

# The Toxics Release Inventory (TRI) and Factors to Consider When Using TRI Data

## Introduction and Background

Following a fatal chemical-release accident in Bhopal, India, the Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986 to promote emergency planning, to minimize the effects of an accident such as occurred at Bhopal, and to provide the public with information on releases of toxic chemicals in their communities.

Section 313 of EPCRA established the Toxics Release Inventory (TRI), a national database that identifies facilities, chemicals manufactured and used at the identified facilities, and the annual amounts of these chemicals released (in routine operations and in accidents and other one-time events) and otherwise managed on- and off-site in waste.

In 1990, Congress passed the Pollution Prevention Act (PPA). Among its requirements was a mandate to expand TRI to include additional information on toxic chemicals in waste and on source reduction and other waste management methods. Beginning in 1991, covered facilities were required to report quantities of TRI chemicals recycled, combusted for energy recovery, and treated on- and off-site. This waste management data has strengthened TRI as a tool for providing information on facilities' handling of TRI chemicals in waste as well as for analyzing progress in reducing releases.

The Toxics Release Inventory (TRI) Program has been a tremendously successful program and the results speak loudly for themselves. Industries have reduced their on- and off-site releases of TRI chemicals by more than 48% or 1.6 billion pounds since the TRI program began (for chemicals reportable in all years). Governments — federal, state, and local — have used the TRI to set priorities, measure progress, and target areas of special and immediate concern. The public, our most important customer, has used the TRI data to understand their local environment, to participate in local and national debates about the choices being made that may affect their health and the health of their children and, ultimately, to exert their influence on the outcome of these debates. Indeed, given the potential for using TRI data in these ways, it is important for the public to understand the limitations as well as the benefits of TRI data and the factors that should be considered before drawing conclusions from the data about risks to human health and the environment. The release estimates alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment. The determination of potential risk depends on many factors, including toxicity, chemical fate after release, release location, and population concentrations.

Since 1987, the first year of TRI reporting, the TRI and the Right-to-Know Program has grown. The number of chemicals has doubled, federal facilities have been added, and seven new industries reported for the first time with the 1998 reporting year (See Box 2). In addition, in October, 1999, EPCRA

section 313 reporting thresholds were lowered for certain persistent, bioaccumulative toxic (PBT) chemicals and certain other PBT chemicals were added to the section 313 list of toxic chemicals. The TRI data has been used by the public to identify facilities and chemical release and other waste management patterns that warrant further study and analysis. Combined with hazard and exposure information, the TRI has proven to be a valuable tool for risk screening.

## TRI Reporting

Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to EPA and to the state or tribal entity in whose jurisdiction the facility is located. Each facility submits a TRI reporting form, known as Form R, for each TRI chemical it has manufactured, processed, or otherwise used during a given year in amounts exceeding the thresholds. Starting with the 1995 reporting year, facilities with less than 500 pounds of production-related waste that do not manufacture, process, or otherwise use more than 1 million pounds of the chemical can file a certification statement, Form A, that they are not required to report release information to TRI. Reports for each calendar year are due by July 1 of the following year. After completion of data entry and data quality assurance activities, the Agency makes the data available to the public in printed reports and electronically via the Internet. States also make available to the public copies of the forms filed by facilities in their jurisdiction. In addition, some states independently produce a data release report.

## Who Must Report?

Refer to Box 1 for a listing of the kinds of facilities that are required to report.

Box 1. Who is Required to Report Under the Toxics Release Inventory Program?

### **Who is Required to Report Under the Toxics Release Inventory Program?**

A facility must report to TRI if it:

- Operates within any of the following industry sectors:
  - Manufacturing—SIC codes 20-39
  - Metal mining (SIC code 10, except for SIC codes 1011, 1081, and 1094)
  - Coal mining (SIC code 12, except for 1241 and extraction activities)
  - Electrical utilities that combust coal and/or oil (SIC codes 4911, 4931, and 4939)
  - Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste treatment and disposal facilities (SIC code 4953)
  - Chemicals and allied products wholesale distributors (SIC code 5169)
  - Petroleum bulk plants and terminals (SIC code 5171)
  - Solvent recovery services (SIC code 7389)
  - a federal facility in any SIC code,
- Has 10 or more full-time equivalent employees, and
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed

chemical during the calendar year. (Note that, beginning in the 2000 reporting year, reporting thresholds for certain PBT chemicals have been lowered. Those new reporting thresholds are not in effect for 1999 TRI data.)

## What Must Be Reported?

Each year, facilities report to TRI the amounts of toxic chemicals released on-site to the air, water, and land and injected underground (Section 5 of TRI Form R), and the amounts of chemicals transferred off-site for recycling, energy recovery, treatment, and disposal (Section 6 of Form R). See Box 2.

They also report production-related waste management information on quantities recycled, combusted for energy recovery, treated, or released or otherwise disposed of, both on- and off-site. In addition, they must report on non-production related releases, specifically catastrophic or other one-time releases (Section 8 of the Form R).

Facilities provide specific identifying information, such as:

- Name
- Location
- Type of business
- Contact names
- Name of parent company
- Environmental permit numbers

They also provide general information about the manufacture, process, and otherwise use of the listed chemical at the facility and the maximum amount of the chemical on-site during the year. Facilities provide information about methods used to treat waste streams containing the toxic chemicals at the site and the efficiencies of those treatment methods. In addition to information about the amount of toxic chemicals sent off-site for further waste management, facilities also must specify the destination of these transfers. Beginning with the 1991 reports, facilities were required to provide information about source reduction and other pollution prevention activities, along with the quantities managed in waste by activities such as recycling. Companies must provide a production index that can help relate changes in reported quantities of toxic chemicals in waste managed to changes in production.

These additional data elements facilitate tracking of industry progress in reducing waste generation and moving towards safer management alternatives. While current TRI data cannot provide an absolute measure of pollution prevention, the data can provide new insight into the complete toxics cycle.

## Box 2. What Must Be Reported?

### What Must Be Reported?

Information reported by facilities includes:

- Basic information identifying the facility;
- Name and telephone number of a contact person;
- Environmental permits held;
- Amounts of each listed chemical released to the environment at the facility;
- Amounts of each chemical shipped from the facility to other locations for recycling, energy recovery, treatment, or disposal;
- Amounts of each chemical recycled, burned for energy recovery, or treated at the facility;
- Maximum amount of chemical present on-site at the facility during the year;
- Types of activities conducted at the facility involving the toxic chemical; and
- Source reduction activities.

## What Are the Benefits and Limitations of the Data?

### **Benefits**

The TRI Program has given the public unprecedented direct access to toxic chemical release and other waste management data at the local, state, regional, and national level. Responsible use of this information can enable the public to identify potential concerns, gain a better understanding of potential risks, and work with industry and government to reduce toxic chemical releases and the risks associated with them. When combined with hazard and exposure data, this information can allow informed environmental priority-setting at the local level. More than 1,500 citizen groups have used TRI data to achieve the goal of a cleaner and healthier neighborhood.

Federal, state, and local governments can use the data to compare facilities or geographic areas, to identify hot spots, to evaluate existing environmental programs, to more effectively set regulatory priorities, and to track pollution control and waste reduction progress. TRI data, in conjunction with demographic data, can help government agencies and the public identify potential environmental justice concerns.

Industry can use the data to obtain a multi-media overview of the release and other waste management of toxic chemicals, to identify and reduce costs associated with toxic chemicals in waste, to identify

promising areas of pollution prevention, to establish reduction targets, and to measure and document progress toward reduction goals. Public availability of the data has prompted many facilities to work with communities to develop effective strategies for reducing environmental and human health risks posed by releases and other waste management of toxic chemicals.

## What to Consider When Using TRI Data

Users of TRI information should be aware that TRI data reflect releases and other waste management of chemicals, not exposures of the public to those chemicals. TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and other waste management activities which involve toxic chemicals. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical, the duration of exposure and the type of organism exposed. Listed in Box 3 are some of the factors that should be considered when reviewing TRI data.

Box 3. Factors to Consider in Using TRI Data

### Factors to Consider in Using TRI Data

**Toxicity of the Chemical:** TRI chemicals vary widely in their ability to produce toxic effects. Some high volume releases of less toxic chemicals may appear to be a more serious problem than lower-volume releases of highly toxic chemicals, when just the opposite may be true.

**Exposure Considerations:** The potential for exposure is greater the longer the chemical remains unchanged in the environment. Sunlight, heat, or microorganisms may or may not decompose the chemical. For example, microorganisms readily degrade some chemicals, such as methanol, into less toxic chemicals, whereas metals are persistent and will not degrade when released to the environment.

**Bioconcentration of the Chemical in the Food Chain:** As a chemical becomes incorporated in the food chain, it may concentrate or disperse as it moves up the food chain.

- Some chemicals, such as mercury, accumulate as they move up the food chain.
- Small releases of a chemical that bioaccumulates may result in significant exposures to consumers.

**Type of Release (Environmental Medium):** Chemical exposure of a population depends on the environmental medium (air, water, land, etc.) to which a chemical is released. The medium also affects the types of exposures possible, such as inhalation, dermal exposure, or ingestion. For example, releases to underground injection wells are regulated by EPA's Underground Injection Control Program to provide safeguards so that injection wells do not endanger current and future underground sources of drinking water. When wells are properly sited, constructed, and operated, underground injection is an effective and environmentally safe method to dispose of wastes.

**Type of Off-Site Facility Receiving the Chemical and the Efficiency of its Waste Management Practices:**

The amount of a toxic chemical that ultimately enters the environment depends on how the chemical was handled during disposal, treatment, energy recovery, or recycling activities. Several factors to keep in mind when considering amounts sent off-site are presented below:

- The efficiency of recycling operations varies depending on the method of recycling and the chemical being recycled.
- Use of a combustible toxic chemical for energy recovery typically results in the destruction of 95% to 99% or more of the toxic chemical. The remaining quantity may be either released to air or disposed of in ash to land.

• For chemicals other than metals, quantities sent to POTWs are not considered releases under current TRI reporting requirements. However, some POTWs may not completely treat these chemicals, and therefore some of the chemical may be released to the environment. Therefore, the quantities of chemicals reported as released to the environment may be underestimated because of these differences in treatment efficiencies at POTWs.

**On-site waste management of the toxic chemical:** As with off-site waste management, the amount of the toxic chemical released to the environment depends on how the chemical was handled during disposal, treatment, energy recovery, or recycling activities. However, since the waste management is on-site, any amount of the chemical that enters the environment after waste management is reported to TRI as part of that facility's releases.

## **Limitations**

TRI reports reflect releases and other waste management activities of chemicals, not exposures of the public to those chemicals. Release estimates alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment. Although additional information is necessary to assess exposure and risk, TRI data can be used to identify areas of potential concern. TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and other waste management activities of toxic chemicals. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical after it is released, the locality of the release, and the human or other populations that are exposed to the chemical after its release.

While TRI provides the public, industry, and state and local governments an invaluable source of key environmental data, it has some limitations that must be considered when using the data. Although the Agency has expanded the number of industries that must report and has added PBT chemicals to the section 313 list of toxic chemicals, the program does not cover all sources of releases and other waste management activities of TRI chemicals. Although TRI is successful in capturing information on a significant portion of toxic chemicals currently being used by covered industry sectors, it does not cover all toxic chemicals or all industry sectors. In addition, facilities that do not meet the TRI threshold levels (those with fewer than 10 full-time employees or those not meeting TRI quantity thresholds) are not required to report. Thus, while the TRI includes 91,513 reports from 23,484 facilities for 2000, the 7.10 billion pounds of on-and off-site releases reported represent only a portion of all toxic chemical releases nationwide.

Another limitation of the existing TRI Program is that the data currently collected provide limited information on the life cycle of chemicals used by facilities. Beyond reporting on releases at the facility and other waste management, only limited and very general information on chemical storage is provided and none on the toxicity of the chemicals. In addition, TRI does not include data on toxic emissions from cars and trucks, nor from the majority of sources of releases of pesticides, volatile organic compounds, fertilizers or from many other non-industrial sources.

Furthermore, facilities often report estimated data to TRI, and the program does not mandate that they

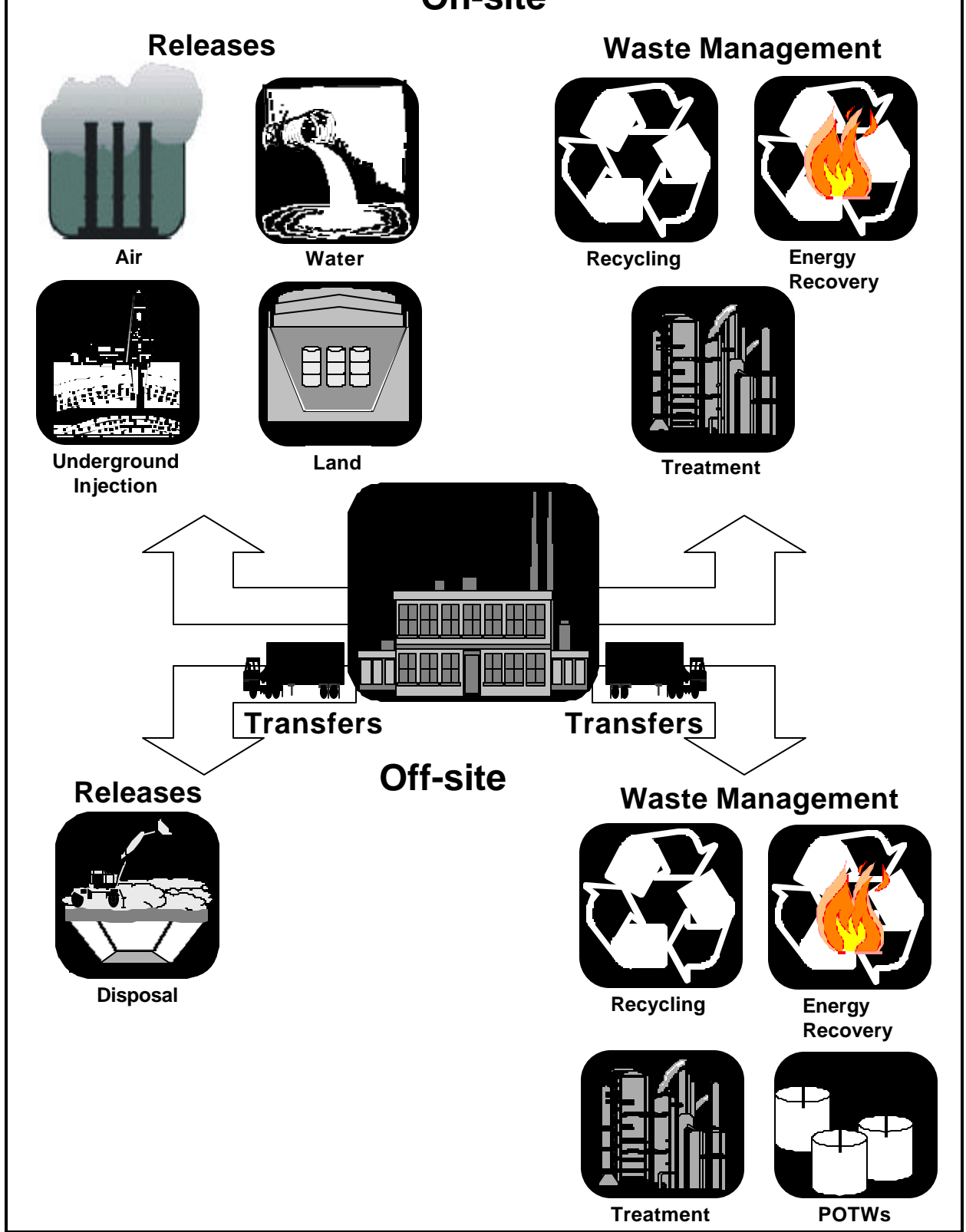
monitor their releases. Various estimation techniques are used when monitoring data are not available, and EPA has published estimation guidance for the regulated community. Variations between facilities can result from the use of different estimation methodologies. These factors should be taken into account when considering data accuracy and comparability.

## **TRI Releases and Waste Management**

The following section describes the categories of releases and other waste management activities that are reportable to TRI.

Figure 1 illustrates on-site and off-site releases, on-site waste management activities, and transfers off-site for further waste management, reportable to TRI. Box 5 describes reportable releases that may occur on-site at the facility and identifies types of activities that may contribute releases to various media. Box 6 describes releases that may result from a facility's transferring chemicals off-site for disposal. As noted in Box 6, off-site releases include additional details about off-site transfers of metals and metal compounds. Box 7 lists on-site waste management activities that are reportable to TRI. Box 8 describes transfers off-site for further waste management.

Figure 1





## An Explanation of On-site Releases

A release is a discharge of a toxic chemical to the environment. On-site releases include emissions to the air, discharges to bodies of water, releases at the facility to land, as well as releases into underground injection wells. Releases are reported to TRI by media type. On-site releases are reported in Section 5 of Form R.

**Air Emissions.** Releases to air are reported either as point source or fugitive emissions. Point source emissions, also referred to as stack emissions, occur through confined air streams, such as stacks, vents, ducts, or pipes. Fugitive emissions are all releases to air that are not released through a confined air stream. Fugitive emissions include equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems.

**Surface Water Discharges.** Releases to water include discharges to streams, rivers, lakes, oceans, and other bodies of water. This includes releases from contained sources, such as industrial process outflow pipes or open trenches. Releases due to runoff, including storm water runoff, are also reportable to TRI.

**Underground Injection.** Underground injection is the subsurface emplacement of fluids through wells. TRI chemicals associated with manufacturing, the petroleum industry, mining, commercial and service industries, and federal and municipal government-related activities may be injected into Class I, II, III, IV, or V wells, if they do not endanger underground sources of drinking water (USDW), public health, or the environment. The different types of authorized injection activities are:

- Class I wells include the emplacement of hazardous and nonhazardous fluids (industrial and municipal wastes) into isolated formations beneath the lowermost underground source of drinking water (USDW). Because they may inject hazardous waste, Class I wells are the most strictly regulated and are further regulated under the Resource Conservation and Recovery Act.
- Class II includes injection of brines and other fluids associated with oil and gas production.
- Class III encompasses injection of fluids associated with solution mining of minerals.
- Class IV addresses injection of hazardous or radioactive wastes into or above a USDW and is banned unless authorized under other Statutes for ground water remediation.
- Class V wells inject nonhazardous fluids into or above a USDW and are typically shallow, on-site disposal systems, such as floor and sink drains which discharge directly or indirectly to ground water, dry wells, leach fields, and similar types of drainage wells.

Beginning with the 1996 reporting year, facilities separately report amounts injected into Class I wells and into all other wells. This change was made to recognize the difference in management and regulatory oversight provided by the Underground Injection Control Program for Class I wells as distinguished from other forms of injection reportable to TRI.

**On-site Land Releases** On-site releases to land occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals in landfills (in which wastes are buried), land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal methods (such as waste piles) or releases to land (such as spills or leaks). Beginning with the 1996 reporting year, facilities separately report amounts released to RCRA subtitle C landfills from amounts released to other on-site landfills. This change was made to address concerns about public misperception of disposal to land and to help the public better understand the nature of these various methods of disposal.

Box 5: An Explanation of Off-site Releases (Transfers Off-site to Disposal)

### An Explanation of Off-site Releases (Transfers Off-site to Disposal)

An off-site release is a discharge of a toxic chemical to the environment that occurs as a result of a facility's transferring a waste containing a TRI chemical off-site to disposal, as reported in Section 6 of Form R. Certain other types of transfers are also categorized as off-site releases because, except for location, the outcome of transferring the chemical off-site is the same as releasing it on-site.

**Transfers to Disposal.** Toxic chemicals in waste that are transferred off-site for disposal generally are either released to land at an off-site facility or are injected underground. (See discussion of on-site releases to land and underground injection for a description of these release types.)

**Storage Only.** Generally, a toxic chemical is sent off-site for storage because there is no known disposal method. One example is toxic chemicals in mixed hazardous and radioactive waste. EPA considers this an off-site release because this method is being used as a form of disposal and the toxic chemical will remain there indefinitely.

**Unknown.** The "unknown" category of disposal indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Therefore, EPA has categorized this method as the lowest type of waste management (environmentally least desirable) and has included it as a type of disposal for reporting purposes. Thus, it is considered to be an off-site release.

**Metals and Metal Compounds.** The transfer of metals and metal compounds to solidification/stabilization and to wastewater treatment (either publicly or privately owned treatment works) also result in releases and are classified as off-site releases (transfers to disposal).

Box 6. An Explanation of On-site Waste Management

### An Explanation of On-site Waste Management

On-site waste management activities are reported in Section 8 of Form R. These amounts do not include one-time events such as accidental releases or remediation (clean-up).

**Recycled On-site.** This is the quantity of the toxic chemical recovered at the facility and made available for further use. To avoid double-counting, the amount reported represents the amount exiting the recycling unit. It is not the quantity that entered an on-site recycling or recovery operation. For example, 3,000 pounds of a listed chemical enters a recycling operation. Of this, 500 pounds of the chemical are in residues from the recycling operation that are subsequently sent off-site for disposal. The quantity reported as recycled on-site would be 2,500 pounds.

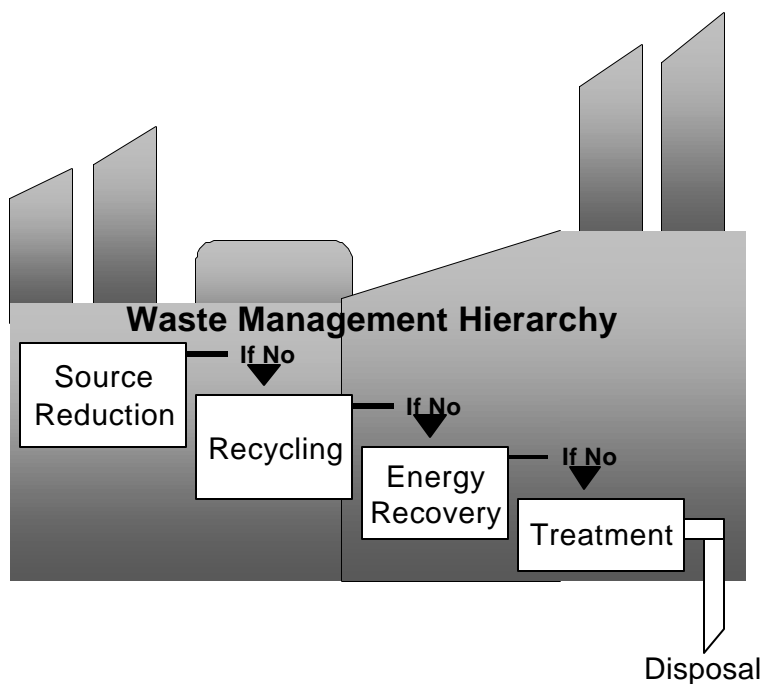
**Used for Energy Recovery On-site.** This is the quantity of the toxic chemical that was combusted in some form of energy recovery device, such as a furnace (including kilns) or boiler. The toxic chemical should have a heating value high enough to sustain combustion. To avoid double-counting, the amount reported represents the amount destroyed in the combustion process, not the amount that entered the energy recovery unit. For example, 100,000 pounds of toluene entered a boiler that, on average, combusted 98% of the toluene. Any remaining toluene was discharged to air. A total of 98,000 pounds is reported as combusted for energy recovery (the remaining 2,000 pounds is reported as released).

**Treated On-site.** This is the quantity of the toxic chemical destroyed in on-site waste treatment operations, not the amount that entered a treatment operation. For example, if 100,000 pounds of benzene were combusted in an incinerator that destroyed 99% of the benzene, the facility would report 99,000 pounds as treated on-site (the remaining 1,000 pounds would be reported as released).

## TRI Chemicals Managed in Waste

The Pollution Prevention Act of 1990 (PPA) requires facilities to report information about the quantities of TRI chemicals they manage in waste, both on- and off-site. The PPA also requires facilities to provide information about their efforts to reduce or eliminate those quantities. Facilities began reporting this information with the 1991 reporting year.

The Pollution Prevention Act established as national policy that source reduction is the preferred approach to managing waste. Source reduction is defined as an activity that prevents the generation of waste. The PPA also established as national policy a hierarchy of waste management options, illustrated in Figure 2, for situations where source reduction is not feasible. Although source reduction is the preferred method of reducing risk, environmentally sound recycling shares many of its advantages. Like source reduction, recycling reduces the need for treatment or disposal of waste and helps conserve energy and natural resources. Where source reduction and recycling are not feasible, waste can be treated. Release (including disposal) of a chemical is viewed as a last resort, to be employed only if the preferred methods of waste management cannot be implemented. The PPA did not specifically address the combustion of waste for energy recovery as a waste management option. However, because energy recovery shares aspects of recycling and treatment, EPA chose to list this activity separately in the waste management hierarchy.



## Waste Management Information Collected

Box 7 describes the waste management information facilities must report to TRI. The amount of TRI chemicals in waste reported includes both waste generated by the facility and waste received by the facility for the purpose of waste management. Facilities report these data as estimates for the reporting year, the previous year, and as projections for the two following years. The PPA requires this data projection to encourage facilities to consider their future waste generation, opportunities for source reduction, and potential improvement in waste management options as presented in the hierarchy. Future-year estimates are not commitments that facilities reporting to TRI must meet.

Box 7. An Explanation of Transfers Off-site for Further Waste Management

### An Explanation of Transfers Off-site for Further Waste Management

An off-site transfer, reported in Section 6 of Form R, is the transfer of toxic chemicals in waste to a facility that is geographically or physically separate from the facility reporting under TRI. Chemicals reported to TRI as transferred are sent to off-site facilities for the purposes of recycling, energy recovery, treatment, or disposal. The amounts reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers to disposal, these amounts do not necessarily represent entry of the chemical into the environment.

Transfers to disposal represent an off-site release (see Box 5).

**Transfers Off-site to Recycling.** Toxic chemicals in waste that are sent off-site for the purposes of recycling are generally recovered by a variety of recycling methods, including solvent recovery and metals recovery. The choice of the recycling method depends on the toxic chemical being sent for recycling. Once they have been recycled, these chemicals may be returned to the originating facility for further processing or made available for use in commerce.

**Transfers Off-site to Energy Recovery.** Toxic chemicals in waste sent off-site for purposes of energy recovery are combusted off-site in industrial furnaces (including kilns) or boilers that generate heat or energy for use at that location. Treatment of a chemical by incineration is not considered to be energy recovery.

**Transfers Off-site to Treatment.** Toxic chemicals in waste that are transferred off-site may be treated through a variety of methods, including biological treatment, neutralization, incineration, and physical separation. These methods typically result in varying degrees of destruction of the toxic chemical.

**Transfers to Publicly Owned Treatment Works (POTWs).** A POTW is a wastewater treatment facility that is owned by a state or municipality. Waste waters from facilities reporting under TRI are transferred through pipes or sewers to a POTW. Treatment or removal of a chemical from the wastewater depends upon the nature of the chemical, as well as the treatment methods present at the POTW. In general, chemicals that are easily utilized as nutrients by microorganisms, or have a low solubility in water, are likely to be removed to some extent.

Chemicals that are volatile and have a low solubility in water may evaporate into the atmosphere. Not all TRI chemicals can be treated or removed by a POTW. Some chemicals, such as metals, may be removed, but are not destroyed and may be disposed of in landfills or discharged to receiving waters; transfers of metals and metal compounds to POTWs are categorized as off-site releases, as explained in Box 6.

**Other Off-site Transfers.** In this report, toxic chemicals in waste that were reported as transferred off-site but for which the off-site activity (i.e., recycling, energy recovery, treatment, or disposal) was not specified or was not an accepted code have been classified as “other off-site transfers.”

Box 8. An Explanation of Waste Management Information

## An Explanation of Waste Management Information

Information about facilities' management of TRI chemicals in waste is reported in Section 8 of Form R.

**Recycled On-site.** This is the quantity of the toxic chemical recovered at the facility and made available for further use. To avoid double-counting, the amount reported represents the amount exiting the recycling unit. It is not the quantity that entered an on-site recycling or recovery operation. For example, 3,000 pounds of a listed chemical enters a recycling operation. Of this, 500 pounds of the chemical are in residues from the recycling operation that are subsequently sent off-site for disposal. The quantity reported as recycled on-site would be 2,500 pounds.

**Recycled Off-site.** This is the quantity of the toxic chemical that left the facility boundary for recycling, not the amount recovered at the off-site location. This quantity includes the amount(s) reported in Section 6 of Form R as transferred off-site for recycling, less any amount(s) associated with non-routine events.

**Used for Energy Recovery On-site.** This is the quantity of the toxic chemical that was combusted in some form of energy recovery device, such as a furnace (including kilns) or boiler. The toxic chemical should have a heating value high enough to sustain combustion. To avoid double-counting, the amount reported represents the amount destroyed in the combustion process, not the amount that entered the energy recovery unit. For example, 100,000 pounds of toluene entered a boiler that, on average, combusted 98% of the toluene. Any remaining toluene was discharged to air. A total of 98,000 pounds is reported as combusted for energy recovery (the remaining 2,000 pounds is reported as released).

**Used for Energy Recovery Off-site.** This is the quantity of the toxic chemical that left the facility boundary for energy recovery, not the amount combusted at the off-site location. The toxic chemical must have a significant heating value, and the off-site location must have some form of energy recovery unit in place. This quantity includes the amount(s) reported in Section 6 of Form R as transferred off-site for energy recovery, less any amount(s) associated with non-routine events.

**Treated On-site.** This is the quantity of the toxic chemical destroyed in on-site waste treatment operations, not the amount that entered a treatment operation. For example, if 100,000 pounds of benzene were combusted in an incinerator that destroyed 99% of the benzene, the facility would report 99,000 pounds as treated on-site (the remaining 1,000 pounds would be reported as released).

**Treated Off-site.** This is the quantity of the toxic chemical that left the facility boundary and was sent to POTWs or other off-site locations for treatment, not the amount that was destroyed at the off-site location(s). This quantity includes the amount(s) reported in Section 6 of Form R as transferred to POTWs or other off-site locations for treatment, less any amount(s) associated with non-routine events and not including quantities of metals and metal compounds.

**Released On- and Off-site.** This is the total quantity of the toxic chemical that was released to the environment or disposed of at the facility (directly discharged to air, land, and water, and injected underground) or sent off-site for disposal. This quantity is the sum of the amounts reported in Sections 5 and 6 of Form R (releases plus transfers to disposal and transfers to POTWs of metals and metal compounds) less any amount(s) associated with non-routine events.

**Production-related Waste Managed** This includes: quantities released to the environment both at the facility and sent off-site for release (including disposal); quantities treated at the facility or sent off-site for treatment; quantities combusted for energy recovery at the facility or sent off-site for energy recovery; and quantities recycled at the facility or sent off-site for recycling. Source reduction or other movement up the waste management hierarchy is feasible for these production-related wastes. Production related wastes do not include quantities reported as released to the environment due to one-time events.

**Released to the Environment Due to One-time Events.** This amount is referred to as non-production-related waste and is the quantity released to the environment or sent off-site for recycling, energy recovery, treatment, or disposal due to one-time events not associated with routine production practices. Such events include catastrophic events, such as accidental releases, as well as remedial actions (clean up). This quantity is separated from the quantities recycled, used for energy recovery, treated, and released, to distinguish between quantities that are routinely associated with production operations and are more amenable to source reduction and those that are not routinely associated with production processes and are not so amenable to source reduction because they are not readily anticipated. This separation is important in assessing progress in source reduction at facilities.

The individual waste management quantities reported are mutually exclusive to avoid double-counting. For example, an incinerator may destroy 99% of the chemical in the waste; in this case, the amount reported as treated on-site would be the amount destroyed by the incinerator, not the amount that entered the incinerator. The amount not destroyed in incineration (1%) would be reported as released. The sum of the individual quantities in a given year equals the total quantity of TRI chemicals in waste resulting from routine production operations at a facility during that year.

For the reporting year only, facilities must also report the quantity of waste released (including disposal) as a result of activities other than routine production operations. This quantity appears in data tables as “non-production-related waste managed.” It includes waste released to the environment at the facility or transferred off-site because of catastrophic events or remedial (clean-up) actions at the facility. Non-production-related waste is considered less amenable to source reduction because facilities cannot reasonably anticipate these quantities.

It is important to note that facilities may vary in how they interpret some of the reporting requirements under the PPA. EPA has not yet specifically defined in regulations the reporting requirements for these data elements, so some facilities may include in their reports amounts that other facilities do not believe they must include. Because of this, higher quantities of TRI chemicals in waste for a particular state or industry may reflect not only differences in actual quantities, but also different interpretations of the reporting requirements.

## Summary

The information collected under The Emergency Planning and Community Right-to-Know Act of 1986 and the Pollution Prevention Act of 1990 can be used by the public to identify facilities and chemical release and other waste management patterns that warrant further study and analysis. Keeping in mind its limitations, TRI data, when combined with hazard and exposure information, has been proven to be a valuable tool for risk identification in communities.