from 5.1 in tonnes

6.2 Transfers reported in previous year
- a) Input previous year's total from 5.1 in tonnes

6.3 Reason for changes in quantities transferred
- a) Changes in production levels
- b) Changes in estimation method
- c) Pollution prevention and abatement
- d) Other (e.g. accidents, spills or breakdowns)
- e) No significant change
- f) Up to 10 lines of text to more fully describe the reasons for a change in quantities released (optional)

6.4 Anticipated transfers for the next three reporting years

7.0 List of names of receiving streams and water bodies.

List the names below using one code for each stream or water body name. Enter the code(s) under item 3.3.4 in part B.

Code A: Stream name 1
Code B: Stream name 2, etc.

Exhibit 2 (continued)

6.0 Identification of off-site facilities to which waste is being sent

List the names below using one code for each off-site waste treatment facility. Enter the code(s) under item 5.2 in part B.

Code A: Off-site facility name 1
Street address
Box number
City
Province/state/etc.
Postal code/zip code/etc.
Country

Code B: Off-site facility name 2, etc.

Exhibit 3

Advantages and Disadvantages for eleven PRTR Dissemination and Storage Mechanisms

(Taken from Pembleton, P.; UNIDO Submission to 4th OECD PRTR Workshop, London, 14-16 June 1995)

Dissemination/Storage Mechanism *PTT*	*Advantages*	*Disadvantages*
Mail (dissemination)	•Little need for investment in communication equipment. •No maintenance needed. •No depreciation costs. •No technical or computer skills needed. •Cheap.	•Slow method of communication (particularly in developing countries). •Security difficult.
Paper/Hard Copy (storage)	•Cheap to produce and purchase. •Dissemination has all the advantages of mail distribution. •Easily copied and passed on to other users. •Requires no technical support, computer literacy, or sophisticated equipment. •Can be stored and archived.	•Requires a lot of storage space. •Information does not have searchable fields and cannot be cross-referenced so cannot be searched for related material. •Searching for information may be time-consuming. •Security difficult. •Paper may degrade in hot and humid conditions.
Telephone (dissemination)	•Quick and easy to use. •Widespread, therefore little need for further investment. •No technical or computer skills needed. •Technical support is readily available. •Low depreciation and maintenance costs.	•Poor line quality can hinder communication. •International lines frequently unavailable. •Language difficulties. •Time zone difference problems. •Difficult to monitor for cost control •A log to *maintain* cost control is unwieldy and tiresome. •Suitable only for transmission of requests, not of responses.

Exhibit 3 (continued)

Dissemination/Storage Mechanism *PTT (contd.)*	*Advantages*	*Disadvantages*
Facsimile (dissemination)	•No technical or computer skills needed. •No time zone difference problems. •Data can be prepared off-line, reducing the linkage costs that would be incurred with an on-line system. •Transmission of high volumes of information is quicker by fax than telephone. •Hard copy output is ready made. •Hard copy provides an audit trail for cost control.	•Moderate depreciation and maintenance costs. •Moderate investment may be necessary. •Poor line quality may hinder transmission. •International lines are not always available.
Telex (dissemination)	•Data can be prepared off-line, reducing the linkage costs that would be incurred with an on-line system. •No time zone difference problems. •Higher target group penetration than facsimile.	•Few advantages over fa. similes, yet more cumbersome to use. •Expensive to buy, requiring an investment of around £800. •Requires a dedicated line which may be expensive to install. •Poor line quality may hinder transmission. •Transmission is very slow. •Needs identifier code for which there is an annual charge.

Exhibit 3 (continued)

Dissemination/Storage Mechanism	*Advantages*	*Disadvantages*
ON-LINE MEDIA		
Electronic Mail (dissemination)	•Can be accessed by phone line and modem or through a dedicated network. •Very secure form of communication (users need own password). •Message can be sent to a number of users simultaneously. •No time zone difference problems. •Versatile in handling data. •Data storage for up to one year. •Data can be prepared off-line and during maintenance can be dumped to hard copy or disk.	•Limited availability (although becoming more widespread). •Large investment in equipment is necessary. •Moderate maintenance and depreciation costs. •Some technical and computer skills are necessary (although help screens are usually available). •Unreliable in communication with developing countries.
On-Line Data Bases (dissemination and storage)	•Networks allow for multi-user access and are often interactive. •Information can be updated regularly, often on a 'real time' basis. •Information can usually be downloaded to hard copy, floppy disk and hard disk enabling further dissemination with minimal additional costs. •On-line systems use technology which may already be available, so equipment costs may be low	•Investment costs may be high if equipment not already available. •Unreliable in communication with developing countries. •Often difficult to make and maintain a link. Error connection by modem may result in slow data transmission and therefore high connection costs. •Budgeting is difficult because charging depends on time and number of connections made. •Most commercial on-line database hosts are located in developed countries, and require payment in hard currencies which are not readily available in many developing countries.

Exhibit 3 (continued)

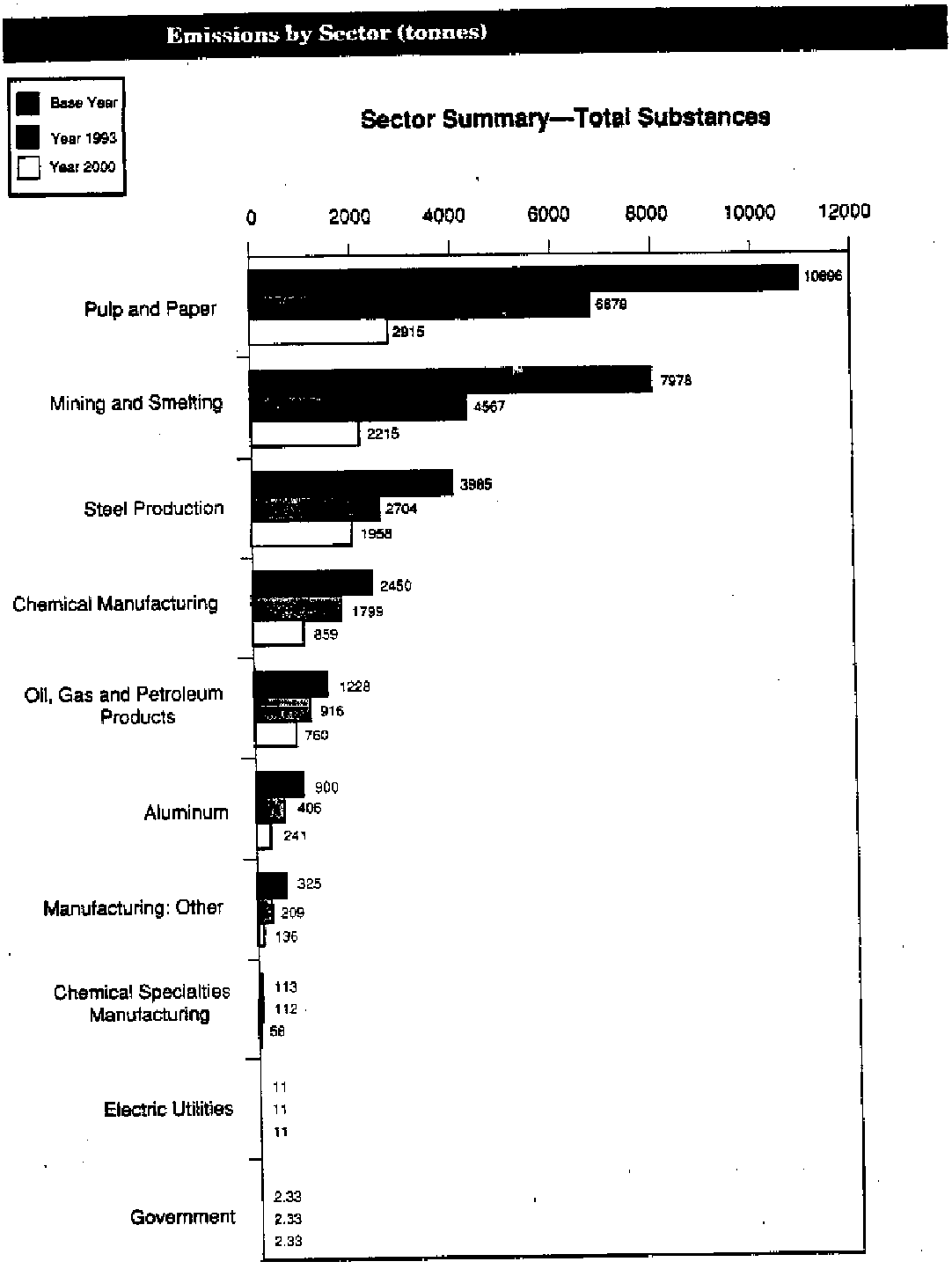
Dissemination/Storage Mechanism *LOCALISED DATA BASES (contd.)*	*Advantages*	*Disadvantages*
Compact Optical Disks (CD-ROMs) (dissemination and storage)	•High data storage capacity. •Durable and lightweight and so easy to send by mail. •Text retrieval is simple and little technical ability needed (help screens often included). •Can store relational and cross-referenced databases. •One CD-RCM may be accessed by a network of PCs. •Allow for an optional dial-in facility for access from outside the user network. •Technical support often accompanies initial installation of equipment.	•CD-ROM technology is costly, with disk readers and databases both costing around $1000. •Unlike PCs, disk readers are not multi-purpose and can only be used with CDs. •Requires much promotion in developing countries, as it is currently a largely unknown technology.
Floppy Magnetic Disks (dissemination and storage)	•Lightweight and easily sent by mail. •Easily downloaded to hard disk, giving multi-user access via a network. •Uses technology which may already be available, so equipment costs may be low.	•Low storage capacity, therefore need for many disks or user choice of specific disks for their information. •Easily corruptible. •May require high capital investment if equipment not already available. •Requires a certain level of computer literacy.

Exhibit 3 (continued)

Dissemination/Storage Mechanism *LOCALISED DATA BASES (contd.)*	*Advantages*	*Disadvantages*
Magnetic Tape (dissemination and storage)	•Whole database can be obtained from supplier. •Magnetic tape can store relational and cross-referenced databases. •High storage capacity. •Can be loaded on to mainframe for multiple user access. •Can be stored for archiving and reference purposes.	•Expensive to purchase and post. •Require very expensive equipment. •Require a high level of technical support. •Requires computer literacy.

Figure 1

Voluntary Commitments to Reduction of Toxic Releases in Canada
(138 firms plus 7 government departments)



BOX 1

KEY PRINCIPLES OF THE RESPONSIBLE CARE PROGRAMME

- *To recognise and respond to community concerns about chemicals and our operations.*
- *To develop and produce chemicals that can be manufactured, transported, used, and disposed of safely.*
- *To make health, safety, and environment considerations a priority in our planning for all existing and new products and processes.*
- *To report promptly to officials, employees, customers, and the public information on chemical-related health or environmental hazards and to recommend protective measures.*
- *To counsel customers on the safe use, transportation, and disposal of chemical products.*
- *To operate our plants and facilities in manner that protects the environment and the health and safety of our employees and the public.*
- *To extend knowledge by conducting or supporting research on the health, safety, and environmental effects of our products, processes, and waste materials.*
- *To work with others to resolve problems created by past handling and disposal of hazardous substances.*
- *To participate with government and others in creating responsible laws, regulations, and standards to safeguard the community, workplace, and environment.*
- *To promote the principles and practices of Responsible Care by sharing experiences and offering assistance to others who produce, handle, use transport, or dispose of chemicals.*

CHAPTER 5

FORMULATING A PRACTICAL PRTR SYSTEM

I. Basic principles concerning establishment of a PRTR system

In keeping with Principle 10 of Agenda 21 which states, *inter alia*, that individuals shall have access to information concerning the environment that is held by public authorities and that countries shall encourage public awareness and participation by making information widely available, governments may consider establishing a PRTR system as one means of implementing this Principle. In deciding whether to establish a PRTR system, governments need to weigh their environmental policy priorities and the potential benefits of a PRTR system. These should then be balanced against potential costs to government, reporters and society.

This Chapter is meant to provide a reprise of the main principles and points associated with establishing a PRTR system. It also includes some information from countries who are considering whether to install a PRTR. The role of international actions concerning PRTRs so as to provide a practical indication of real issues currently being faced in moving toward PRTR implementation is also discussed.

The key principles for a practical PRTR system include the following:

-- PRTR systems should provide data to support the identification and assessment of possible risks to humans and the environment by indicating sources and amounts of potentially harmful releases and transfers to all environmental media.

-- The PRTR data should be used to promote prevention of pollution at the source, e.g. by encouraging implementation of cleaner technologies.

-- National governments should use PRTR data to evaluate the progress of environmental policies and to assess to what extent national environmental goals are, or can be, achieved.

-- In devising a PRTR system or when modifying existing systems, governments should consult with affected and interested parties to develop a set of goals and objectives for the system and to identify potential benefits and estimate costs to reporters, government and society as a whole.

-- PRTR systems should cover an appropriate number of substances which may be potentially harmful to humans and/or the environment into which they are released or transferred.

-- PRTR systems should involve both the public and private sectors as appropriate: a PRTR should include those facilities or acitivies which might release and/or transfer substances of interest and, if appropriate, diffuse sources.

-- To reduce duplicative reporting, PRTR systems should be integrated to the degree practicable with existing information sources such as licenses or operating permits.

-- Both voluntary and mandatory reporting mechanisms for providing PRTR inputs should be considered with a view as to how best to meet national goals and objectives of the system.

-- The comprehensiveness of any PRTR in helping to meet environmental policy goals should be taken into account, e.g. whether to include releases from diffuse sources ought to be determined by national conditions and the need for such data.

-- The results of a PRTR should be made accessible to all affected and interested parties on a timely and regular basis.

-- Any PRTR system should undergo evaluations and have the flexibility to be altered by governments in response to these evaluations or to the changing needs of affected and interested parties.

-- The data handling and management capabilities of the system should allow for verification of data entries and outputs and be capable of identifying geographical distribution of releases and transfers.

-- PRTR systems should allow, insofar as possible, for comparison and cooperation with other national PRTR data systems and consideration for possible harmonization with similar international data bases.

-- A compliance mechanism to best meet the needs of the goals and objectives should be agreed by affected and interested parties.

-- The entire process of establishing the PRTR system, its implementation and operation, should be transparent and objective.

While these principles are applicable to any PRTR approach, they are not meant to suggest that a single "global" PRTR system is achievable or even desirable. Clearly, experience, cultural and political issues, environmental policies and priorities tend to indicate that a PRTR system has to be adapted to national needs. This should be done while keeping in mind the utility of being able to share and compare or even harmonize data for certain international purposes.

Bearing in mind the basic principles for a PRTR system, a government which decides to proceed needs to: a) formulate a practical and efficient PRTR system; b) to extract as many benefits from it as possible for reasonable and affordable costs; and c) to evaluate, monitor and improve the system once it becomes operational.

II. Formulating a practical PRTR system

The foundation for a practical PRTR system is a set of carefully thought-out goals, objectives, enabling legislation and regulations designed to allow the system to function in a timely, cost effective manner. In order to set the goals and objectives, affected and interested parties need to be identified and formally invited to participate in the process[16]. All of these parties should have the opportunity to contribute to the decision-making process. It is desirable to have wide support among affected and interested parties for deciding to adopt a specific set of initial PRTR goals and objectives.

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[16] For detailed discussion about how to identify and involve affected and interested parties, see UNITAR Supplementary Guidelines #3 on Implementation of UNITAR-PRTR Pilot Studies.

Once these initial PRTR goals and objectives have been selected, then some estimation of potential benefits and potential costs to government, reporters and society needs to be made. This estimate need not be costly in terms of time or other resources; rather, it can be a broad listing of possible benefits, (e.g. improving environmental policy, stimulating pollution reduction, identifying the largest polluters, and the distribution of releases, etc.) as contrasted with costs and who bears them, e.g. cost of estimating releases from transport or agriculture to government, costs of reporting by individual firms, costs to government for making data accessible, costs of analysing data, etc.

The exercise of estimating benefits and costs should help affected and interested parties focus sharply on how to choose key attributes of an operational PRTR system which would meet the goals and objectives. In particular, the initial scope and design (comprehensiveness) of the PRTR system should take into account the following:

(a) Selection of a preliminary list of chemicals whose releases and/or transfers are to be included in the PRTR (see Chapter 2);

(b) The comprehensiveness of the PRTR system needs to be delineated, e.g. will diffuse sources such as releases from transport, agriculture and others be incorporated along with releases and/or transfers to the environment from specific facilities such as public power plants, private factories, etc., or not? Will transfers into product streams be considered?

(c) What types of data elements should be included?

(d) What thresholds are most useful to capture the desired data without creating undue burdens on the PRTR system reporting process? (N.B. It may be that differing thresholds are appropriate for various chemicals or categories of chemicals in the list.) See Chapters 2 and 3 for more details on thresholds;

(e) The importance of defining what constitutes confidential data and a consistent and simple process for making, reviewing and dealing with confidentiality claims;

(f) A plan for ensuring accessibility of the data and how broadly the data are to be disseminated is required (see Chapter 4);

(g) A mechanism for mid-course monitoring and evaluation of the PRTR system needs to be incorporated, e.g. delisting of items no longer of interest, listing of new items etc. (see Chapters 2 and 3 for details);

(h) PRTR system design should ensure flexibility to alter the system in response to changing needs, e.g. how best to incorporate release and/or transfer information from SMEs;

(i) Geographical distribution issues (reports based on locale), possible comparison with other national PRTR systems and the harmonization with appropriate national and international data bases should be considered in selecting PRTR data management and handling options (see Chapter 3);

(j) Also, in selecting data management and handling options, a government needs to consider the means to obtain data from procedures and practices necessary for properly collecting release and transfer data, verify data entries, respond to errors and integrate results into the data base (see Chapter 3);

(k) In order to reduce duplicative activities, the degree of possible integration of the PRTR information with existing information sources, e.g. licenses and permits, should be

examined at the outset of the PRTR system design; reporting requirements for PRTR data should be made as clear and simple as possible consistent with the goals and objectives;

(l) Timeframes are factors for governments to consider, particularly the need to delineate deadlines for facilities to sumbit data and the need to actively disseminate PRTR results on a regular periodic basis;

(m) The process of designing the PRTR system and its subsequent operations should be objective and transparent;

(n) At this point, affected and interested parties will have developed a basis for providing input as to whether reporting for the PRTR system should be mandatory, voluntary, or some combination of the two (see Chapter 2);

(o) Affected and interested parties need to provide input on what to propose in any legislation necessary to achieve PRTR goals and objectives;

(p) For any mandatory aspects of the PRTR system, an equitable compliance mechanism designed to meet the needs of the system has to be devised;

(q) At this stage, a re-examination of the resources likely to be needed to operate the system is worthwhile; these resources include mechanical, financial, political and human assets;

(r) A test study or trial effort in some area of the country is worthwhile as a test of the initial PRTR design (see Chapter 3 for brief descriptions of test studies).

III. Obtaining the benefits of a PRTR system

A well-designed PRTR system can generate results which assist governments, communities and reporting facilities to identify potential risks arising from releases and/or transfers of substances on the list. A systematic evaluation of the probable risk to the community and environment from such releases and/or transfers could then allow facilities to better respond to community concerns and prioritise efforts to reduce releases and/or transfers more effectively. Moreover, such analyses can demonstrate to employees and nearby citizens that the releases and transfers from a facility fall within statutory or otherwise acceptable levels of risk. PRTR data, therefore, increase public participation, which can lead to greater co-operation and trust. Indeed, such data provide focus for management effort and a means to involve all operational employees in becoming personally knowledgeable and active in controlling and reducing potentially harmful releases and/or transfers.

A number of potential benefits can arise from the implementation of a well-designed PRTR system, which is aimed at achieving a set of goals and objectives that have the wide support of interested and affected parties. Benefits arising in conjunction with a PRTR system have been mentioned. What follows is an attempt to summarize the main potential benefits which can be anticipated; these are presented in no particular order of priority. Which benefits actually are obtained will depend strongly on the goals, objectives, design and operation of each specific PRTR system implemented.

The following potential benefits can arise from public dissemination of PRTR data:

-- Comprehensive assessment of sources of releases and/or transfers for chemicals on the list, how much is being released and the geographic distribution of releases is possible. In turn, this information can promote more precise priority-setting and environmental decision-making by public sector bodies;

-- PRTR outputs can provide one indicator for whether a variety of environmental policy goals are being achieved over time, e.g. reduction of toxic pollutants;

-- PRTR results can provide local or even regional bases for performance measurement and appropriate dialogues with reporting facilities -- both public and private;

-- The existence of the PRTR can spur reporting facilities to improve internal auditing activities so as to provide high quality data to the PRTR;

-- The PRTR promotes improved data entry and database management capabilities in an atmosphere conducive to valid analyses of the data;

-- Public accessibility of the data promotes interest from many audiences, e.g. the number of "affected and interested parties" can increase *because* the data are accessible;

-- The reduction of releases and/or transfers of chemicals on the list is promoted. Ideally, reductions in chemicals likely to present high risks to humans and/or the environment would be targeted first;

-- PRTR outputs can stimulate the private sector, especially SMEs, to develop and provide technologies for reducing releases and transfers. Lists of reporting facilities enable technology providers to identify potential customers, i.e. supply and demand for cleaner technologies can be matched more rapidly and efficiently;

-- A PRTR can help promote sustainable development.

There are a number of additional potential benefits which can arise from having PRTR system data:

-- Impartial release and/or transfer data can encourage affected and interested parties by fostering dialogue about local and national concerns. Common ground among these parties then might be reached concerning management of chemicals on the list;

-- In turn, the dialogue among affected and interested parties can promote cost-effective risk management decisions by government;

-- On a local level, PRTR data can promote more focused discussions between reporting facilities and their neighbours;

-- By providing PRTR data, reporting facilities become more aware of quantities of chemicals released or transferred which can spur them to avoid costs by more efficient use of these chemicals, e.g. by means of better usage and/or recovery of materials, energy, water and other feedstocks to productive activities. Increased efficiency means reduced releases and/or transfers over time, increased profits and perhaps a better public image for reporters;

-- PRTR data can be useful to those involved in planning for possible emergencies since these data provide some insights into the kinds of releases which might occur under emergency circumstances;

-- Regular, periodic publication of PRTR data encourages and stimulates prevention of pollution at source and the development and implementation of technologies for cleaner production and products;

-- The data may be helpful in focusing public policy objectives concerning control and monitoring of various releases and/or transfers and in enforcing existing rules;

-- Comparisons among reporting facilities and tracking of specific releases and/or transfers over time are made feasible;

-- PRTR results could allow sharing of data between neighbouring countries to help assess progress toward attaining commitments agreed under terms of international compacts or agreements, e.g. issues of transborder migration of releases and/or transfers; and results achieved by PRTR data can assist in evaluating cleaner production techniques and processes.

In addition to these potential benefits, other unforeseen benefits may be identified during the operation of a PRTR system. For example, certain aspects of the environmental status of a facility being offered for sale can be estimated from careful analysis of PRTR data; investors are increasingly using PRTR data when they are available to help them to know about environmental behaviour of a firm they are considering for investment. Facilities will thus become more fully aware of the need to be environmentally responsible which can lead to efforts to reduce releases and/or transfers. Such unanticipated benefits should be sought once a PRTR is put into operation and taken into account during any changes to the PRTR system.

Many of the potential benefits cannot be readily converted into direct monetary or other tangible units, such as avoiding adverse environmental or human health risks. Some PRTRs promote commercial activities in developing technologies for cleaner production and products and stimulate more efficient governmental policies to protect the environment. There are costs which must be paid in order to gain the benefits of a PRTR. These costs are borne by government which collects data and operates the PRTR system, by reporting facilities that identify what data to report and by the public which uses the outputs of the PRTR system (Chapter 3 includes discussion of costs).

In designing a PRTR system, potential benefits and the potential costs need to be considered in order to try to make the system as efficient and equitable as possible and consistent with its goals and objectives. For example, a PRTR system which is too broad and unfocussed might create problems because the total amount of data is so large that trends may be unclear, operational activities become very expensive and clear directions for environmental policy improvement are masked. Thus, a PRTR system should be monitored in order to help ensure that the goals and objectives remain valid and that they are being attained in a cost-effective fashion. This means that a PRTR system requires monitoring and must be flexible enough to undergo mid-course improvements fairly rapidly.

IV. Monitoring and improving a PRTR system in operation

Monitoring a PRTR calls for systematic observation of the PRTR system including: a) data collection and data accuracy; b) reporting and dissemination; c) uses of the data; d) comments from affected and interested parties concerning the value added; and e) resource requirements for the system. The evaluation of these observations is necessary in order to compare progress with the goals and objectives of the system with a view to identifying where it could be improved. Elements of the evaluation include effectiveness and efficiency of the PRTR as well as an assessment of the PRTR in the hierarchy of national environmental policies and priorities. Box 1 includes a set of items on which an evaluation of a PRTR might be based.

Monitoring and improving a PRTR system need to be a continuing process which includes the participation of all affected and interested parties. But improvement of PRTR systems should not be limited only to PRTR "specialists". A PRTR is only one tool to further environmental policy aims so it is very important to involve other experts, e.g. specialists in risk assessment, in permitting, cleaner production

technical assistance, etc., in the evaluation process. Given the need to monitor and evaluate PRTR systems, the initial design of any PRTR should include a process for evaluation. The PRTR system also should have the flexibility to accommodate changes to meet new circumstances and changing needs.

In practice, there should be a provision for routine monitoring and evaluation of the daily operations of a PRTR such as: how well the data handling and management mechanism is working; whether reporting forms need to be clarified and simplified; devising better means to verify and validate incoming data; providing better access to PRTR outputs and so on. At longer intervals, a major review might be in order to re-examine the entire PRTR system, its design and operation.

The advent of new technology could trigger a review. For example, the availability of the Internet as a means to provide better access to PRTR data might call for PRTR system design alterations (N.B. the UK and Canada's versions of a PRTR are already available on Internet and others are anticipated). A need for change might be due to the possibility for new geographic information systems to provide better locational indications of releases and/or transfers. Results of test studies of a PRTR system might indicate need for changes and improvements in design as well; this need not only be true at the inception of a PRTR, but special test studies of suggested approaches could be made during regular operations of a PRTR. Results might then be used to make mid-course changes.

In any major review of a PRTR system against proposed -- and/or attained -- goals and objectives, the relative benefits and costs of the system deserve consideration. As noted, benefits are often intangible in monetary terms, e.g. avoided adverse environmental affects, and therefore hard to express in quantitative terms. Many costs, however, can be tracked in monetary terms, for instance, the procurement of computer machinery for government use or the expenditures which some reporters might incur when purchasing equipment to measure releases and transfers. But there may also be less quantifiable costs, such as productivity reductions arising from the need to use personnel to track and report release and/or transfer data to the PRTR, opportunities for other investments foregone by having expenditures for reporting, etc. However the benefits and costs are considered, the process should be open and transparent; all affected and interested parties should have the opportunity to contribute to the discussions.

V. Countries who are considering or are in the process of developing a national PRTR system

A number of OECD and non-OECD countries are in the process of moving toward a national PRTR system. Experiences to date from some of these countries might be informative for other national administrations who may elect to investigate the benefits and costs of installing a PRTR. What follows is a brief description of activities in six countries and the European Union based upon presentations made at an OECD workshop held 7-9 November 1995, in the Hague.

South Africa has initiated a project for integrated pollution control (IPC) concerned with effective management of problems of water, air and soil quality as well as waste management. Economic, developmental and institutional issues are being considered with a view toward proposing an integrated approach to pollution prevention and control. Within the development of an IPC approach, a PRTR is viewed as falling into the area of an incentive-based regulatory instrument. Government functions may include development and management of the system, information collection, dissemination and distribution including publication of the results. Government will promote voluntary participation by industry for obtaining the required input data. A pilot study of a PRTR will be run in one South African province which contains a high degree of industrial activity. The South African government suggests that a PRTR could be more cost effective than other instruments. Moreover, the PRTR will pay special attention to diffuse sources of pollution as well as to point-sources.

Egypt is one of three pilot countries selected by UNITAR for testing whether a PRTR would be useful and if so, how it might be implemented in a practical and cost-effective fashion. Egypt has decided to proceed and has designated the Egyptian Environmental Affairs Agency to take the lead. Informal contacts with affected and interested parties have led to the establishment of a national coordinating team representing government, NGOs and the private sector. This team will have considerable input to the design of the PRTR. Egypt has taken a major step by incorporating into the Egyptian Environmental Law, requirements enabling the PRTR to be implemented. Next steps are formal consultations with affected and interested parties, draft design of the PRTR and public meetings concerning PRTRs.

The Czech Republic (which became the 26th Member country of OECD in December 1995) is also participating in the UNITAR pilot programme for PRTRs. The Czech Republic has focused on design of its PRTR by working to: a) develop the list of chemicals of interest; b) identify industrial sources of releases and/or transfers; c) delineate data elements needed; and d) outline proposed legislative approaches. Costs and probable benefits are being evaluated given the results of these efforts. Next, training for potential PRTR system participants is planned. Then the PRTR will be made active in phases. (See also Chapter 2.)

Mexico, an OECD Member country, is also participating in the UNITAR pilot efforts. Mexico intends to implement its PRTR in 1996 and has completed many of the steps necessary for setting up and operating a PRTR system. One area is now undergoing a test study of the initial design. Because Mexico is almost at the point of implementing a PRTR, a number of details of its approach are available. These are described in Annex 1 of this Chapter.

Switzerland, an OECD Member country, is considering how to develop its national PRTR. A great deal of information about emissions is already available with industry (e.g. responsible care programmes) as well as regional and national authorities. The national administration is now taking a survey of the existing data in order to design a PRTR which minimises duplicative data reporting, handling and management. The next steps for a Swiss PRTR will be:

-- To define which information is to be made publicly accessible;

-- To choose appropriate software for data handling and management; and

-- To operate a small trial project to test possibilities for PRTR system design.

Australia, an OECD Member country, is in process of implementing its PRTR system. Many public meetings and consultations were held throughout the country in order to allow all affected and interested parties to participate in the process of developing the PRTR. The National Pollutant Release Inventory Task Force is now in the process of designing and implementing a PRTR.

The European Union, which includes 15 OECD Member countries, has decided to proceed with a PRTR under the terms of its Directive on Integrated Pollution Prevention and Control. Only certain facilities - primarily large ones - will be required to report to EU Member states. In turn, Member states will report each three years to the European Commission. Diffuse sources will not be included. The EU is now taking steps to put a system in place. The first full report is expected in 2002. The EU will consider how it can compare the data supplied by each of the 15 Member states.

VI. The role of international activities to promote PRTRs globally

At present, there is consensus that there should not be any attempt to seek a single "global" PRTR system. Clearly, experience has shown that for PRTRs, "one size does not fit all". Still, a number of international bodies, regional institutions, bilateral aid agencies and multi-lateral banks are being asked to cooperate with country administrations who intend to develop a national PRTR. These entities are trying to respond to these requests; they also need to communicate and cooperate with one another so as to avoid duplication of efforts.

In the international context, while a single PRTR system is not feasible, the possibility for comparing and possibly harmonizing data from national PRTRs is very appealing. Moreover, if fairly standard approaches for data management and handling software were available, costs of instituting a PRTR might be lessened while possibilities for data comparison and harmonization might be increased. (See Chapter 3 for further details.)

Access to the Internet and availability of PRTR data via the Internet may prompt people in places without PRTRs to demand, "Why not here in our country?" As noted by the NGO, Friends of the Earth, which placed PRTR data from the UK into the Internet, "By publishing the data on the Internet, we are expecting to greatly increase interest in the information and encourage analysis." The Internet compilation of UK data allows a user to learn the quantities of chemicals released into the environment from industrial facilities in his or her local area.

There have been suggestions that possibilities for installing a PRTR be examined as a first item in developing national environmental action plans (NEAPs) which must be produced by all countries who are seeking loans from multi-lateral banks and which are demanded by many bi-lateral donors of official development assistance funds. There have also been suggestions that the International Standards Organisation act to develop a PRTR proposal as part of the ISO 14000 series or another series as appropriate. The ISO 14000 series also can be used to help ensure compliance by reporters since any facility wishing to be ISO 14000 certified by a qualified third party certifier would have to observe the host country's environmental laws including submission of timely and valid data to that country's PRTR.

Given the surge of interest in PRTRs in the past few years and recent developments, e.g. "PRTR on-line", interest in PRTRs by a number of countries can be expected to grow. Many of these countries are likely to seek advice and cooperation from international bodies, especially UN agencies, in getting started and proceeding toward deployment of a national PRTR. Several UN agencies are already active in this field and stand prepared to work with countries who are considering a PRTR as one option to further environment and development goals in accord with Agenda 21.

UNITAR has initiated PRTR pilot projects in the Czech Republic, Egypt and Mexico. The objectives are to assist each of these countries to design an appropriate proposal for a national PRTR with the aid and advice of affected and interested parties and to obtain a better understanding of the challenges associated with introducing PRTRs into developing and industrialising countries. Initial results of the pilot projects suggest that national PRTRs are a promising environmental management tool for developing and industrializing countries. Based upon these positive results, UNITAR has decided to develop a more comprehensive programme aimed at assisting developing and industrializing countries to design national PRTR systems in line with their national development and environment objectives.

The methodology developed by UNITAR during the pilot projects consists of a set of distinct steps which serve as a basis for organizing national efforts to develop, design and implement a PRTR system. Box 2 contains a description of these steps and their objectives.

Several countries have expressed interest in cooperation with UNITAR towards establishing national PRTRs. Once UNITAR has assisted countries in their process of designing a national PRTR,

technical services such as PRTR software options should be provided by specialised UN agencies in order to support the operational phases of a national PRTR in developing and industrialising countries.

In line with this approach, UNEP-IRPTC has indicated that it could assist countries in the data handling and management aspects of PRTR systems, e.g. by assisting in matching needs to existing software systems. IRPTC is also willing to integrate PRTR issues into its training programmes concerning potentially toxic chemicals; this has been done already in Central America. IRPTC could also act as a general PRTR information clearinghouse on behalf of the UN system.

The World Health Organisation (WHO) is developing approaches for estimating releases (emissions) from various sources in a statistically valid manner. At present, WHO is evaluating models, resources needed, required input information and the most useful outputs. These methods are likely to prove very valuable to national governments who elect to include data from diffuse sources into their PRTR, as has been done in Canada and the Netherlands.

The United Nations Industrial Development Organisation (UNIDO) views PRTRs as a particularly important tool to measure and monitor the criteria for environmental compatibility of industrial development. UNIDO has close links with organised and unorganised industry sectors in developing countries. It has developed an Industrial Technological Information Bank (INTIB) and installed it in 120 countries which each have trained personnel and appropriate software. Primary data generation for PRTR reporting is often by a specific industrial facility from which data could be sent directly to a computerized system or (more likely for developing countries) provided in written form to data storage centers. These storage centers could be the industry associations of those sub-sectors of industry which are likely to be required to report releases and/or transfers to a PRTR. UNIDO/INTIB could play a major role in supporting these flows of data and in validating and storing a total industry overview of such data and making them available nationally and globally.

Indeed, UNIDO/INTIB has already developed a data management system and methodology for PRTR type data collection from industry in developing countries. The Referral Data Base on Energy and Environment (REED) was specifically devised *inter alia* to collect data such as those required for PRTR and is already being used in some pilot locations in developing countries. In particular, REED is being used to collect industrial process and related input/output data. Hence, UNIDO is well placed to help countries in establishing the PRTR data handling system and train appropriate personnel to collect and validate the PRTR data, store them and disseminate the outputs on an national and global basis. According to UNIDO, once a country is well on its way to establishment of a PRTR system, the Ministry of Industry when issuing new operating licenses "should insist on adhering to the PRTR requirements as a condition for issuance of a license."

VII. Summary of PRTR issues for national governments

The first step for a country is to decide whether a PRTR is an appropriate tool for attaining environment and development objectives; and, if so, what priority and timetable should be assigned to the development, design and implementation of the PRTR system. If a national government does decide to proceed with a PRTR, then certain government actions are necessary if the PRTR is to realize its full potential -- to yield environmental policy benefits in a cost-effective manner. In particular, government must take a leading role to:

(a) Provide a structure whereby affected and interested parties can be consulted when government devises goals and objectives for the PRTR system;

(b) Act to build wide support for the PRTR approach;

(c) Ensure consistent data collection and data management (N.B. thresholds and confidentiality issues need to be included here);

(d) Evaluate potential uses for PRTR outputs;

(e) Facilitate uses of the PRTR outputs;

(f) Ensure accessibility of the PRTR data nationally and perhaps internationally for purposes of comparison and possibly harmonization;

(g) Provide PRTR outputs on a timely, regular periodic basis;

(h) Ensure a mechanism for monitoring and evaluating the PRTR against goals and objectives and to estimate benefits and costs of the PRTR system;

(i) Have flexibility to alter the PRTR system in response to changing conditions and needs, e.g. response to new technologies, listing and de-listing of substances.

(j) Ensure appropriate compliance systems for any mandatory portions of the PRTR;

(k) Decide if it should take a role in interpreting PRTR data, e.g. by supplying estimates of exposure data or acting to help assess chemical exposures and estimated risks in local areas.

In the international arena, governments which decide to invest in a PRTR system should consider the following as they design and implement the system:

-- Be prepared to share PRTR outputs internationally;

-- Use International Standard Industrial Codes (ISICs) to delineate reporting facilities;

-- Use consistent units to describe releases and/or transfers;

-- Cooperate with neighbours since PRTR results can help inform studies of transfrontier flows of releases and/or transfers;

-- Participate with and support international agencies who are concerned with PRTR activities, e.g. UN activities, EU efforts.

-- Plan to make PRTR outputs accessible on the Internet;

-- When selecting goals and objectives for a PRTR, examine those chosen by other countries so as to gain new insights and perhaps avoid pitfalls;

-- Publicise your errors and any difficulties you have encountered so that others may avoid them.

In sum, PRTR can be a practical and cost-effective tool for furthering environmental policy goals. It is not a panacea, however. Still, because of the potential benefits provided by a PRTR, this tool deserves careful consideration by governments as they weigh environmental priorities. This Guidance represents one means to inform national governments of the issues, benefits, costs and needed actions for establishing a cost-effective and successful PRTR system.

BOX 1

PRTR EVALUATION STATEMENTS AND QUESTIONS

- State the intended goals and objectives of the PRTR.
- State the measures which will be used to determine progress toward these objectives.
- Have the objectives been accomplished?
- If not, has significant progress been made toward meeting the objectives?
- Has the PRTR been effective or instrumental to the progress made to date?
- Has a new tool or concept been developed that supports or supplants the need to continue this version of the PRTR?
- Are aspects of the PRTR programme limiting the progress towards the objectives (data collection, data dissemination, data use, data accuracy)?
- Have inefficiencies or difficulties arisen as a result of the PRTR that act to add unnecessary costs to the PRTR programme?
- Have inefficiencies or difficulties arisen as a result of the PRTR that act to cause unanticipated and unwanted results:
- What modifications are needed to increase the efficiency or effectiveness of the PRTR?

Evaluation of Data Collection, Handling, Dissemination & Use

- How can the efficiency and accuracy of the information collection process be increased:
- Is the information which is needed to accomplish the objectives being collected?
- Is the source of the data sufficient to meet the intended objectives?
- Do the costs associated with the data collection, reporting, handling, dissemination and use remain an acceptable burden given progress made to date and anticipated?

Source: Business and Industry Advisory Committee (BIAC) to OECD; Contribution to OECD Workshops, The Hague, 1995 as amended by OECD.

Box 2

UNITAR Framework for Developing a National PRTR

Stage	Activity	Objective
Stage 1	Selection of a National Focal Point	To identify a national agency or institute that can serve as the National Focal Point throughout the pilot study process and to determine its responsibilities towards national agencies and parties-of-interest as well as towards international organisations.
Stage 2	Informal Consultations with Parties-of-Interest and Formulation of Preliminary Objectives of a National PRTR	To initiate informal consultations with parties-of-interest, to identify the preliminary objectives for the establishment of a national PRTR, and to determine how a PRTR can contribute towards achieving these objectives.
Stage 3	Establishment of a National PRTR Co-ordinating Team	To establish a core working group whose members have an interest in contributing towards the development of a national PRTR, and to clearly define its membership, functions and responsibilities.
Stage 4	Development of a Work Plan for the Implementation of the PRTR Pilot Study	To schedule activities conducted within the pilot study process and to identify roles and expected contributions of all parties-of-interest involved throughout the pilot study process.
Stage 5	Assessment of the National Legal, Institutional, Administrative, and Technical Infrastructure Relevant to a PRTR.	To identify and prioritize the substantive issues to be addressed in the design of a national PRTR concept.
Stage 6	Identification of Technical Questions and Procedural Issues Relevant for Designing a National PRTR	To identify and prioritise the substantive issues to be addressed in the design of a national PRTR concept.
Stage 7	Formal Consultations with Parties-of-Interest on Technical Issues	To formally involve all parties-of-interest (stakeholders) in the process of designing a national PRTR, to obtain feedback from industry and public interest groups, and to identify potential challenges for operating a national PRTR.
Stage 8	Development of a Draft National PRTR Concept Paper/Assessment Report	To formulate a draft national PRTR concept.
Stage 9	National Workshop on the Establishment of a PRTR	To formally share the draft national PRTR concept with all parties-of-interest and to organise an open forum to obtain response and input.
Stage 10	Preparation of a Final PRTR Concept/Assessment	To formulate a final national PRTR concept.
Stage 11	Development of a Strategy for Implementing and Operating a National PRTR	To develop an action strategy for the implementation and operation of the national PRTR.

Source: United Nations Institute of Training and Research (1995).

ANNEX 1

DEVELOPMENT OF A MEXICAN PRTR

The Mexican government has included the development of the Pollutant Release and Transfer Register as one of its priorities in environmental policy.

The PRTR is a mechanism for the integrated registry of emissions to air, water and soil, that intends to simplify the procedures of information gathering and evaluation, and to make environmental management easier. This registry has been identified as a strategic tool within environmental policy; and for that reason, Mexico decided to participate in the Pilot Study for the establishment of a PRTR on the national level that was proposed by the United Nations Institute for Training and Research (UNITAR), since December 1993.

The National Institute of Ecology, and specifically its Directorate for Environmental Management and Information, is responsible for conducting this project.

The objectives of the Mexican PRTR are the following:

1. To provide a reliable information source about emissions and transfer of specific pollutants to different media (air, water, soil) to support decision-making processes and formulation of environmental policies in Mexico.

2. To allow the follow-up and quantifying of the in the abatement of pollutant emissions and discharges to different media (air, water, soil).

3. To simplify and rationalise information gathering about the emission and transfer of specific pollutants to different media, as well as the reporting requirements with which industry must comply.

4. To constitute an additional element for industry, as a complement to its own environmental management systems and priorities.

5. Provide an information tool to support compliance with international agreements concerning environmental information.

6. To provide accessibility for the general public through reports and a comprehensive PRTR information system.

In the process of creating a PRTR some concrete tasks have been identified. Among the most important are:

a) Linkages with the sectors involved in the PRTR development and operation

At the moment, there are more than 80 members in the PRTR National Coordinating Group (NCG). They represent different sectors of society for which the development of this project may be relevant.

The National Coordinating Group (NCG) includes the following parties:

-- The National Focal Point (NFP), in charge of the coordination of the project.

-- The Secretariat appointed by the NFP to assist in the implementation of its functions.

-- The Members of the NCG, that are representatives from governmental agencies, the industrial sector, academia and NGO's (the list of organisations that are participating in the NCG is attached)

-- Working Groups (WG) integrated with members of the NCG to develop specific tasks.

b) The development of the list of substances that must be reported

The list of substances for the PRTR was developed by a working group that included people from different institutions in the public sector, representatives from industrial organisations, academic staff from universities, and members of NGOs.

The proposed list of substances is a preliminary one to be tested in a pilot trial. The criteria considered to define this list were derived from considerations regarding the objectives of the PRTR, international experience in this subject, and OECD and UNITAR guidelines. The list was always intended to be of a manageable size.

The initial set of substances included in the list came from the Mexican Official Standards, and from the revision of the lists considered in other countries. Using certain criteria of toxicity, bio-accumulation, and environmental persistence, the first list was revised. The substances regulated in the standards for emissions of combustion emissions, and those considered as relevant by the Convention on Climate Change were both included in the revised list. The final list of substances includes 157 substances.

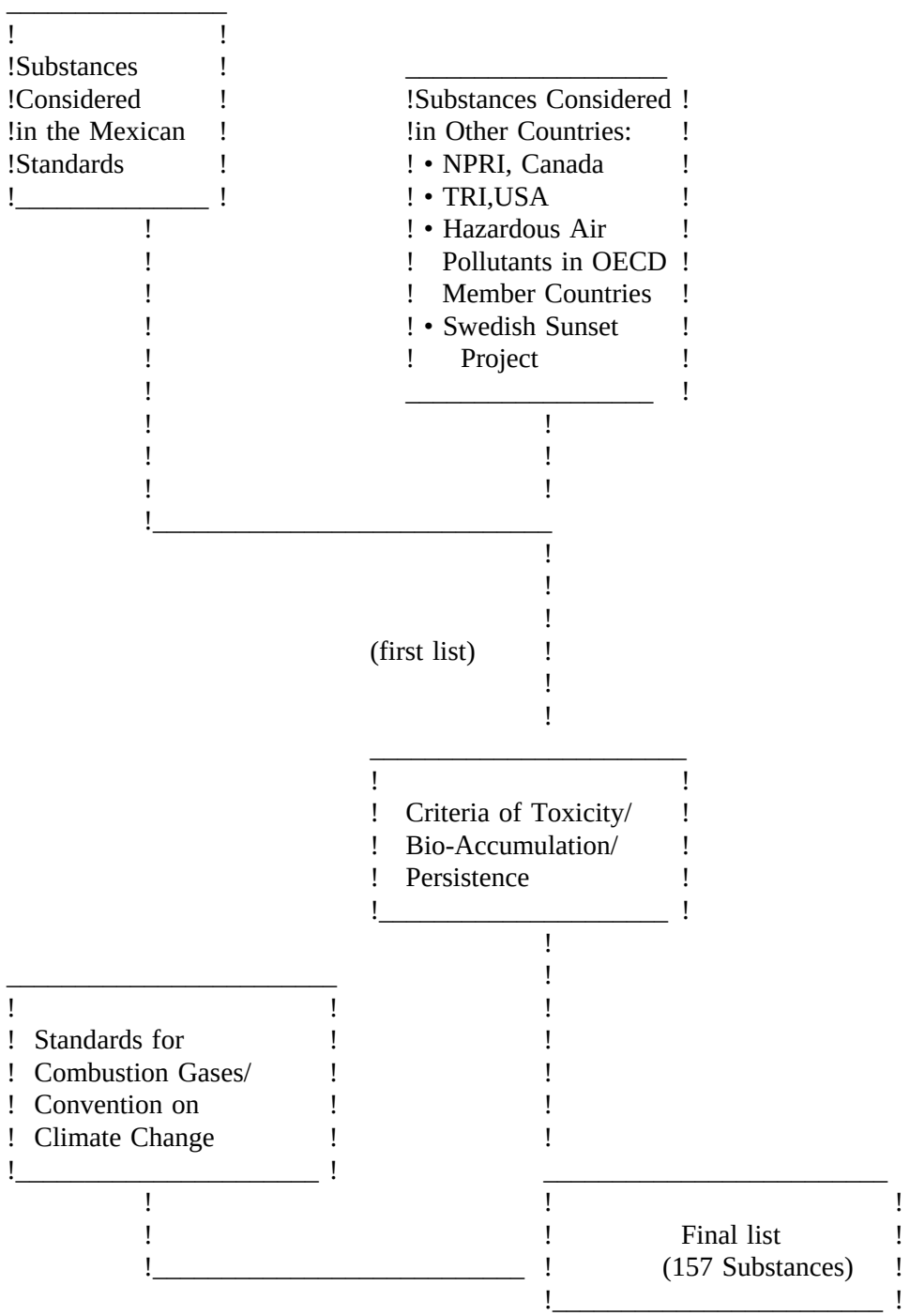
The following chart shows the path to define the list of substances.

c) The reporting format

The basic principle when designing the reporting format is to make it as complete and simple as possible, both for industry that is reporting and for the governmental agency that is responsible collecting the data.

Industry currently must report up-to-date information due to regulated activities in several different formats. The idea with a PRTR format is also to simplify this task and to avoid duplication. A preliminary reporting format is intended to be used in the pilot trial. The costs faced by industry and governmental agencies to fulfill the reporting format and complete a reporting cycle will also be evaluated in the pilot trial.

FLOW CHART FOR THE SELECTION OF SUBSTANCES



In order to assess the additional costs that the industrial sector may face when estimating their emissions, and the methods that they may use for that purpose, a study will be carried out. This study will include data from 40 firms, representative of all industrial branches, over four consecutive months.

e) The design of software

Software must include the capabilities necessary to estimate pollutant release by emission factors or other indirect estimation, as well as those to efficiently process PRTR data.

f) The development of a pilot trial for one state of the country

The state that has been selected for this pilot trial is Querétaro: this state has a diversified industrial infrastructure and is close to Mexico City.

g) Integrating an initial PRTR, with the information already available

Industry has already reported some information to different federal agencies regarding emissions and pollutant releases. This historical information might be compiled and organised into a PRTR database. Nevertheless, the outputs of this database would be only from a partial and uneven list of industries, regions and substances, since the available information is not always compatible.

Members of the Mexican National Coordinating Group

Organisation		Kind
Instituto Nacionale de Ecologia (INE)	National Institute of Ecology	Government
Associación Nacional de la Industria Química (ANIQ)	National Association of the Chemical Industry	Industry
Cámara Nacional de la Industria de la Transformación (CANACINTRA)	National Chamber of the Manufacturing Industry	Industry
Centro Nacional de Prevención de Desastres (CENAPRED)	National Center for Disasters Prevention	Government
OPS-Centro Panamericano de Ecologia Humana (ECO)	PAHO-Pan-American Center of Human Ecology	International
Comisión Nacional del Agua (CNA)	Water National Commission	Government
Comité Cívico de Divulgación Ecológica, A.C.	Civic Committee for Ecological Divulgence	NGO
Confederación de Cámaras Industriales de los Estados Unidos Mexicanos (CONCAMIN)	Confederation of Mexican Industrial Chambers	Industry
Confederación Patronal de la República Mexicana (COPARMEX)	Entrepreneurial Confederation of Mexico	Industry
Consejo de Cámaras Industriales de Jalisco (CCIJ)	Jalisco Council of Industrial Chambers	Industry
Consejo Nacional de Industriales Ecologístas, A.C. (CONIECO)	National Council of Environmental Industries	Industry
Departamento del Distrito Federal (DDF)	Federal District Department	Government
Ecoltec, S.A. de C.V.	Ecoltec, S.A. de C.V.	Consulting Firm
Enlace Ecológico, A.C.	Ecological Liaison	NGO
Gobierno del Estado de Querétaro	Government of the State of Querétaro	Government
Secretaría de Ecología del Estado de México	Ministry of Ecology of the State of Mexico	Government
Instituto Nacional de Salud Pública (INSP)	National Institute of Public Health	Government
Instituto Tecnologico y de Estudios Superiores de Monterrey (ITESM)	Technological and Higher Studies Institute of Monterrey	University
Petróleos Mexicanos (PEMEX)	Mexican Petroleum Company	Industry-Gov.
Procuraduría Federal de Protección al Ambiente (PROFEPA)	Federal Attorneyship for Environmental Protection	Government
Proyecto Fronterizo de Educación Ambiental, A.C.	Environmental Education Border Project	NGO
Secretaria de Comercio y Fomento Industrial (SECOFI)	Ministry of Commerce and Industry	Government
Secretaria de Communicaciones y Transportes (SCT)	Ministry of Communications and Transportation	Government
Secretaria de Medio Ambiente Recursos Naturales Pesca	Ministry of the Environment Natural Resources and Fishery	Government
Secretaria de Relaciones Exteriores (SRE)	Ministry for International Affairs	Government
Secretaria de Salud (SSA)	Ministry of Health	Government

GLOSSARY OF ABBREVIATIONS

ARET	Accelerated Reduction/Elimination of Toxics (Canadian Voluntary Programme)
BIAC	Business and Industry Advisory Committee
CRI	Chemical Releases Invnetory (United Kingdom)
EC	European Commission
EDI	Electronic data interchange
EU	European Union
FAO	Food and Agriculture Organisation
ILO	International Labour Organisation
IPCS	International Programme for Chemical Safety
IRPTC	International Register of Potentially Toxic Chemicals
ISO	International Standards Organisation
JCIA	Japanese Chemical Industry Association
NGO	Non-governmental organisation
NPRI	National Pollutant Release Inventory (Canada)
QA	Quality assurance
QC	Quality control
SME	Small- and medium-sized enterprises
TRI	Toxic Release Inventory (US)
UN	United Nations
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organisation
UNIDO/ INTIB	UNIDO Industrial Technilogical Information Base
UNITAR	United Nations Institute for Training and Research
US EPA	United States Environmental Protection Agency
WHO	World Health Organisation

ANNEX

GLOSSARY OF TERMS FOR PRTR DEVELOPMENT

International [IPCS[17], (IP), IUPAC[18] (IU), WHO[19] (E)] and dictionary [Concise Oxford[20] (Ox)] definitions are as follows:

accuracy

IP The closeness of agreement between the "true" value and the measured values (ISO, 1981). [Another is epidemiological.]

IU Quantity referring to the differences between the mean of a set of results or an individual result and the value which is accepted as the true or correct value for the quantity measured.

E The closeness of agreement between the "true" value and the mean result which would be obtained by applying the experimental procedure a very large number of times (used in statistics).

Ox Accurate: careful, precise; in-exact conformity with a standard or with truth.

adverse effect

IU Change in morphology, physiology, growth, development or lifespan of an organism which results in impairment of functional capacity or impairment of capacity to compensate for additional stress or increase in susceptibility to the harmful effects of other environmental influences.

air pollution

IP The presence of substances in the atmosphere resulting either from human activity or natural processes, present in sufficient concentration, for a sufficient time and under circumstances such as to interfere with the comfort, health, or welfare of persons or the environment (ISO, 1980).

IU Same as above, ISO, 1980

E See "pollution".

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[17] Glossary of terms on chemical safety for use in IPCS publications (1989) WHO: Geneva. definitions listed without further annotation as to origin.

[18] International Union of Pure and Applied Chemistry Glossary for Chemists of Terms Used in Toxicology, Pure & Applied Chemistry, 65: 2003-2122 (1993).

[19] WHO (1980) Glossary of Air Pollution. WHO Regional Publications, European Series No. 9, WHO Regional Office for Europe: Copenhagen.

[20] The Concise Oxford Dictionary, 6th Edn., 1976, Oxford University Press: Oxford

Chemical Species

IU Set of chemically identical atomic or molecular structural units in a solid array or of chemically identical molecular identities that can explore the same set of chemically molecular energy levels on the time scale of the experiment. For example, two conformational isomers may interconvert sufficiently slowly to be detectable by separate nuclear magnetic resonance spectra and hence be considered to be separate chemical species on a time scale governed by the radio frequency of the spectrometer used. On the other hand, in a slow chemical reaction the same mixture of conformers may behave as a single chemical species, i.e. there is a virtually complete equilibrium population of the total set of molecular energy levels belonging to the two conformers. Except where the context requires otherwise, the term is taken to refer to a set of molecular entities containing isotopes in their natural abundance. The working of the definition given is intended to embrace both cases such as graphite, sodium chloride, or a surface oxide where the basic structural units are not capable of a separate existence as well as those cases where they are.

contaminant

IP In some contexts used as a synonym for pollutant (ISO, 1979).

IU
1. Minor impurity present in a substance.
2. Extraneous material inadvertently added to a sample prior to or during chemical or biological analysis.
3. In some contexts, as in relation to gas cleaning equipment, used as a synonym for "pollutant", especially on a small scale.
4. Unintended component in food that may pose a hazard to the consumer.

E In some contexts, used as a synonym for "pollutant". Some authors make a distinction, considering a contaminant to be an addition to the atmosphere that causes the composition of the latter to vary from its mean global values, but which is not known to have any deleterious effect.

Ox Contaminate: pollute. Discharge (or effluent or emission) standard or release limit

IP The maximum acceptable release of a pollutant from a given source to a specified medium under specified circumstances (WHO, 1979)

IU (Exact synonym for discharge: emission) Maximum amount of a pollutant released from a given source to a specified medium which is acceptable under specified circumstances.

Ox Put forth, get rid of, send out, emit (missile, liquid, purulent Fetter, abuse); intransitive verb: undergo discharge of contents, (of river) flow into sea.

ecotoxicology

IP The effects of chemical agents on the environment, including, in addition to the effects on man, adverse events that take place in the general ecosystem. It is not necessarily related primarily to human health (WHO, 1979).

IU Study of the toxic effects of chemical and physical agents on all living organisms, especially on populations and communities within defined ecosystems; it includes transfer pathways of these agents and their interactions with the environment.

effect

IP A biological change in an organism, organ, or tissue (WHO, 1979).

IU See "adverse effect"

Ox Result, consequence ...

emission

IP The giving off of environmental pollutants from various sources (WHO, 1979).

IU Release of a substance from a source, including discharges to the wider environment.

E A measure of the extent to which a given source discharges a pollutant, commonly expressed either as a rate (amount per unit time) or as the amount of pollutant per unit volume of gas emitted.

Ox Giving off or out (of radiation, heat, smell, noise, fluid from body, etc.); thing thus given off or out.

emission or exposure control

IP The technical and administrative procedures applied for the reduction or elimination of emissions from the source or of exposure to the target (WHO 1988).

IU Technical and administrative procedures and specifications applied for the monitoring, reduction or elimination of emissions from a source or exposure to a target.

environment

IP The aggregate, at a given moment, of all external conditions and influences to which a system is subjected (ISO, 1975). The term ecosystem covers all living organisms including human beings.

IU Aggregate, at a given moment, of all external conditions and influences to which a system under study is subjected (ISO, 1975).

E The aggregate, at a given moment, of all external conditions and influences to which a system (or organism) is subjected (ISO, 14).

OX Surrounding; surrounding objects, region, or conditions, especially circumstances of life of person or society.

environmental health (synonyms: environmental medicine, environmental hygiene)

IP The health aspects of the human environment, including technical and administrative measures for improving the human environment from a health point of view.

IU Human welfare and its influence by the environment, including technical and administrative measures for improving the human environment from a health point of view.

environmental monitoring

TU Continuous or repeated measurement of agents in the environment to evaluate environmental exposure and possible damage by comparison with appropriate reference values based on knowledge of the probable relationship between ambient exposure and resultant adverse effects.

environmental transformation

IP Once emitted into the environment, a chemical substance may be transported in the biosphere and undergo various types of chemical changes (WHO, 1979).

IU Chemical transformation of substances resulting from interactions in the environment.

exposure

IP The amount of an environmental agent that has reached the individual (external dose) or has been absorbed into the individual (internal dose, absorbed dose) (WHO, 1979).

TU
1. Concentration, amount or intensity of a particular physical or chemical agent or environmental agent that reaches the target population, organism, organ, tissue or cell, usually expressed in numerical terms of substance concentration, duration and frequency (for chemical agents and micro-organisms) or intensity (for physical agents such as radiation).
2. Process by which a substance becomes available for absorption by the target population, organism, organ tissue or cell, by any route.

ox Exposing or being exposed (to air, cold, danger, etc.).

exposure assessment

IU Process of measuring or estimating concentration (or intensity), duration and frequency of exposures to an agent present in the environment or, if estimating hypothetical exposures, that might arise from the release of a substance, or radionuclide, into the environment.

exposure limit

TP A general term implying the level of exposure that should not be exceeded (WHO, 1979).

IU General term defining an administrative substance concentration or intensity of exposure that should not be exceeded.

harm

IU Damage or adverse effect to a population, species, individual organism, organ, tissue or cell.

harmful substance

ILT Substance that, following contact with an organism can cause ill health or adverse effects either at the time of exposure or later in the life of present and future generations.

hazard

IP A source of danger: a qualitative term expressing the potential that an environmental agent can harm health (WHO, 1988).

IU Set of inherent properties of a substance, mixture of substances or a process involving substances that, under production, usage or disposal conditions, make it capable of causing adverse effects to organisms or the environment depending on the degree of exposure; in other words, it is a source of danger.

Ox (source of) danger. (**Hazardous**: risky, dependent on chance.)

health

IP A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 1978b)

IU
1. State of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity.
2. State of dynamic balance in which an individual's or a group's capacity to cope with the circumstances of living is at an optimal level.
3. State characterized by anatomical, physiological and psychological integrity, ability to perform personally valued family, work and community roles; ability to deal with physical, biological,

psychological and social stress; a feeling of wellbeing; and freedom from the risk of disease and untimely death.

monitoring (for health, environmental, and associated technical purposes)

IP The repetitive and continued observation, measurement, and evaluation of health and/or environmental or technical data for defined purposes, according to prearranged schedules in space and time, and using comparable methods for sensing and data collection.

IU Continuous or repeated observation, measurement, and evaluation of health and/or environmental or technical data for defined purposes, according to prearranged schedules in space and time, using comparable methods for sensing, and data collection. Evaluation requires comparison with appropriate reference values based on knowledge of the probable relationship between ambient exposure and adverse effects.

E In environmental health, the repetitive and continued observation, measurement, and evaluation of health and/or environmental or technical data for defined purposes, according to prearranged schedules in space and time using comparable methods for sensing and data collection.

objective environment

IP The actual physical, chemical, and social environment as described by objective measurements, such as noise levels in decibels and concentration of air pollutants (WHO, 1979).

IU Actual physical, chemical, and social environment as described by objective measurements, such as noise levels in decibels and concentration of air pollutants.

point source

IP A single source, usually in a defined location (WHO, 1979).

IU Single emission source in a defined location.

E See "emission source".

pollutant

IP Any undesirable solid, liquid, or gaseous matter in a gaseous, liquid or solid medium (ISO, 1977). For the meaning of "undesirable" in air pollution contexts, see pollution. A primary pollutant is a pollutant emitted into the atmosphere from an identifiable source. A secondary pollutant is a pollutant formed by chemical reaction in the atmosphere (WHO,1988).

IU Any undesirable solid, liquid or gaseous matter in a solid, liquid or gaseous environmental medium: "undesirability" is often concentration-dependent, low concentrations of most substances being tolerable or even essential in many cases. For the meaning of "undesirable" in air pollution contexts, see "pollution". A primary pollutant is one emitted into the atmosphere, water, sediments or soil from an identifiable source. A secondary pollutant is a pollutant formed by chemical reaction in the atmosphere, water, sediments or soil.

E Any undesirable solid, liquid, or gaseous matter in a gaseous or liquid medium (provisional ISO, 8). For the meaning of "undesirable" in air pollution contexts, see "pollution". Cf. "contaminant". Primary pollutant, a pollutant emitted into the atmosphere from an identifiable source. Secondary pollutant, a pollutant formed by chemical reaction in the atmosphere.

Ox Pollute: destroy the purity or sanctity of, make foul or filthy, contaminate or defile (man’s environment).

pollution

IU Introduction of pollutants into a solid, liquid, or gaseous environmental medium, the presence of pollutants in a solid, liquid or gaseous environmental medium, or any undesirable modification of the composition of a solid, liquid or gaseous one that has injurious or deleterious effects.

E The introduction of pollutants into a liquid or gaseous medium, the presence of pollutants in a liquid or gaseous medium, or any undesirable modification of the composition of a liquid or gaseous medium (provisional ISO, 8). For purposes of air pollution control, an "undesirable - modification" is one that has injurious or deleterious effects. [Note: US Engineers Joint Council definition quoted also: "the presence in the outdoor atmosphere of one or more contaminants, such as dust, fumes, gas, misty, odour, smoke, or vapour, in quantities, of characteristics, and duration such as to be injurious to human, plant or animal life or to property, or which unreasonably interferes with the comfortable enjoyment of life and property".]

population (general usage)

IP the total number of persons inhabiting a country, town, or other area. A population may also be defined by some other characteristic (such as biological, legal, social, or economic) than living in a particular area, e.g. the male population, the gainfully employed population.

IU In statistics, the totality of items under consideration. A clearly defined part of the population is called a subpopulation. In the case of a random variable, the probability distribution is considered as defining the population of that variable. The "population" segment is sometimes used as a synonym for subpopulation.

Ox Total of inhabitants of a town, country, etc., total number or quantity of things in a given place or region, (statistics) total group of items under consideration.

population at risk

IP The number of people who can develop the adverse health effect under study and who are potentially exposed to the risk factor of interest. For example, all people in a population who have not developed immunity to an infectious disease are at risk of developing the disease, if they are exposed. Similarly, people already having a chronic disease are excluded from the population at risk in studies of the incidence of the disease (WHO, 1979).

IU Number of persons who can and may develop an adverse health effect and who are potentially exposed to a risk factor under study: for example, all people in a population who have not developed immunity to an infectious disease are at risk of developing that disease if they are exposed to it. People already having chronic disease are excluded from the population at risk in studies of the incidence of the disease.

precision

IP The closeness of agreement between the results obtained by applying the experimental procedure several times under prescribed conditions (ISO, 1977).

IU Measure for the reproducibility of measurements within a set, that is of the scatter or dispersion of a set about its central value.

Ox Accuracy, degree of refinement in measurement.

E Same as IPCS and Adds: Note - the smaller the random uncertainties that affect the results, the greater the precision, but precision has no numerical value. For this reason, the term "imprecision" may be preferable in some contexts (provisional ISO, 15).

risk

IP The probability that an event will occur, e.g. that an individual will become ill or die within a stated period of time or age. Also, a non-technical term encompassing a variety of measures of the probability of a (generally) unfavourable outcome (epi ref).

IU
1. Possibility that a harmful event (death, injury, or loss) arising from exposure to a chemical or physical agent may occur under specific conditions.
2. Expected frequency of occurrence of a harmful event (death, injury or loss) arising from exposure to a chemical or physical agent under specific conditions.

ox Hazard, chance of or of bad consequences, loss, etc., exposure to mischance, exposed to danger, (intransitive verb) expose to chance of injury or loss, venture on, accept the chance of.

risk assessment

IP A combination of hazard identification, risk estimation, exposure and risk characterisation (WHO, 1988).

IU Identification and quantification of the risk resulting from a specific use or occurrence of a chemical or physical agent, taking account of possible harmful effects on individual people or society of using the chemical or physical agent in the amount and manner proposed and all the possible routes of exposure. Quantification ideally requires the establishment of dose-effect and dose-response relationships in likely target individuals and populations.

risk characterization

IP The outcome of hazard identification and risk estimation applied to a specific use or occurrence of an environmental health hazard (e.g. a chemical compound). The assessment requires quantitative data on human exposure in the specific situation. The end product is a quantitative statement about the proportion of afflicted people in a target population (WHO, 1988).

IU Outcome of hazard identification and risk estimation applied to a specific use of a substance or occurrence of an environmental health hazard: the assessment requires quantitative data on the exposure of organisms or people at risk in the specific situation. The end product is a quantitative statement about the proportion of organisms or people affected in the target population.

risk estimation

IP The quantification of dose-effect and dose-response relationships for a given environmental agent, showing the probability and nature of health effects of exposure to the agent (WHO, 1988).

IU Assessment, with or without mathematical modelling, of the probability and nature of effects of exposure to a substance based on quantification of dose-effect and dose-response relationships for that substance and the population(s) and environment components likely to be exposed and on assessment of the levels of potential exposure of people, organisms and environment at risk.

risk management

IP The managerial, decision-making and control process to deal with those environmental agents for which risk evaluation has indicated that the risk is too high (WHO, 1988).

IU Decision-making process involving considerations of political, social, economic, and engineering factors with relevant risk assessments relating to a potential hazard so as to develop, analyse, and compare regulatory options and to select the optimal regulatory response for safety from that hazard. Essentially risk management is the combination of three steps: risk evaluation emission, exposure control; and risk monitoring.

risk marker (synonym: risk indicator)

IP An attribute that is associated with an increased probability of occurrence of a disease or other specified outcome and that can be used as an indicator of this increased risk. Not necessarily a causal factor (epidemiological).

IU Attribute that is associated with an increased probability of occurrence of a disease or other specified outcome and that can be used as an indicator of this increased risk: not necessarily a causal or pathogenic factor.

risk monitoring

IP The process of following up decisions and actions within risk management in order to check whether the aims of reduced exposure and risk are achieved (WHO, 1988).

IU Same

speciation

IU Determination of the exact chemical form or compound in which an element occurs in a sample, for instance determination of whether arsenic occurs in the form of trivalent or pentavalent ions or as part of an organic molecule, and the quantitative distribution of the different chemical forms that may coexist.

subjective environment (synonym: perceived environment)

IP The environment as it is perceived by persons living in it, e.g. eye irritation caused by air pollution, or pleasure arising from good housing conditions (WHO, 1979).

IU Surrounding conditions as perceived by persons living in these conditions.

validity

IP [measurement validity and criterion validity] CARE]

IU (of a measurement) Expression of the degree to which a measurement measures what it purports to measure.

Ox Sound, defensible, well-grounded (of reason, objection, argument, etc.), sound and sufficient, executed with proper formalities, legally acceptable (e.g. valid passport).