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National Priority Chemicals Trends Report (2005-2007)

Section 1
Overview of the National Priority Chemicals Trends Report (2005-2007)

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SECTION 1
OVERVIEW OF THE NATIONAL PRIORITY CHEMICALS TRENDS REPORT (2005–2007)

Introduction

The U.S. Environmental Protection Agency's (EPA) Office of Resource Conservation and Recovery (ORCR), formerly the Office of Solid Waste (OSW), periodically produces this *National Priority Chemicals Trends Report* to assist states and EPA's regional offices to identify opportunities for reducing wastes containing one or more of the Priority Chemicals (PCs) (see Exhibit 1.1).

This year's Report shows that EPA has achieved its Government Performance and Results Act (GPRA) goal: *By 2011, reduce 4 million pounds of priority chemicals from waste streams as measured by National Partnership for Environmental Priorities (NPEP) contributions, Supplemental Environmental Projects (SEPs), and other tools used by EPA to achieve priority chemical reductions,* (see Section 2). EPA has set an additional goal to reduce 3 million pounds of priority chemicals in fiscal year (FY) 2012. EPA recruits partners who voluntarily pledge to reduce PCs through source reduction and/or increased recycling, and who set target dates to achieve those reductions. NPEP members serve as the foundation upon which EPA has built its chemical reduction and management plan.[1]

In this Report, we also provide information and trends regarding the generation and management of PCs in wastes for the nation by EPA regions, states, counties, industry sectors, and Federal facilities. We primarily rely on Toxic Release Inventory (TRI) data for this information but also include data about PCs derived from 2007 Hazardous Waste Biennial Report (BR) data, the most recent available at the time this Report was published.

What's New in This Report?

We made improvements to this Report, including:

- Expanded the presentation of data derived from a methodology to extract BR data applicable to PCs. We present these data, where available, by individual PC or by industry sector (North American Industry Classification System [NAICS] code), to supplement the TRI data and provide a better picture of which industries and waste streams might offer the most promising waste minimization opportunities. For the first time, we also present these data for Federal facilities.
- Compiled data about recycling of PCs into one place – as an appendix (see Appendix C) – to more succinctly and clearly show the extent to which PCs are recycled.
- Provided a new appendix to show data about TRI reported air emissions and surface water discharges of PCs (see Appendix D).

This Report is an evolving document and we continue to look for ways to better present the data. If you have any comments concerning this Report, please contact us. One way to do so is to use the Customer Feedback Survey at the beginning of this Report.

[1] NPEP is part of ORCR's Resource Conservation Challenge (RCC). See http://epa.gov/rcc. For more information about the NPEP program see http://www.epa.gov/npep.

What Are Priority Chemicals And Why Is EPA Concerned About Them?

Exhibit 1.1. List of 31 Chemicals Addressed Under the National Partnership for Environmental Priorities (NPEP) program

PCs Reported to TRI (24)	
1,2,4 – Trichlorobenzene	Lindane
2,4,5 - Trichlorophenol	Mercury and mercury compounds
Anthracene	Methoxychlor
Benzo(g,h,i)perylene	Naphthalene
Cadmium and cadmium compounds	Pendimethalin
Dibenzofuran	Pentachlorobenzene
Dioxins and dioxin-like compounds	Pentachlorophenol
Heptachlor	Phenanthrene
Hexachloro-1, 3-butadiene	Polychlorinated biphenyls (PCBs)
Hexachlorobenzene	Polycyclic aromatic compounds (PACs)
Hexachloroethane	Quintozene
Lead and lead compounds	Trifluralin
PCs Not Reported to TRI (7)	
1,2,4,5 - Tetrachlorobenzene	Endosulfan, alpha, beta-*
4-Bromophenyl phenyl ether	Fluorene
Acenaphthene	Pyrene
Acenaphthylene	

* For the purposes of developing this list of Priority Chemicals, endosulfan alpha and endosulfan beta were counted together as were heptachlor and heptachlor epoxide. Also, each of the three metals (lead, cadmium, and mercury) is combined with its associated compounds and addressed as a single PC in this Report (the metals and metal compounds are reported separately to TRI). Only the weight of the metal portion of metal compounds is reported to TRI.

Note: Twelve of the PCs are classified by the TRI program as persistent, bioaccumulative, and toxic (PBT) chemicals and therefore have lower reporting thresholds than non-PBT chemicals: benzo(g,h,i)perylene (10 pounds), dioxins and dioxin-like compounds (0.1 grams), heptachlor (10 pounds), hexachlorobenzene (10 pounds), lead and lead compounds (100 pounds), mercury and mercury compounds (10 pounds), methoxychlor (100 pounds), pendimethalin (100 pounds), pentachlorobenzene (10 pounds), polychlorinated biphenyls (10 pounds), polycyclic aromatic compounds (100 pounds), trifluralin (100 pounds).

The PC list is composed of 28 organic chemicals and three metals/metal compounds that are frequently found in releases to water, air, and land. They are present in soil, sediment, ground water, surface water, air, and/or biota, with several serving as the basis for classifying a waste as hazardous under the Resource Conservation and Recovery Act (RCRA). Most of the PCs are generated as products or ingredients in products, byproducts from the production process, or impurities, and continue to be released to the environment. Once there, many of these PCs also pose remediation challenges, resulting in costly cleanups. We selected three metals/metal compounds because they occur frequently in U.S. industrial waste streams and have also been recognized as international concerns.

Priority Chemicals in TRI

TRI is a database that contains information about the release and management of 581 individually listed chemicals and 30 chemical categories reported by industrial and Federal facilities whose primary business activity is on the Section 313 list of North American Industry Classification System (NAICS) codes. In 2007, 21,966 facilities reported to TRI.

The TRI includes annual reports from certain facilities for the PCs listed in Exhibit 1.1. For most chemicals in TRI, facilities with more than 10 full-time employees in most industrial sectors must submit detailed reports if they manufacture or process 25,000 pounds—or otherwise use 10,000 pounds—of the chemical during the reporting year. However, for chemicals designated as persistent, bioaccumulative, and toxic (PBT), the threshold for reporting is either 10 or 100 pounds during the same period (for dioxins the threshold is 0.1 grams). Twelve of the PCs are PBTs reported in TRI; routine reporting thresholds apply to the remainder of the TRI-reported PCs.

In general, TRI includes chemical quantities that are released, recycled, treated, or used for energy recovery. Under TRI, releases include chemical quantities in air emissions, surface water discharges, underground injection wells, and placement to land, including RCRA hazardous waste landfills and other landfills. TRI also tracks quantities transferred to publicly owned treatment works (POTWs) and to off-site facilities.

Nationwide, for 2007, approximately 9,700 industrial and Federal facilities reported to TRI approximately 1.3 billion pounds of PCs in wastes, of which 1.1 billion pounds were lead and lead compounds. Metal mining, storage battery manufacturing, and primary metal manufacturing facilities reported approximately 35 percent, 23 percent, and 19 percent, respectively of the total quantity of PCs generated[2]. In general, the large quantities of lead and lead compounds reported in TRI (often more than an order of magnitude larger than the nearest quantity) tend to distort the summaries and statistics for PCs. Thus, excluding lead and lead compounds from the totals, facilities managed approximately 126 million pounds of PCs. However, it is important to note that the PC quantities reported to TRI do not represent the full universe of PCs in wastes. For example, neither small businesses (with less than 10 full-time employees) nor certain non-manufacturing sectors are required to report to TRI. Exhibit 1.2 shows the quantities of PCs and management methods reported by TRI facilities for 2007.

Exhibit 1.2. Release and Management Quantities of Priority Chemicals Reported to TRI (2007)

Release or Management Method	Lead and Lead Compounds (pounds)	Other Priority Chemicals (pounds)	Total (pounds)
Recycled	636,530,550	47,902,231	684,432,781
Land Disposal (landfills, surface impoundments, underground injection)	494,975,511	15,793,677	510,769,188
Treatment (including transfers to POTWs)	48,287	43,306,210	43,354,497
Energy Recovery	20	16,686,319	16,686,339
Air Emissions	1,028,355	2,301,519	3,329,874
Surface Water Discharges	98,861	24,786	123,647
Total	**1,132,681,584**	**126,014,742**	**1,258,696,326**

Only a subset of the total quantity of PCs reported to TRI is used for this Report. Our primary focus in this Report is the quantities of PCs amenable to waste minimization. Thus, this Report focuses on the subset of PC quantities reported to TRI as land disposal, treatment, and energy recovery, including the approximately 84 million pounds of PC quantities reported for 2007. We exclude quantities of PCs that are subject to the Bevill Amendment[3]. To avoid double-counting, PC quantities transferred by the generating facility to off-site management facilities (e.g., hazardous waste treatment and disposal facilities) also were excluded. For a more detailed discussion of the PC quantities considered in this Report, please see the following discussions of the methodologies we used to extract data from the TRI as well as the BR datasets.

How Did EPA Derive the Priority Chemicals Quantities Used for Trends Analyses in This Report?

Of the 31 PCs, 24 are reported to the TRI[4]. We use the TRI database as the primary source of information to analyze and identify where each of these PCs is generated, the industry sectors that generate them, the methods used by facilities to manage them, and the extent to which the quantities of PCs in wastes have increased or decreased over time. We also provide information about PCs contained in BR waste streams, including six of the seven PCs not reported to TRI.

[2] In this Report, "generated" means that a facility, as a result of manufacturing, processing, or otherwise using a Priority Chemical, produced a waste containing one or more Priority Chemicals , and managed that waste using disposal, energy recovery, or treatment methods.

[3] In October, 1980, RCRA was amended by adding Section 3001(b)(3)(A)(ii), known as the Bevill exclusion, to exclude "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA. For additional information concerning the Bevill Exclusion, please see http://www.epa.gov/compliance/assistance/sectors/minerals/processing/bevilltraining.html#bevillexclusion.

[4] Facilities are required to annually report to TRI under the Emergency Planning and Community Right to Know Act (EPCRA § 313). TRI is a publicly available EPA database that contains information about a list of 581 individually listed chemicals and 30 chemical categories that are being used, manufactured, treated, transported, released into the environment, or recycled. This information must be reported to TRI by July 1 of the year following the year for which the information is being reported. For example, chemicals subject to reporting requirements for the 2006 TRI reporting year must have been reported by July 1, 2007.

Methodology to Extract Priority Chemical Data from Toxics Release Inventory

We use a measurement methodology[5] (referred to as the PC TRI methodology) to extract the applicable data from the TRI database that encompass these PC quantities and focus on those quantities reported by the primary generation facilities, and exclude those with limited waste minimization opportunities. In addition, data reported by off-site treatment, storage, and disposal facilities (TSDFs) were excluded from the analysis in order to avoid double-counting of wastes reported by both generating and treatment facilities. Likewise, facilities that are undertaking RCRA corrective action or Superfund activities, and do not offer waste minimization opportunities at the primary generation level (e.g., with primary NAICS code 924110) were also excluded. Finally, we excluded facilities in certain NAICS codes or with specific processes that generate wastes exempted from RCRA regulation by the Bevill amendment, including mining, primary smelting, the titanium dioxide (TiO_2) process, and red muds process.

Methodology to Extract Priority Chemical Data from Hazardous Waste Biennial Reports

We use a second methodology (referred to as the PC BR Measurement Methodology) to estimate the quantity of PCs contained in BR waste streams that are reported under RCRA. The data derived from applying this methodology to the BR data supplements the data for the 24 PCs reported to TRI and also provides data for six of the seven PCs that are not reported to TRI. The PC BR Measurement Methodology is designed to identify hazardous waste streams reported to the BR that are likely to contain PCs and estimate the quantity of PCs in these waste streams. For this methodology, we use data from the Resource Conservation and Recovery Act Information System (RCRAInfo). RCRAInfo is a national program management and inventory system that contains information about RCRA hazardous waste handlers. It characterizes facility status, regulated activities, and compliance histories. Data on hazardous waste generation and management activities contained in RCRAInfo are obtained from the Hazardous Waste Report (also called the Biennial Report). A BR must be submitted by large quantity generators (LQGs)[6] and TSDFs every two years.

The focus of the PC BR Measurement Methodology is on the primary generation activities because the waste streams associated with primary generation represent an opportunity to reduce PCs in hazardous waste streams. It only includes waste streams generated from a production process, service activity, or routine/periodic cleanup, where potential opportunities for direct waste minimization (e.g., source reduction, recycling) are the greatest. Waste streams not associated with primary generation, such as leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one hazardous waste, are not included because they generally do not offer opportunities for direct waste minimization. In addition, we identified and excluded waste streams generated by facilities in the Waste Management and Remediation Services industry (NAICS Code 562) because we did not consider waste streams generated by these waste treatment, storage, and disposal facilities to be primary generation waste streams. In an effort to better identify opportunities for waste minimization, we also excluded primary generation waste streams with more than ten EPA hazardous waste codes from the analysis. We assumed these waste streams may offer limited opportunities for waste minimization given their highly heterogeneous nature and/or unique characteristics.

The methodology employs the following steps:

1. Identify waste streams reported in GM[7] Forms of the BR that are likely to contain PCs. These waste codes were identified based on review of technical background documents and knowledge of the feedstock, processes, and byproducts of the industries generating these hazardous wastes.
2. Classify waste streams as “non-wastewater” or “wastewater” based on both the form code and the management method code.
3. Collect data on PC concentrations from best demonstrated available technology (BDAT) background documents and hazardous waste listing background documents. BDAT background documents provide EPA’s rationale and technical support for developing the land disposal restriction (LDR) treatment standards. Listing background documents provide EPA’s rationale and technical support for listing a waste as a hazardous waste. These documents also provide constituent-specific concentration data for the EPA hazardous waste codes for which the LDR treatment standard or the listing is being established. In addition to the BDAT and listing background documents, we also referred to the National Hazardous Waste Constituent Survey (NHWCS) to collect data on PC concentrations. The NHWCS was a voluntary survey that OSW administered, in 1996, to 221 of the largest generators and managers of hazardous industrial process waste in the United States.

[5] The TRI dataset used to develop the PC TRI database contains data for reporting years 2003 through 2007. The data were frozen as of September 10, 2008. The PC TRI methodology might differ from the methodology used by the TRI program to show trends for the EPCRA Section 313 chemicals in the annual TRI Public Data Release. For further information about either the PC TRI or PC BR methodologies, please see ://www.epa.gov/wastes/hazard/wastemin/trend.htm.

[6] An LQG is a generator that generates 1,000 kilograms (2,200 pounds) or greater of hazardous waste in a calendar month.

[7] The GM Form must be filed by LQGs to report on-site hazardous waste generation and management. It is divided into three sections that document 1) the source, characteristics, and quantity of hazardous waste generated; 2) the quantity of hazardous waste managed on site along with the management method used; and 3) the quantity of hazardous waste shipped off site for treatment, disposal, or recycling along with the off-site management method used.

4. Use the available concentration data collected from these documents to develop PC-specific concentration assumptions. The concentration assumptions were based either on the midpoint or median of all background concentration data for each combination of PC, EPA hazardous waste code, and waste form. Because the BDAT and listing background documents do not identify BR form code groups, we used waste descriptions in the background documents to classify each concentration value as representing a wastewater or a nonwastewater. In some cases, background concentration data were available only for one or the other waste form for a PC-hazardous waste code combination. In those cases, we used the data for one waste form to make assumptions for both waste forms. In addition, we developed industry-specific PC concentration assumptions for the specific industries discussed in Section 6 of this Report.

5. Assign the appropriate concentration to each hazardous waste stream. We then multiplied the PC concentration (in pounds per ton) for each waste stream by the quantity of waste (in tons) to estimate the amount of the PC (in pounds) in the waste stream.[8]

Comparing TRI- versus BR-Derived Priority Chemicals Quantities

In this Report, we present data derived from a methodology we developed to extract BR data applicable to PCs. We present these data within each of the PC-specific (Section 4), Federal facilities (Section 5), and industry-specific (Section 6) analyses. The BR and TRI reporting processes are substantially different (Exhibit 1.3).

Exhibit 1.3. Comparison of Toxics Release Inventory (TRI) and Hazardous Waste Biennial Report (BR) Reporting

Item	TRI Data	BR Data
Statutory Authority	Emergency Planning and Community Right-to-Know Act (EPCRA) and the Pollution Prevention Act	Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984
Frequency of Reporting	Annual	Minimum of biennial (odd years) by Federal law. States may require more frequent reporting.
Chemicals/Wastes Reported	Chemical-based: release and waste management quantities of individual chemicals—per a list of 581 individually listed chemicals and 30 chemical categories. (Note: TRI does provide a distinction between RCRA Subtitle C landfills and other landfills (non-Subtitle C) and also for Class I underground injection wells (used for hazardous wastes) versus Class II-V wells. However, there is no such distinction for chemicals in wastes that are managed on site using treatment or energy recovery).	Waste-based: any waste stream that exhibits a hazardous waste characteristic (ignitability, corrosivity, reactivity, toxicity) or is specifically listed on one of four hazardous wastes lists. These wastes must be treated, stored, and disposed in RCRA regulated Subtitle C units. (Note: BR waste streams might include any number of TRI chemical constituents or none.)
Reporting Universe	Facility must meet the following criteria: 1) Be in one of the designated industries (NAICS codes), 2) Have 10 or more full-time employees or total hours worked by all employees is greater than 20,000 hours, and 3) Manufactures, processes, or otherwise uses the individual chemical in quantities greater than established thresholds in a calendar year.	Large quantity generators or facilities that treat, store, or dispose of RCRA hazardous wastes on site in units subject to RCRA permitting requirements

There are numerous potential reasons that differences exist between the data obtained through application of the PC BR and PC TRI Measurement Methodologies, including:

- Differences in the scope and reporting thresholds of the two reporting programs.
- The PC BR Measurement Methodology includes assumptions about which PCs are associated with the EPA hazardous waste codes. It is possible that the PCs assumed to be associated with waste codes reported by the facilities do not represent the actual chemical content of the waste streams.
- Facilities may incorrectly assign EPA hazardous waste codes to their waste streams when reporting to the BR. As a result, the PC BR Measurement Methodology may incorrectly associate PCs with the waste stream.
- The PC BR Measurement Methodology uses assumptions about the concentrations of PCs in waste streams in order to estimate the quantity of PCs. These assumptions were identified through the review of technical background documents. The assumptions may over- or under-estimate actual PC concentrations in the actual waste streams.

[8] ORCR recognizes that chemical concentrations vary among waste streams and facilities. However, for the purposes of this analysis, ORCR made the simplifying assumption that all waste streams represented by a particular hazardous waste code/waste form combination have similar chemical concentrations.

- In the PC BR Measurement Methodology, some waste streams may be assigned two concentrations for one PC. This may happen when the PC is associated with more than one of the waste codes reported for the waste stream. In these cases, the two PC concentration assumptions are averaged, which may result in the over- or under-estimation of actual PC concentrations.
- The PC TRI Measurement Methodology includes a series of decision rules that are used to classify wastes as hazardous (i.e., RCRA Subtitle C) and non-hazardous (i.e., RCRA Subtitle D). In some cases, this approach may not correctly classify wastes reported to TRI as hazardous or non-hazardous, thereby causing discrepancies with the BR data.
- Some RCRA IDs found in the PC BR results are associated with multiple TRI facility IDs in the PC TRI results.
- Differences may result from the fact that RCRA distinguishes between regulated and exempt wastes. A particular TRI chemical may occur in a waste that is exempt and need not be included in a facility's BR.

Most of the analyses presented in this Report are based on the TRI data. We present the BR data in order to provide another perspective on hazardous wastes that might contain PCs. These reporting differences, among others, can cause significant variation in the number of reporting facilities and quantities of chemicals reported. Therefore, we caution the reader against making casual one-to-one comparisons of PC quantities derived from the TRI and BR data. We are continuing to evaluate if and how the TRI and BR quantities of PCs can be correlated.

What Does This Report Cover and How Is It Organized?

In this Report, we primarily use TRI data reported for calendar years 2005 through 2007 for our analyses. In addition, when available, we also present BR data, to supplement the TRI data.

Section 2 evaluates progress toward ORCR's GPRA goal to reduce PCs. Because of the particularly high Agency priority of mercury and mercury compounds, we also include an expanded section on this chemical in which we describe the various ORCR projects to reduce and eliminate mercury.

Section 3 provides an overview of the generation and management of 24 PCs (from the original list) reported to TRI from national, state, county, and industry (i.e., NAICS code) perspectives.

Section 4 presents generation and management trends for ten of the PCs reported to TRI, showing them from national, EPA region and state, county, and industry sector perspectives. The ten PCs include the three metals and their compounds, dioxins, and the next six PCs with the greatest non-recycled quantities. We also provide basic information regarding each PC— including its Chemical Abstracts Service number, alternative names, and general uses. Where available, we provide information derived from our PC BR Measurement Methodology to supplement the TRI data.

Section 5 analyzes generation and management trends for the PCs which Federal facilities reported to TRI.

Section 6 presents generation and management trends for the five industries (excluding the National Security sector) with the largest total non-recycled quantities of PCs. Facilities in these industries reported approximately 56 percent of the total non-recycled quantity of PCs for 2007. For each of these industries, we analyze the trends from national, EPA region, state, county and Federal agency perspectives. We also provide information derived from the BR data.

We have also included five appendices:

- **Appendix A** provides a list of the states within each EPA region.
- **Appendix B** provides an index of terms used in this Report.
- **Appendix C** provides TRI information about the recycling of PCs.
- **Appendix D** provides TRI information about releases of PCs as air emissions and surface water discharges.
- **Appendix E** provides a list of the BR management method codes and descriptions.
- **Appendix F** provides contact information.