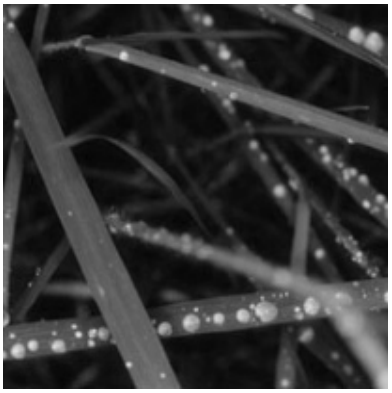
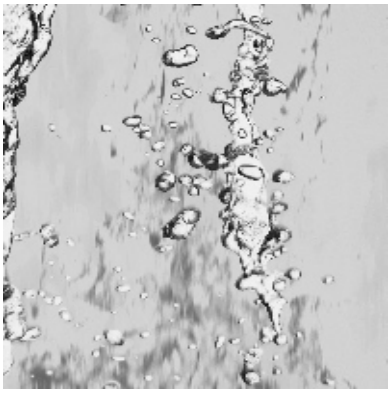
2004 Toxics Use Reduction Information Release

Commonwealth of Massachusetts
Department of Environmental Protection

Developed in collaboration with:
Office of Technical Assistance for Toxics Use Reduction
Toxics Use Reduction Institute
Executive Office of Environmental Affairs

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Executive Summary

The Toxics Use Reduction Act (TURA) Program now has 15 years of toxics use information in Massachusetts. This information shows that manufacturers and other businesses statewide have reduced their reliance on toxic chemicals dramatically, making Massachusetts the national leader in demonstrable reductions in toxic chemical use and providing clear evidence that the state has made tremendous progress in pollution prevention. Through toxics use reduction, Massachusetts businesses have reduced chemical transportation risks, workplace hazards, reduced toxics in products, reduced waste, and saved money.

In 2004, 632 facilities reported the use of 181 listed toxic substances. These facilities fell within certain standard industrial classification (SIC) codes, had ten or more full-time employees, and used listed toxic substances at or above reporting thresholds. In total (including trade secret data), these facilities reported:

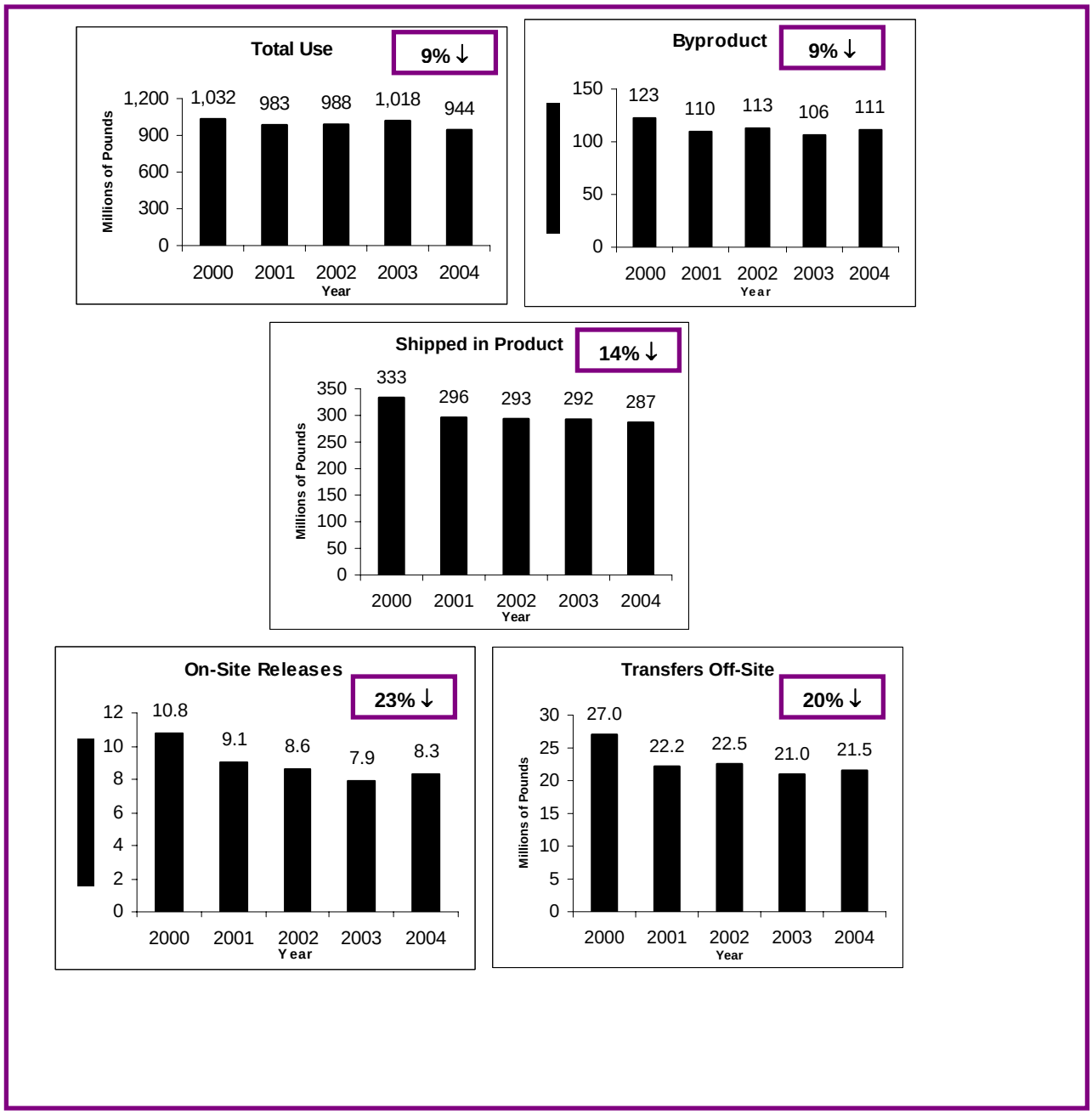
- 1.1 billion pounds of toxic substances used (down from 1.2 billion pounds in 2003),
- 111 million pounds of toxic byproduct (or waste) generated (up from 107 million pounds in 2003),
- 371 million pounds of toxics shipped in or as products (up from 359 million pounds in 2003),
- 9 million pounds of toxics released to the environment (the same as 9 million pounds in 2003), and
- 35 million pounds of toxics transferred off-site for further waste management (the same as 35 million pounds in 2003).

Year to year comparisons of raw TURA data do not always show actual progress in toxics use reduction since production levels and reporting requirements change over time. To account for these changes, the TURA program measures progress by using reported data (excluding trade secret data) normalized for changes in production and using a consistent set of chemicals and industries subject to reporting over a given period of time (referred to as a "Core Group"). Data is presented below for two core groups, a 2000 Core Group and a 1990 Core Group.

In 2004, the **2000 Core Group**, which includes only those industry categories and chemicals subject to reporting in 2000 and 2004, used 842 million pounds, or 91% of the toxic chemicals reported (i.e., 926 million pounds excluding trade secret data). Adjusting the data to account for an 11% decrease in production from 2000 to 2004, over that four-year period (see Figure 1), the 2000 Core Group facilities reduced:

- toxic chemical use by 9%,
- toxic byproducts by 9%,
- toxics shipped in product by 14%,
- on-site releases of toxics to the environment by 23%, and
- transfers of toxics off-site for further waste management by 20%.

Figure 1 – 2000 Core Group Toxics Use Reduction Progress From 2000 to 2004 (Production Adjusted)



When data are not adjusted for changes in production from 2000 to 2004, the **2000 Core Group** facilities reduced:

- toxic chemical use by 18% (from 1,032 million pounds in 2000 to 842 million pounds in 2004),
- toxic byproducts by 19% (from 123 million pounds in 2000 to 99 million pounds in 2004),
- toxics shipped in product by 23% (from 333 million pounds in 2000 to 256 million pounds in 2004),
- on-site releases of toxics to the environment by 32% (from 11 million pounds in 2000 to 7 million pounds in 2004), and
- transfers of toxics off-site for further waste management by 29% (from 27 million pounds in 2000 to 19 million pounds in 2004).

In 2004, the **1990 Core Group**, which includes only those industry categories and chemicals subject to reporting in 1990 and 2004, used 520 million pounds, or 56% of the toxic chemicals reported (i.e., 926 million pounds excluding trade secret data). Adjusting the data to account for a 17% increase in production from 1990 to 2004, over that fourteen-year period the 1990 Core Group facilities reduced:

- toxic chemical use by 41%,
- toxic byproducts by 65%,
- toxics shipped in product by 58%,
- on-site releases of toxics to the environment by 91%, and
- transfers of toxics off-site for further waste management by 56%.

When 1990 Core Group data are not adjusted for changes in production from 1990 to 2004, the **1990 Core Group** facilities reduced:

- toxic chemical use by 32% (from 759 million pounds in 1990 to 520 million pounds in 2004),
- toxic byproducts by 60% (from 100 million pounds in 1990 to 40 million pounds in 2004),
- toxics shipped in product by 51% (from 164 million pounds in 1990 to 80 million pounds in 2004),
- on-site releases of toxics to the environment by 90% (from 21 million pounds in 1990 to 2 million pounds in 2004), and
- transfers of toxics off-site for further waste management by 47% (from 20 million pounds in 1991[1] to 11 million pounds in 2004).

2004 was the fifth year TURA facilities reported on chemicals now classified as persistent bio-accumulative toxic (PBT) chemicals by the U.S. Environmental Protection Agency (EPA) under the Toxics Release Inventory (TRI) Program (see Table 1). PBT chemicals are of special concern because they are highly toxic, remain in the environment for long periods of time, are not readily destroyed, and build up in the food chain. In 2004, no facilities reported the use of tetrabromobisphenol or hexachlorobenzene, both of which had been reported by one facility each in 2003.

[1] Trends are measured from 1991 due to a change in the definition of Transfers Off-Site that year.

Table 1 2004 PBT Summary (in pounds unless otherwise noted)							
PBT Chemical/ Chemical Category	**Reporting Threshold**	**Number of Facilities**	**Total Use**	**Generated as Byproduct**	**Shipped in Product**	**On-Site Releases**	**Transfers Off-Site**
Polycyclic Aromatic Compounds (PACs)	100 lbs.	132	11,791,211	6,255	83,459	426	6,161
Benzo(g,h,i) perylene	10 lbs.	113	128,419	72	1,848	3	54
Mercury	10 lbs.	20	12,629	5,858	2,506	1,969	5,352
Mercury Compounds	10 lbs.	6	899	367	167	234	127
Poly-chlorinated biphenyls (PCBs)	10 lbs.	2	46,879	46,858	21	0	46,858
Dioxin and Dioxin-like Compounds	0.1 Grams	15	3,033.241 Grams	3,029.949 Grams	0.000 Grams	2,217.900 Grams	878.374 Grams
Lead	100 lbs.	107	3,586,554	2,861,702	1,093,268	854,979	1,988,797
Lead Compounds	100 lbs.	127	5,280,575	231,527	3,941,781	9,000	235,797

The TURA program has achieved its sustained success through the efforts of Massachusetts industry working with state government to implement the goals of the TURA program. Massachusetts facilities have reduced significant amounts of waste by implementing toxics use reduction techniques, including input substitution, production unit modernization, production unit redesign, improved operation and maintenance, and recycling and reuse of chemicals in their production processes. They have demonstrated that toxics use reduction not only reduces toxic chemical use and waste, but also saves businesses money over the long term.

The first decade of TURA was considered a success when TURA filers met the goal of reducing toxic byproduct generation by 50%. Although overall use of toxic chemicals decreased from 2003 to 2004, amounts of toxic byproducts and toxics shipped in products increased, showing that opportunities for further progress still remain.

I. Introduction

The Toxics Use Reduction Act (TURA) requires Massachusetts facilities that fall within certain standard industrial classification (SIC) codes, have ten or more full-time employees, and use listed toxic substances at or above reporting thresholds to report their chemical use annually to the Massachusetts Department of Environmental Protection (MassDEP) and pay an annual toxics use fee. TURA also requires reporting facilities to develop toxics use reduction plans that identify and evaluate opportunities to reduce the use of toxics and the generation of toxic byproducts. These plans must be updated every two years and approved by a MassDEP-certified toxics use reduction planner.

In addition to MassDEP's administration of reporting and planning requirements, the TURA program is supported by the Office of Technical Assistance (OTA) and the Toxics Use Reduction Institute (TURI). OTA provides non-regulatory technical assistance to facilities seeking to reduce the use of toxics, develops fact sheets and other technical guidance documents, supports the development of technology solutions by leveraging state and federal funding, and creates market-based incentives to reduce toxics use for qualifying TURA filers. TURI provides toxics use reduction education, training, and library services; supports research on cleaner materials and processes; and operates a laboratory for testing non-toxic or less-toxic cleaning alternatives. TURI also makes TURA data available on its website in a user-friendly way that is searchable by community, chemical or company. See www.turi.org/turadata.

This 2004 Toxics Use Reduction Information Release contains important chemical information that is useful to the public, government, and industry. However, it is important to note that because the data in this report are collected only from facilities within certain industrial sectors that have ten or more full-time employees and that use certain chemicals above established reporting thresholds, this report does not provide a complete picture of the use and release of all chemicals. In addition, this report does not contain information about exposures of the public to reported chemicals.

For more information about the TURA program, please visit the following web sites:

Massachusetts Department of Environmental Protection,
Toxics Use Reduction Program: www.mass.gov/dep/toxics/toxicsus.htm

Office of Technical Assistance for Toxcis Use Reduction: www.mass.gov/ota

Toxics Use Reduction Institute: www.turi.org

II. TURA Progress 1990-2004

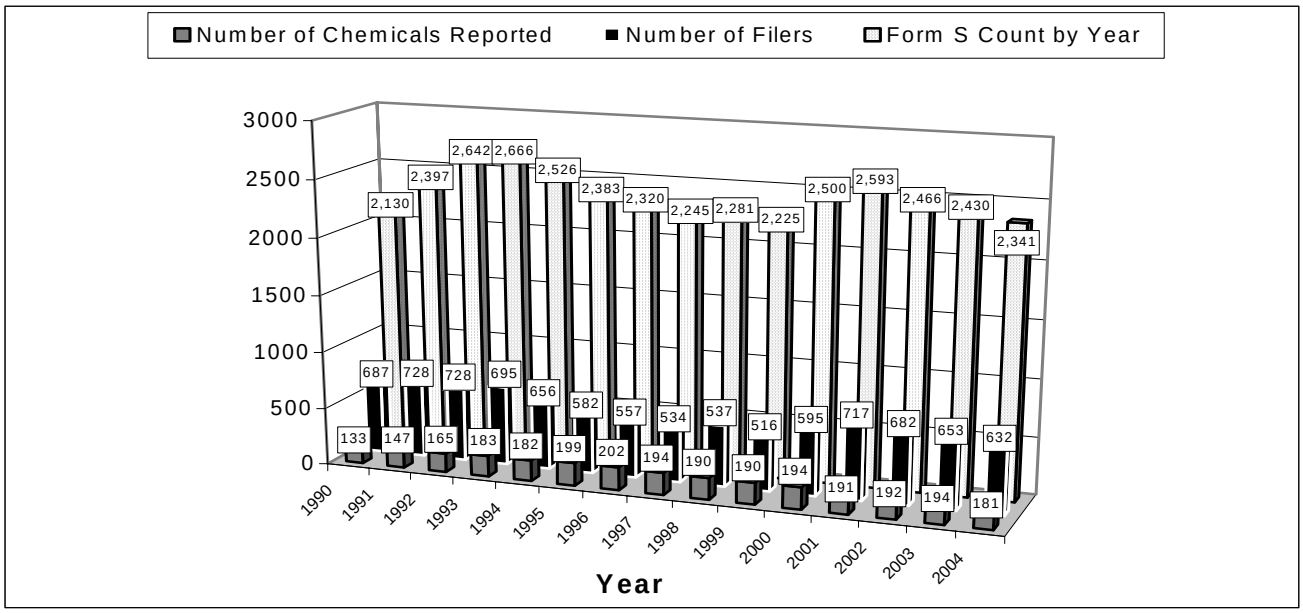
Since 1990, when the TURA program began, Massachusetts TURA filers have made substantial progress in reducing their use of toxic substances and their generation of toxic byproducts. In measuring this progress, a number of changes in the TURA reporting universe must be taken into account.

In 1990, only manufacturing firms were required to report to the TURA program. Then, in accordance with TURA's phase-in schedule, the reporting universe was expanded to include industries beyond the manufacturing sector. The list of chemicals subject to reporting also was expanded in reporting years 1991, 1992, 1993, 2000, and 2001, further enlarging the universe of companies reporting. In addition, over the years, certain chemicals have been de-listed. For example, effective reporting year 1999, the Administrative Council on Toxics Use Reduction de-listed pure copper in solid or molten metal form.

Figure 2 illustrates TURA filing trends over the past fifteen years. Out of 1,422 chemicals listed under TURA, only 181 were reported in 2004, down from 194 in 2003. The number of facilities reporting under TURA generally declined during the 1990s, from a high of 728 facilities in 1991 and 1992, to 516 in 1999. The number of reporting facilities increased to 595 in 2000 due in part to the new requirement to report PBTs at lower thresholds, and further increased to 717 in 2001 due to the new requirement to report lead and lead compounds (both PBTs) at lower 100 pound thresholds. The number of filers has decreased steadily since then to 632 in 2004, due in part to facilities closing or leaving Massachusettts or reducing production due to the economic slowdown.

The number of individual Form Ss[2] declined from a high of 2,666 in 1993, to 2,225 in 1999, increased to 2,500 in 2000, again due partly to the reporting of PBTs, and increased to 2,593 in 2001 due to the new reporting requirement for lead and lead compounds. The number of Form Ss has decreased since then to 2,341 in 2004, consistent with the decline in the number of TURA filers.

Figure 2 - TURA Filer Trends 1990 – 2004



[2] A separate Form S is required for each chemical reported by a facility; the Form S is the form used to report chemical information.

2000 Core Group Progress – Without Adjusting for Production

Since TURA reporting requirements have changed over time, TURA progress is best measured by using a consistent set of chemicals and industries subject to reporting over a given period of time (referred to as a "Core Group").

To measure recent progress, the TURA program has defined a 2000 Core Group that includes facility categories and chemicals that were subject to reporting in 2000 and that remained subject to reporting in 2004[3]. In 2004, the 2000 Core Group used 842 million pounds, or 91% of the toxic chemicals reported (i.e., 926 million pounds excluding trade secret data).

The changes in reported Core Group quantities over the period 2000 to 2004 are shown in Figure 3. These quantities have not been adjusted for changes in production. From 2000 to 2004, Core Group filers reduced:

- toxic chemical use by 18% (from 1,032 million pounds in 2000 to 842 million pounds in 2004),
- toxic byproducts by 19% (from 123 million pounds in 2000 to 99 million pounds in 2004),
- toxics shipped in product by 23% (from 333 million pounds in 2000 to 256 million pounds in 2004),
- on-site releases of toxics to the environment by 32% (from 11 million pounds in 2000 to 7 million pounds in 2004), and
- transfers of toxics off-site for further waste management by 29% (from 27 million pounds in 2000 to 19 million pounds in 2004).

2000 Core Group Progress – Production Adjusted Data

From 2000 to 2004, 2000 Core Group filers reported an 11% decrease in production. In order to more accurately measure progress, the TURA data are adjusted or normalized to eliminate the effects of changes in production using production ratios reported by the Core Group facilities.

The following example illustrates how data are adjusted to reflect changes in production:

- In year 1, a facility produces 1,000 machine parts, and generates 100 lbs. of byproduct.
- In year 2, the facility produces 10% less machine parts (900). Therefore, the production ratio is .90. However, the facility only generates 80 lbs. of byproduct.
- The production adjusted byproduct for year 2 is 80 lbs./.90 = 89 lbs.
- The production adjusted percent change from year 1 to year 2 is [100-89]/100 = .11, or an 11% reduction, while its actual byproduct reduction is 20%.

From 2000 to 2004 (see Figure 4), when adjusted for production, the 2000 Core Group facilities reduced:

- toxic chemical use by 9%,
- toxic byproducts by 9%,
- toxics shipped in product by 14%,
- on-site releases of toxics to the environment by 23%, and
- transfers of toxics off-site for further waste management by 20%.

[3] The 2000 Core Group includes all SIC codes and all chemical use except use of respirable crystalline silica (which was first reportable in 2001), use of lead and lead compounds due only to the lower 100 pound thresholds for lead and lead compounds that took effect in 2001, municipal waste combustor combustion-related emissions first reportable in 2003, and use of any chemical covered by a trade secret claim.

Figure 3 – 2000 Core Group Toxics Use Reduction Progress From 2000 to 2004 (Not Production Adjusted)

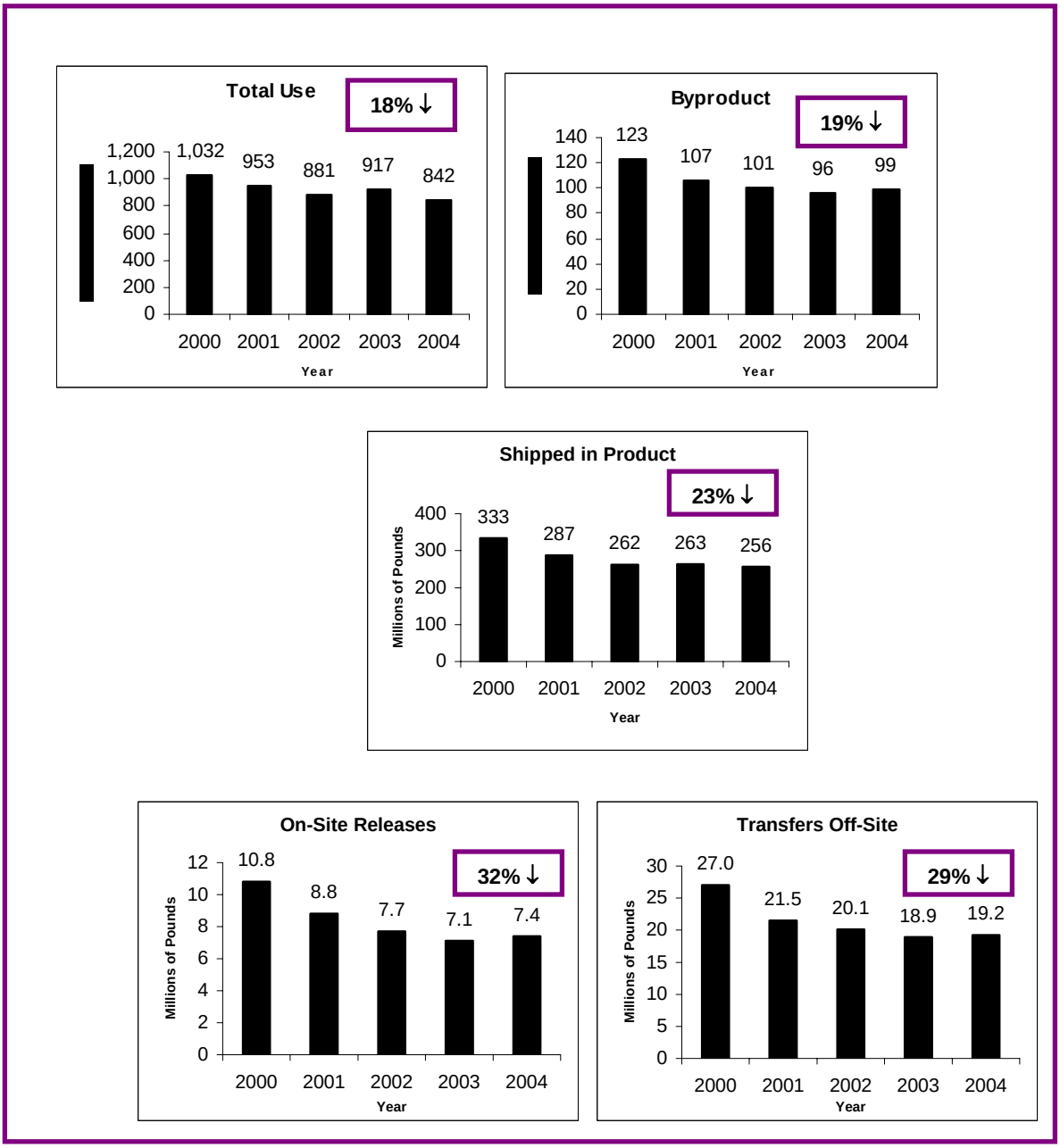
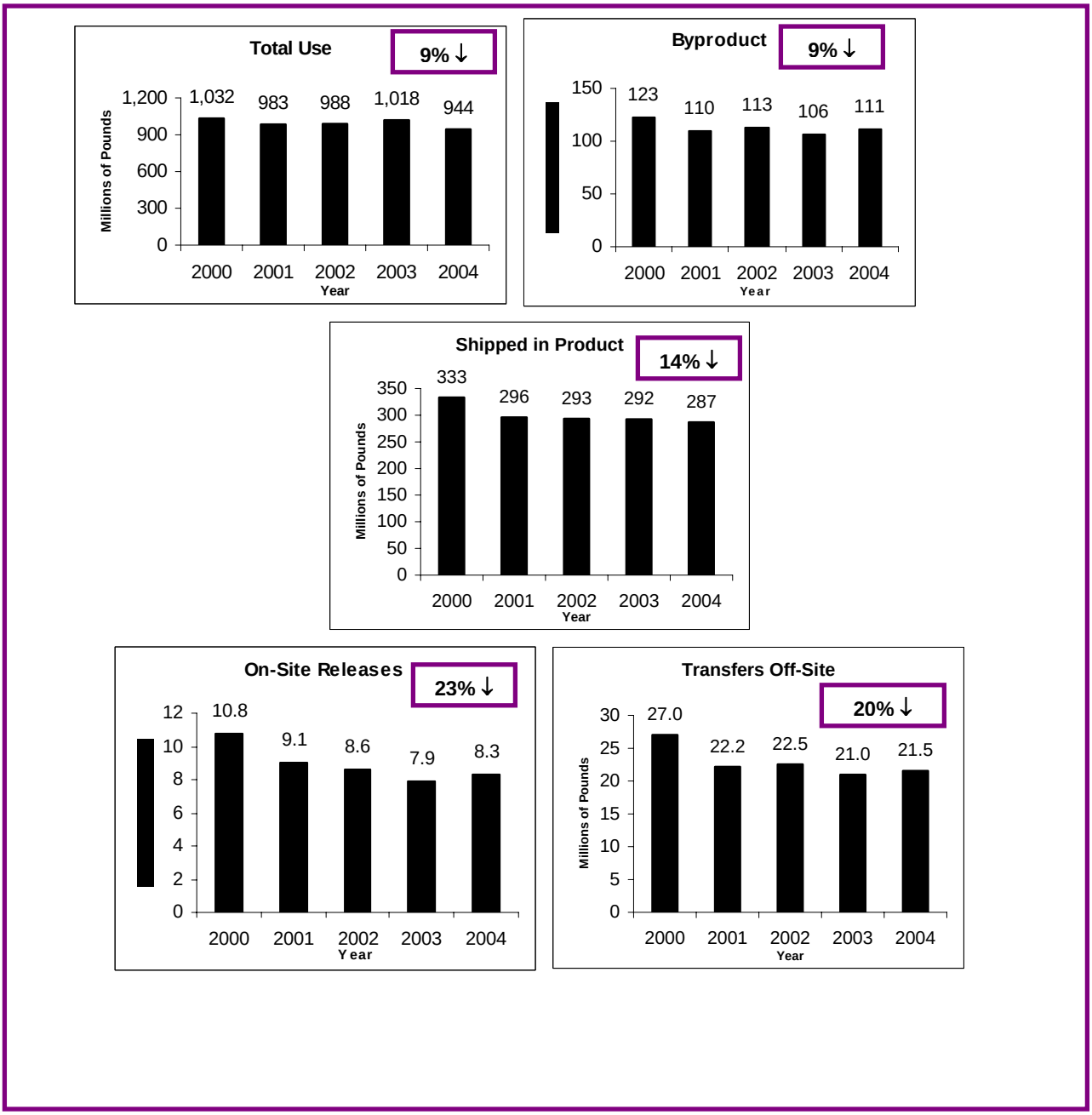


Figure 4 – 2000 Core Group Toxics Use Reduction Progress From 2000 to 2004 (Production Adjusted)



1990 Core Group Progress – Without Adjusting for Production

To measure progress since the start of the TURA program, the program uses a 1990 Core Group that currently represents just over half of the total toxics use. In 2004, the 1990 Core Group used 520 million pounds, or 56% of the toxic chemicals reported (i.e., 926 million pounds excluding trade secret data).

The changes in reported 1990 Core Group quantities over the period 1990 to 2004 are shown in Figure 5. These quantities have not been adjusted for changes in production. From 1990 to 2004, 1990 Core Group filers reduced:

- toxic chemical use by 32% (from 759 million pounds in 1990 to 520 million pounds in 2004),
- toxic byproducts by 60% (from 100 million pounds in 1990 to 40 million pounds in 2004),
- toxics shipped in product by 51% (from 164 mi1lion pounds in 1990 to 80 million pounds in 2004),
- on-site releases of toxics to the environment by 90% (from 21 million pounds in 1990 to 2 million pounds in 2004), and
- transfers of toxics off-site for further waste management by 47% (from 20 million pounds in 1991[4] to 11 million pounds in 2004).

1990 Core Group Progress - Production Adjusted Data

From 1990 and 2004, 1990 Core Group filers reported a 17% increase in production. When the Core Group data are adjusted to account for changes in production since 1990 (see Figure 6), Core Group filers reduced:

- toxic chemical use by 41%,
- toxic byproducts by 65%,
- toxics shipped in product by 58%,
- on-site releases of toxics to the environment by 91%, and
- transfers of toxics off-site for further waste management by 56%.

[4] Trends are measured from 1991 due to a change in the definition of Transfers Off-Site that year.

Figure 5 – 1990 Core Group Toxics Use Reduction Progress From 1990 to 2004 (Not Production Adjusted)

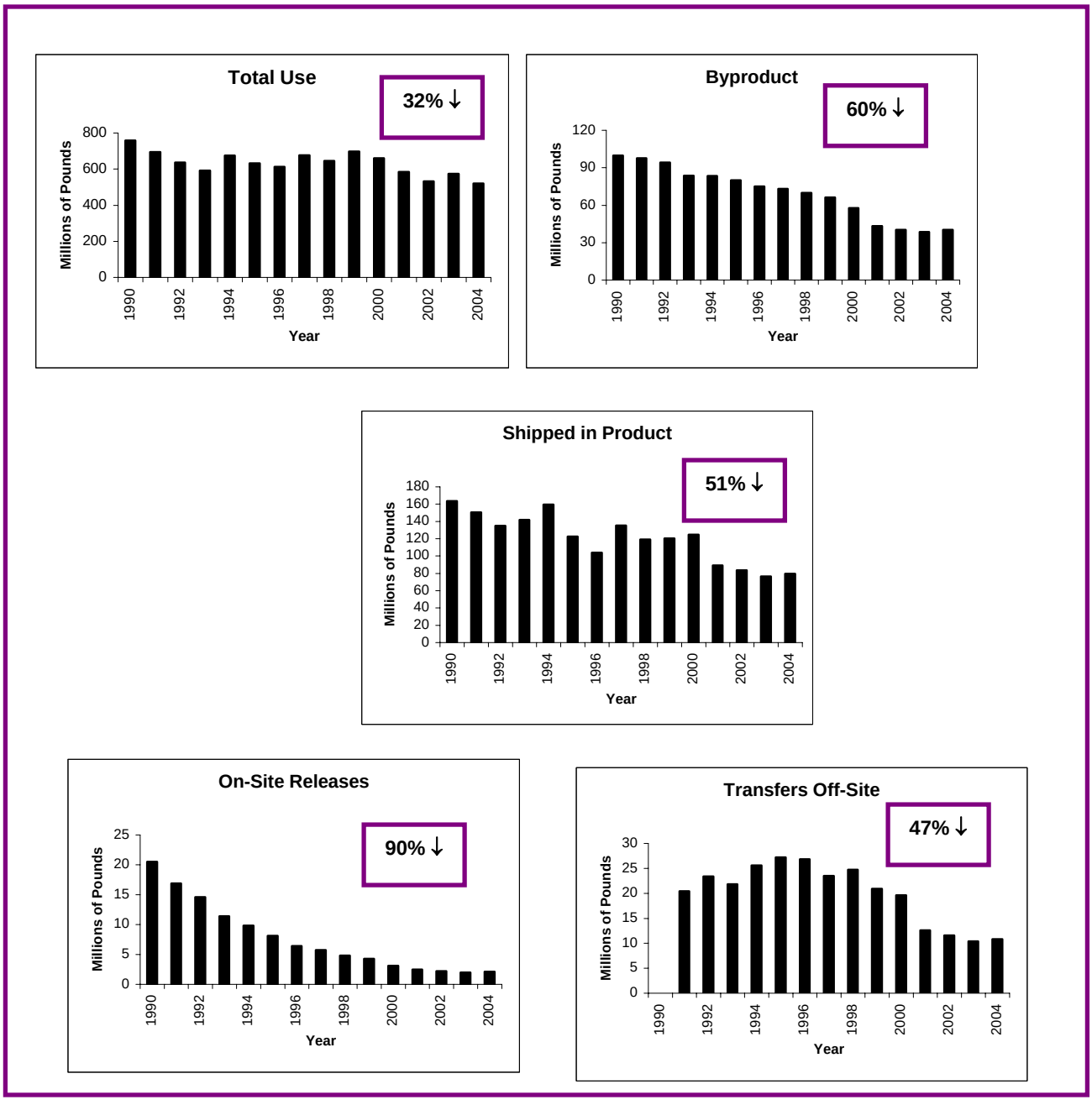


Figure 6 – 1990 Core Group Toxics Use Reduction Progress From 1990 to 2004 (Production Adjusted)

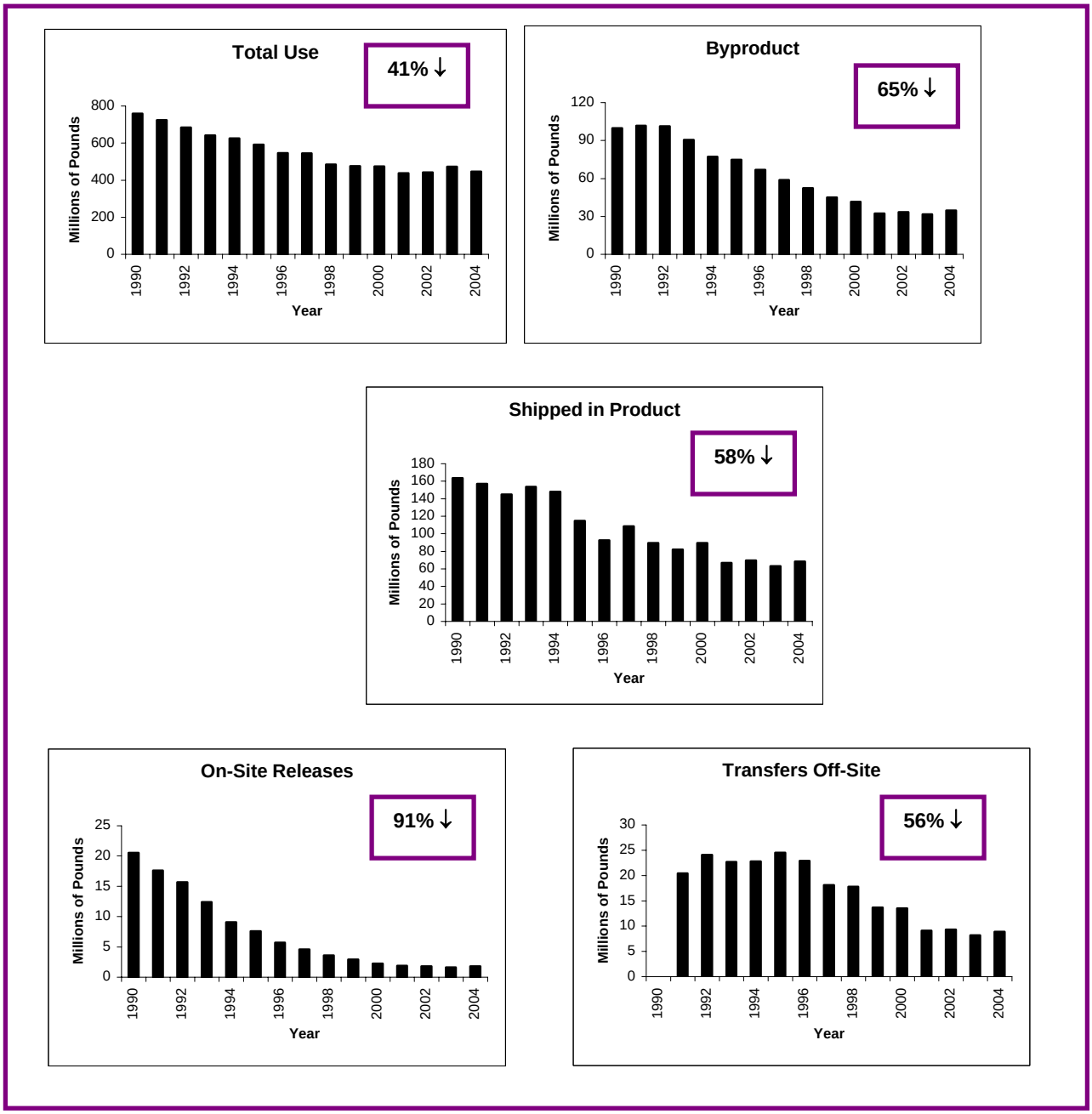


Table 2 and Table 3 summarize TURA data from 2000 to 2004, and from 1990 to 2004, respectively, showing both **reported** and **production adjusted** quantities. For each category, each year's production adjusted quantity is normalized to the base year production level, thus providing a comparison of production-adjusted quantities to base year quantities. Quantities in shaded boxes are adjusted for changes in manufacturing activity (level of production) using the facility-reported TRI Production Ratio/Activity Index. For the 2000 Core Group, the activity index shows a decrease in production of 11 percent from 2000 to 2004. For the 1990 Core Group, the activity index shows an increase in production of 17 percent from 1990 to 2004.

Table 2
2000 CORE GROUP DATA: 2000 - 2004 TREND SUMMARY

(Quantities are in millions of pounds, does not include trade secret quantities. Shaded columns show production-adjusted quantities.)

	TOTAL USE		**BYPRODUCT**		**SHIPPED IN PRODUCT**		**ON-SITE RELEASES**		**TRANSFERS OFF-SITE**		**ACTIVITY INDEX**[5]
2000	1,031.5	1,031.5	122.6	122.6	333.1	333.1	10.8	10.8	27.0	27.0	NA
2001	953.2	982.68	106.7	110.0	287.1	295.98	8.8	9.07	21.5	22.16	0.97
2002	881.3	987.56	101.0	113.18	261.7	293.25	7.7	8.63	20.1	22.52	0.92
2003	917.3	1017.73	95.7	106.18	263.4	292.24	7.1	7.88	18.9	20.97	1.01
2004	842.0	943.62	99.4	111.40	255.9	286.78	7.4	8.29	19.2	21.52	0.99
Percent Change 2000-2004	18% Reduction	9% Reduction	19% Reduction	9% Reduction	23% Reduction	14% Reduction	32% Reduction	23% Reduction	29% Reduction	20% Reduction	11% Decrease

[5] The Production Ratio / Activity Index reported by each facility measures the change in production from the previous reporting year to the current reporting year.

Table 3
1990 CORE GROUP DATA: 1990 - 2004 TREND SUMMARY

(Quantities are in millions of pounds, does not include trade secret quantities. Shaded columns show production-adjusted quantities.)

	TOTAL USE		BYPRODUCT		SHIPPED IN PRODUCT		ON-SITE RELEASES		TRANSFERS OFF-SITE[6]		ACTIVITY INDEX[7]
1990	759.0	759.0	99.8	99.8	163.6	163.6	20.5	20.5			NA
1991	694.1	723.0	97.7	101.8	150.6	156.9	16.9	17.6	20.4	20.4	0.96
1992	636.3	683.3	94.2	101.2	135.0	145.0	14.6	15.7	23.4	24.1	0.97
1993	591.2	641.3	83.5	90.6	141.7	153.7	11.4	12.4	21.8	22.7	0.99
1994	675.0	625.8	83.3	77.2	159.5	147.9	9.8	9.1	25.6	22.8	1.17
1995	631.1	591.0	79.9	74.8	122.4	114.6	8.1	7.6	27.2	24.5	0.99
1996	611.8	545.7	75.0	66.9	103.7	92.5	6.4	5.7	26.8	22.9	1.05
1997	677.0	544.0	73.1	58.7	135.2	108.6	5.7	4.6	23.5	18.1	1.11
1998	645.1	484.4	69.7	52.3	119.2	89.5	4.8	3.6	24.7	17.8	1.07
1999	697.6	476.2	66.1	45.1	120.3	82.1	4.3	2.9	20.9	13.7	1.10
2000	659.7	474.1	57.8	41.5	124.7	89.6	3.1	2.2	19.6	13.5	0.95
2001	584.3	437.4	43.3	32.4	89.3	66.8	2.5	1.9	12.6	9.1	0.96
2002	532.0	442.5	40.2	33.4	83.6	69.5	2.2	1.8	11.6	9.3	0.90
2003	573.5	472.3	38.5	31.7	76.6	63.1	2.0	1.6	10.4	8.2	1.01
2004	519.8	445.9	40.3	34.6	79.6	68.3	2.1	1.8	10.8	8.9	0.96
Percent Change 1990-2004	32% Reduction	41% Reduction	60% Reduction	65% Reduction	51% Reduction	58% Reduction	90% Reduction	91% Reduction	47% Reduction	56% Reduction	17% Increase

[6] Trends are measured from 1991 due to a change in the definition of Transfers Off-Site that year.

[7] The Production Ratio / Activity Index reported by each facility measures the change in production from the previous reporting year to the current reporting year.

III. 2004 TURA Chemical Data

Table 4 summarizes the 2004 data for all TURA filers, including trade secret data. These companies reported using 1.1 billion pounds of chemicals and generating 111 million pounds of byproduct.

Table 4 - 2004 Data for All TURA Filers (in Pounds) (including trade secret data)	
Total Use	1,143,000,000
Generated as Byproduct	111,000,000
Shipped in Product	371,000,000
On-Site Releases	9,000,000
Transfers Off-Site	35,000,000

The 1.1 billion pounds of chemical use occurred in three categories: manufactured, processed, or otherwise used. In TURA, these terms are defined as follows:

> **Manufacture** – "to produce, prepare, import or compound a toxic or hazardous substance" (e.g., intentional manufacture of a metal compound or the unintentional manufacture of acid gases during combustion of fossil fuels).
>
> **Process** – "the preparation of a toxic or hazardous substance, including without limitation, a toxic substance contained in a mixture or trade name product, after its manufacture, for distribution in commerce" (e.g., in the formulation of paints or coatings, any listed toxics are "processed;" in the manufacture of polystyrene, the styrene monomer is "processed").
>
> **Otherwise Use** – "any use of a toxic substance that is not covered by the terms "manufacture" or "process" and includes use of a toxic substance contained in a mixture or trade name product" (e.g., chemicals used to clean parts, chemicals contained in fuels that are combusted).

In this Report, when total use is broken down by type of use (i.e., manufactured, processed, or otherwise used), trade secret data are not included. Thus, the total use in Figure 7 is 926 million pounds, rather than 1.1 billion pounds (which includes trade secret data).

Manufactured Chemicals

Figure 7 shows that relatively little manufacturing of TURA chemicals occurs in Massachusetts. Chemicals reported as "manufactured" accounted for 10% of the total use statewide (or 90 million pounds, the same as in 2003). A significant amount of the chemicals reported as manufactured are not manufactured intentionally, but are coincidentally manufactured as a result of some other activity. Examples include the creation of acid gases from fuel combustion for power generation and the production of nitrate compounds as a result of wastewater treatment.

Processed Chemicals

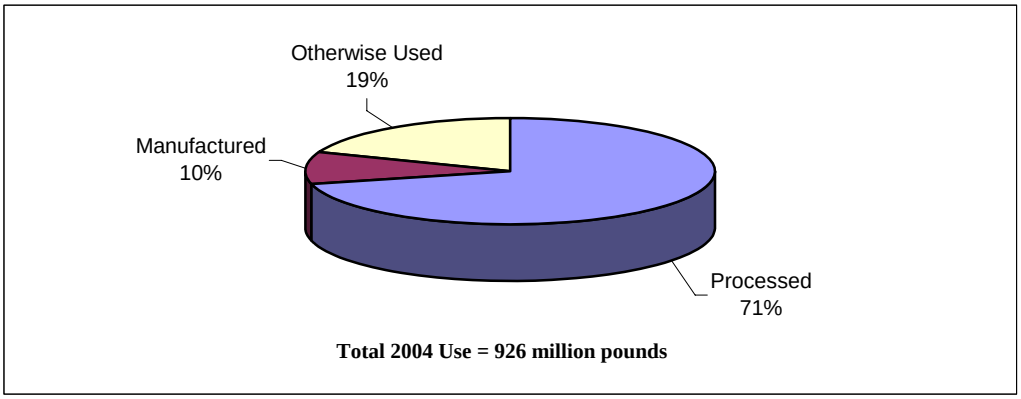
In Massachusetts, the predominant chemical use is "processing," which includes incorporating a listed chemical into a product. Processing of chemicals accounted for 71% of total use (or 659 million pounds, down from 718 million pounds in 2003). Styrene, which is used in the production of plastics, accounted for 46% (or 305 million pounds) of total chemicals processed.

Otherwise Used Chemicals

Chemicals "otherwise used" accounted for 19% of total use (or 177 million pounds, down slightly from 178 million pounds in 2003). Chemicals otherwise used include activities such as parts cleaning, waste

treatment, and the combustion of fuel oil containing listed chemicals such as polycyclic aromatic compounds and benzo(g,h,i)perylene.

Figure 7 – 2004 Chemical Use (does not include trade secret data)



Top 20 Chemicals

In 2004, 181 chemicals were reported out of 1,422 TURA-listed chemicals. Of the 181, 20 chemicals accounted for 84%, or 780 million pounds (not including trade secret information), of total use reported statewide (see Table 5). Styrene monomer was the chemical with the largest quantity reported in 2004, accounting for 33% of total use reported (or 305 million pounds, down from 353 million pounds in 2003). Styrene monomer is the building block for various plastics.

Sodium hydroxide was the second highest used chemical with 192 facilities (or 30%) reporting its use, representing 9% of total use reported (or 82 million pounds, down from 88 million pounds in 2003). Sodium hydroxide is used to treat wastewater, neutralize acids, make sodium salts, rayon, plastics, paper and cellophane, and manufacture laundering, bleaching, and dishwashing materials.

Hydrochloric acid was the third highest used chemical with 72 facilities (or 11%) reporting its use, representing 8% of total use reported (or 70 million pounds, down slightly from 71 million pounds in 2003). Hydrochloric acid is a byproduct of combustion, is used in chloride production, in electroplating, for cleaning metal products, in removing scale from boilers, and in neutralizing basic systems.

Table 5 - 2004 Top 20 Chemicals: Total Use

Total Use ***These quantities do not include Trade Secret***	
Chemical Name (CAS #)	**Total Use (Lbs.)**
Styrene Monomer (100425)	304,605,884
Sodium Hydroxide (1310732)	81,669,729
Hydrochloric Acid (7647010)	70,447,311
Methanol (67561)	43,028,412
Sulfuric Acid (7664939)	34,999,271
Toluene (108883)	31,424,330
Nitrate Compounds (1090)	30,910,067
Sodium Hypochlorite (7681529)	29,473,054
Ammonia (7664417)	21,528,897
Potassium Hydroxide (1310583)	17,297,532
Zinc Compounds (1039)	14,899,540
Methyl Ethyl Ketone (78933)	14,798,407
Methyl Methacrylate (80626)	14,438,204
Chlorine (7782505)	11,887,109
Ethyl Acetate (141786)	11,805,335
Polycyclic Aromatic Compounds (1040)	11,791,211
Acetone (67641)	11,790,311
Phosphoric Acid (7664382)	8,141,842
Toluene Diisocyanate (26471625)	7,753,683
Ethylene Glycol (107211)	7,284,740
The following four chemicals would appear in the Top 20 Chemicals Total Use list if trade secret quantities were included: Butyraldehyde, Formaldehyde, Sodium Bisulfite, Vinyl Acetate.	

Table 6 shows the Top 20 chemicals generated as byproduct in 2004, which accounted for 86% (or 96 million pounds) of total byproduct generated statewide. Table 6 also shows the Top 20 chemicals shipped in product in 2004, which accounted for 81% (or 245 million pounds) of total shipped in product.

Table 6 - 2004 Top 20 Chemicals: Byproduct Generation and Shipped in Product

Byproduct Generation *These quantities include Trade Secret*		**Shipped in Product** *These quantities do not include Trade Secret*	
Chemical Name (CAS #)	**Byproduct Generation (Lbs.)**	**Chemical Name (CAS #)**	**Shipped in Product (Lbs.)**
Nitrate Compounds (1090)	14,736,219	Sodium Hydroxide (1310732)	47,969,758
Sulfuric Acid (7664939)	11,750,911	Methanol (67561)	38,745,466
Sodium Hydroxide (1310732)	10,765,749	Sodium Hypochlorite (7681529)	24,627,403
Toluene (108883)	9,880,286	Toluene (108883)	21,196,764
Ethyl Acetate (141786)	9,827,644	Potassium Hydroxide (1310583)	14,751,730
Methanol (67561)	5,123,909	Chlorine (7782505)	11,655,090
Hydrochloric Acid (7647010)	4,796,759	Methyl Ethyl Ketone (78933)	10,373,709
Ammonia (7664417)	4,445,869	Ammonia (7664417)	10,280,064
Methyl Ethyl Ketone (78933)	3,964,430	Zinc Compounds (1039)	9,271,065
Acetone (67641)	3,273,629	Acetone (67641)	8,583,710
Lead (7439921)	2,861,702	Sulfuric Acid (7664939)	7,008,052
Nitric Acid (7697372)	2,486,933	Dichloromethane (75092)	5,910,659
N-Methyl-2-Pyrrolidone (872504)	2,342,044	N-Methyl-2-Pyrrolidone (872504)	4,999,312
Formaldehyde (50000)	2,312,086	Glycol Ethers (1022)	4,918,541
Dimethylformamide (68122)	1,533,638	Antimony Compounds (1000)	4,894,949
Ethylene Glycol (107211)	1,532,198	Ethylene Glycol (107211)	4,304,403
Phosphoric Acid (7664382)	1,519,587	Hexane (110543)	4,090,176
Sodium Hypochlorite (7681529)	1,051,939	Lead Compounds (1026)	3,941,781
Dichloromethane (75092)	996,255	Xylene Mixed Isomer (1330207)	3,906,698
Tetrahydrofuran (109999)	942,130	Phosphoric Acid (7664382)	3,816,076
		The following chemicals would appear in the Top 20 Chemicals Shipped in Product list if trade secret quantities were included: Ethyl Acetate, Sodium Bisulfite, Vinyl Acetate.	

Table 7 shows the Top 20 chemicals reported as on-site releases in 2004, which totaled 92% (or 8 million pounds) of total on-site releases reported. Hydrochloric acid had the highest amount of on-site releases reported statewide, accounting for 31% (or 2.7 million pounds) of total on-site releases. Over 2.3 million pounds of hydrochloric acid, or 88% of total on-site releases of hydrochloric acid, were attributed to power plants. Table 7 also shows the Top 20 chemicals reported as transfers off-site in 2004, which totaled 82% (or 29 million pounds) of total transfers off-site. Nitrate compounds had the highest transfers off-site reported statewide, accounting for 16% of total transfers off-site. Nitrate compounds were primarily coincidentally manufactured during neutralization of nitric acid in wastewater treatment.

Table 7 - 2004 Top 20 Chemicals: On-Site Releases and Transfers Off-site

On-Site Releases *These quantities include Trade Secret*		**Transfers Off-Site** *These quantities include Trade Secret*	
Chemical Name (CAS #)	**On-Site Releases (Lbs.)**	**Chemical Name (CAS #)**	**Transfers Off-Site (Lbs.)**
Hydrochloric Acid (7647010)	2,658,603	Nitrate Compounds (1090)	5,644,518
Lead (7439921)	854,984	Methanol (67561)	2,419,193
Ammonia (7664417)	757,132	Toluene (108883)	2,297,471
Sulfuric Acid (7664939)	585,610	N-Methyl-2-Pyrrolidone (872504)	2,220,999
Acetone (67641)	523,839	Formaldehyde (50000)	2,132,789
Toluene (108883)	404,372	Lead (7439921)	1,988,797
Ethyl Acetate (141786)	348,802	Ethyl Acetate (141786)	1,986,864
Glycol Ethers (1022)	296,709	Acetone (67641)	1,803,397
Butyl Alcohol (71363)	224,411	Ethylene Glycol (107211)	1,094,333
Hydrogen Fluoride (7664393)	222,573	Methyl Ethyl Ketone (78933)	1,092,429
Methanol (67561)	219,879	Dichloromethane (75092)	857,329
Methyl Ethyl Ketone (78933)	149,545	Sodium Hydroxide (1310732)	789,696
Vanadium Compounds (1065)	118,794	Zinc Compounds (1039)	775,671
Nitrate Compounds (1090)	110,647	Copper Compounds (1015)	769,361
Manganese Compounds (1027)	96,152	Butyraldehyde (123728)	600,490
Trichloroethylene (79016)	88,877	Sulfuric Acid (7664939)	582,487
Formaldehyde (50000)	75,731	Phenol (108952)	475,160
Nickel Compounds (1029)	62,598	Acetonitrile (75058)	442,450
Xylene Mixed Isomer (1330207)	61,439	Nickel (7440020)	439,623
Butyl Acetate (123864)	59,313	Chromium (7440473)	421,741

Persistent Bioaccumulative Toxic (PBT) Chemicals

2004 was the fifth year TURA facilities reported on chemicals classified as persistent bioaccumulative toxic (PBT) chemicals by the U.S. Environmental Protection Agency (EPA) under the Toxics Release Inventory (TRI) Program.

PBT chemicals are of particular concern because they are highly toxic, remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. Relatively small releases of PBT chemicals can pose human and environmental health threats and, therefore, the use and release of these chemicals, even in relatively small amounts, warrant public reporting as well as efforts to reduce their use and release.

For 2004, Massachusetts facilities reported the use of eight PBT chemicals/chemical categories (see Table 8). No facilities reported the use of tetrabromobisphenol or hexachlorobenzene, both of which had been reported by one facility each in 2003.

It should be noted that TURA data are collected only from facilities within certain industrial sectors that have 10 or more full-time employees, and therefore it does not provide a complete picture of the use and emissions of chemicals, whether PBT or non-PBT chemicals. For instance, TURA data do not include emissions from cars and trucks, or emissions from the majority of releases of pesticides, volatile organic compounds, fertilizers, and many other non-industrial sources. They also do not capture the use of toxic chemicals in consumer products that are not manufactured in Massachusetts.

Table 8
2004 PBT Summary
(in pounds unless otherwise noted)

PBT Chemical/ Chemical Category	Reporting Threshold	Number of Facilities	Total Use	Generated as Byproduct	Shipped in Product	On-Site Releases	Transfers Off-Site
Polycyclic Aromatic Compounds (PACs)	100 lbs.	132	11,791,211	6,255	83,459	426	6,161
Benzo(g,h,i) perylene	10 lbs.	113	128,419	72	1,848	3	54
Mercury	10 lbs.	20	12,629	5,858	2,506	1,969	5,352
Mercury Compounds	10 lbs.	6	899	367	167	234	127
Poly-chlorinated biphenyls (PCBs)	10 lbs.	2	46,879	46,858	21	0	46,858
Dioxin and Dioxin-like Compounds	0.1 Grams	15	3,033.241 Grams	3,029.949 Grams	0.000 Grams	2,217.900 Grams	878.374 Grams
Lead	100 lbs.	107	3,586,554	2,861,702	1,093,268	854,979	1,988,797
Lead Compounds	100 lbs.	127	5,280,575	231,527	3,941,781	9,000	235,797

Polycyclic Aromatic Compounds (PACs) and Benzo(g,h,i)perylene

In 2004, polycyclic aromatic compounds (PACs) and benzo(g,h,i)perylene were the two largest PBT chemical use categories. A total of 132 facilities reported on PACs and 113 reported on benzo(g,h,i)perylene. The primary activity that triggered reporting of these chemicals was combustion of #6 and #4 fuel oils, and to a lesser extent #2 fuel oil. These fuel oils contain PACs and benzo(g,h,i)perylene (i.e., they are already in the fuel that enters a facility's boiler to be combusted to generate heat or steam). Benzo(g,h,i)perylene is an especially toxic polycyclic aromatic compound, and therefore is reported separately from the PACs category and has a lower reporting threshold of 10 pounds (versus a 100 pound reporting threshold for the PACs category). Table 9 shows a breakdown of PACs use and Table 10 shows a breakdown of benzo(g,h,i)perylene use. **Note:** The numbers in all the PBT tables have been rounded to the nearest pound (to the nearest 0.001 gram for dioxin). As a consequence, the sum of the numbers in the columns may be slightly greater or lesser than the totals due to rounding.

Table 9
2004 PACs Summary
(in pounds)
(Data in parentheses are subtotals)

Activity / Facility Type	Number of Facilities	Total Use	Byproduct	Shipped in Product	On-site Releases	Transfers Off-site
Fuel Combustion	112	11,645,543	481	134	122	737
(Power plants)	*(10)*	*(9,862,861)*	*(330)*	*(0)*	*(10)*	*(347)*
(Other Facilities)	*(102)*	*(1,782,681)*	*(151)*	*(134)*	*(111)*	*(390)*
Waste Oil Processors	3	36,153	5,089	25,297	0	5,089
Asphalt Manufacturers	17	109,515	685	58,028	304	335
Total	**132**	**11,791,211**	**6,255**	**83,459**	**426**	**6,161**

Table 10 2004 Benzo(g,h,i)perylene Summary (in pounds) (Data in parentheses are subtotals)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-site**
Fuel Combustion	96	125,807	8	7	2	26
(Power Plants)	(10)	(105,907)	(4)	(0)	(1)	(3)
(Other Facilities)	(86)	(19,900)	(4)	(7)	(1)	(23)
Waste Oil Processors	1	308	37	271	0	1
Asphalt Manufacturers	16	2,303	27	1,571	1	27
Total	**113**	**128,419**	**72**	**1,848**	**3**	**54**

The 10 power plants that reported PACs and the 10 that reported benzo(g,h,i)perylene accounted for 84% of total PACs use and 82% of total benzo(g,h,i)perylene use (9,862,861 pounds and 105,907 pounds, respectively). The other facilities that reported due to fuel combustion accounted for about 15% (1,782,681 pounds) of PAC use and 16% (19,900 pounds) of benzo(g,h,i)perylene use. The majority of facilities reported zero byproduct generation, on-site releases, and transfers off-site for these chemicals. This is because most PACs and benzo(g,h,i)perylene are destroyed in the combustion process.

Asphalt manufacturers reported total use of 109,515 pounds of PACs and 2,303 pounds of benzo(g,h,i)perylene. Seventeen asphalt manufacturers reported PACs; 16 reported benzo(g,h,i)perylene. Three waste oil processors reported 36,153 pounds of PACs and one waste oil processor reported 308 pounds of benzo(g,h,i)perylene.

Mercury and Mercury Compounds

Twenty facilities reported the use of mercury, and six facilities reported the use of mercury compounds. Table 11 shows a breakdown of mercury use by activity. Total mercury use declined significantly (from 29,956 pounds in 2003 to 12,629 pounds in 2004) due primarily to a hazardous waste treatment, storage, and disposal facility not having reportable quantities in 2004, whereas this facility reported 15,980 pounds in 2003 from a major removal of mercury-containing manufacturing equipment.

Municipal waste combustors reported on-site mercury releases of 1,962 pounds, which included 386 pounds in air emissions and 1,576 pounds in ash disposed in lined on-site landfills. The 3,559 pounds of mercury reported as transferred off-site were in ash disposed in lined off-site landfills.

Table 11
2004 Mercury Summary
(in pounds)

Activity / Facility Type	Number of Facilities	Total Use	Byproduct	Shipped in Product	On-Site Releases	Transfers Off-site
Lamp / Ballast Recyclers	2	5,111	3	2,330	2	1
Manufacturers: incorporated mercury into products	3	411	333	82	2	298
Municipal Waste Combustors: combustion of waste with mercury-containing products	7	5,520	5,520	0	1,962	3,559
Concrete manufacturers & Sand and gravel companies: mercury occurs naturally in Portland cement, and is also in coal combustion fly ash that is mixed with concrete.	6	82	2	80	2	0
Manufacturer: used mercury as a processing aid.	1	1,490	0	0	0	1,495
Paper Mill	1	14	0	14	1	0
Total	**20**	**12,629**	**5,858**	**2,506**	**1,969**	**5,352**

Table 12 shows a breakdown of mercury compounds use. Total mercury compounds use in 2004 was 899 pounds. All of the use was due to fuel combustion at power plants. Mercury compounds are found in fuel that is otherwise used to produce power. Mercury compounds also are coincidentally manufactured during combustion. The 167 pounds of mercury compounds shipped in product represents the amount contained in fly ash sold by two utilities.

Table 12 2004 Mercury Compounds Summary (in pounds)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-Site**
Power plants: mercury coincidentally generated via combustion	6	899	367	167	234	127

Polychlorinated Biphenyls (PCBs)

For 2004, 2 facilities reported the use of polychlorinated biphenyls (PCBs). Table 13 shows the breakdown of PCB use. Nearly 100% of total use of PCBs was attributed to one facility that recycled fluorescent light fixture ballasts and other equipment. This facility also accounted for 100% of byproduct and 100% of transfers off-site of PCBs. The other facility reported the coincidental generation of PCBs in the manufacture of organic pigments, in accordance with EPA's guidance for reporting PCBs.

Table 13 2004 PCBs Summary (in pounds)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-site**
Recycler: Lamp / ballast recycling	1	46,858	46,858	0	0	46,858
Manufacturer: coincidentally generates PCBs in manufacture of organic pigments	1	21	0	21	0	0
Total	**2**	**46,879**	**46,858**	**21**	**0**	**46,858**

Dioxin and Dioxin-like Compounds

Dioxins are byproducts of chemical and combustion processes, often involving chlorine. Dioxins have poor solubility in water and thus accumulate in body fat and concentrate in the food chain. Because dioxin is considered extremely toxic, EPA established a very low reporting threshold of 0.01 gram.

For 2004, 15 facilities reported the use (i.e., coincidental generation) of dioxin and dioxin-like compounds, including seven municipal waste combustors, six power plants, and two pulp and paper manufacturers. Of the 2,207.532 grams of dioxin reported by MWCs as on-site releases, 7.862 grams were air emissions and 2,199.67 grams were in ash disposed in on-site landfills. The 876.653 grams of dioxins reported as transferred off-site were in ash disposed in off-site landfills. Two pulp and paper manufacturers also reported dioxin. The combustors account for nearly 100% of total use. Table 14 shows the breakdown of dioxin and dioxin-like compounds use.

Table 14 2004 Dioxin and Dioxin-like Compounds Summary (in grams)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Trans-fer Off-site**
Power Plants: dioxin coincidentally generated	6	12.884	9.592	0.000	10.321	0.861
Municipal Waste Combustors: dioxin coincidentally generated	7	3,019.280	3,019.280	0.000	2,207.532	876.653
Paper Manufacturers: dioxin coincidentally generated via paper bleaching	2	1.077	1.077	0.000	0 .047	0.861
Total	**15**	**3,033.241**	**3,029.949**	**0.000**	**2,217.9**	**878.374**

Lead and Lead Compounds

For 2004, 107 facilities reported the use of lead and 127 reported the use of lead compounds. The largest use of lead was reported by the municipal waste combustors (2,741,189 or 76% of total lead use). The lead results from combustion of trash and is primarily disposed of as part of ash in lined landfills.

The second largest use was in the fabricated metals sector (578,257 pounds or 16% of the total reported use), where the metal is used in a variety of applications. This sector processes a variety of ferrous and nonferrous products, such as tools and hardware.

The electronic equipment industry (i.e., printed circuit boards, semiconductors) represented the largest number of filers (27) as a distinct group. This sector reported a total use of 67,021 pounds or 2% of the total reported. Facilities in this sector typically use lead in soldering operations.

Table 15 2004 Lead Summary (in pounds)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-site**
Municipal Waste Combustors	7	2,741,189	2,741,189	0	852,286	1,889,068
Fabricated Metals Manufacturers	19	578,257	83,970	859,838	315	61,722
Primary Metals Manufacturers	7	134,450	3,713	130,699	260	3,658
Electronic Equipment Manufacturers	27	67,021	15,982	51,438	32	19,426
Other Industries	47	65,637	16,847	51,293	2,086	14,923
Total	**107**	**3,586,554**	**2,861,702**	**1,093,268**	**854,979**	**1,988,797**

The largest reported use of lead compounds was in the wire and cable sector (2,537,459 pounds or 48% of total lead compounds use). In this sector, lead compounds are mostly used as heat stabilizers in the wire insulation.

Eleven facilities in the rubber and plastics accounted for 32% (or 1,691,680 pounds) of the total lead compounds use. In this sector, lead compounds are typically formulated into resins and used as heat stabilizers to protect plastic and rubber polymers from degrading during processing.

Total use of lead compounds declined 672,957 pounds from 2003 while transfers off-site fell 1,239,382 pounds. In 2003, a hazardous waste treatment, storage and disposal facility (TSDF) accounted for 1,372,798 pounds of lead compounds use and 1,253,624 pounds transferred off-site. The annual amounts processed by this facility can vary greatly from year to year, and in 2004 the facility had no reportable quantities of lead compounds.

Table 16 2004 Lead Compounds Summary (in pounds)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-site**
Rubber and Plastics Manufacturers	11	1,691,680	9,762	1,668,813	168	4,642
Wire & Cable Manufacturers	18	2,537,459	124,703	1,475,767	1	138,890
Chemicals & Allied Products	14	578,182	3,951	461,513	1,975	1,996
Other Industries	84	473,254	93,112	335,689	6,857	90,269
Total	**127**	**5,280,575**	**231,527**	**3,941,781**	**9,000**	**235,797**

IV. 2004 Significant Industrial Sectors

Under TURA, facilities in the Manufacturing Standard Industrial Classification (SIC) codes (20-39 inclusive) and those in SIC codes 10-14, 40, 44-51, 72, 73, 75 and 76, must report their chemical use if they exceed certain thresholds.

Figure 8 shows the number of TURA reporting facilities in each industry sector. The Chemicals and Allied Products sector represents approximately 16% (103 facilities) of the number of TURA reporting facilities, and uses 76% of the reportable TURA chemicals (see Figure 9). This sector is a diverse group of industries, and includes companies that manufacture or formulate adhesives, paints, pharmaceuticals, and plastic materials and resins. Approximately 35% of the total chemical use for this sector was attributable to the use of styrene monomer, which is used in the manufacture of polystyrene and other plastics.

Figure 8 - 2004 Number of Facilities By Industrial Sector
Total Number of Facilities = 632

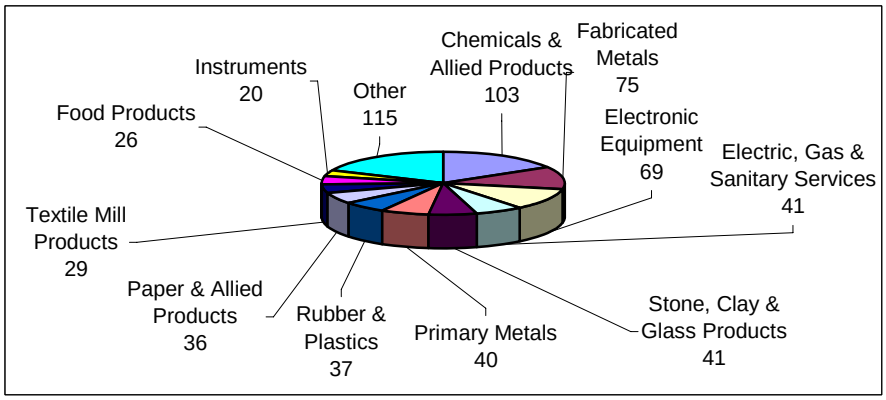
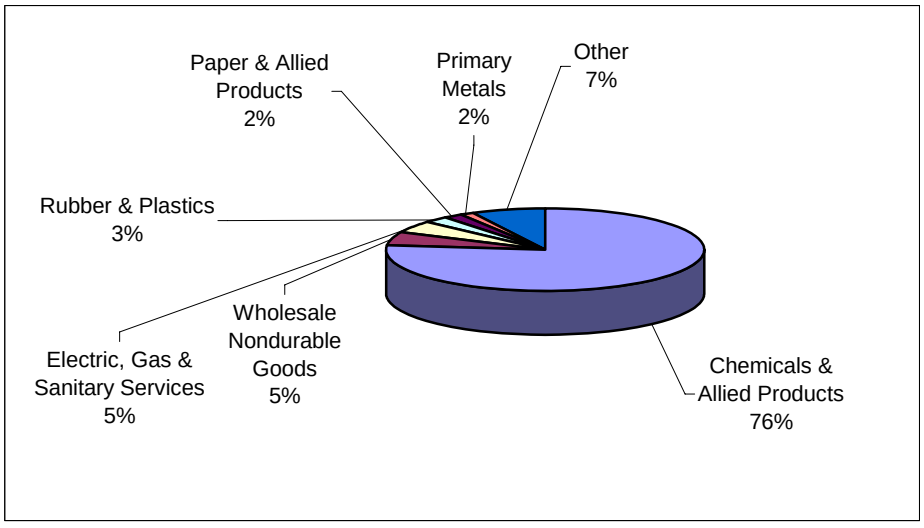


Figure 9 - 2004 Chemical Use By Industrial Sector
Total Use = 1,143,000,000 Pounds



The Wholesale Nondurable Goods and the Electric, Gas and Sanitary Services sectors, the second largest chemical users, each accounted for 5% of total statewide use. The activities of the Wholesale Nondurable Goods sector involve repackaging of chemicals for sale to other sectors. The 41 facilities reporting in the Electric, Gas and Sanitary Services sector are primarily involved in the production of electricity. The Rubber and Plastics sector accounted for 3% of chemical use, and the Paper and Allied Products and Primary Metals sectors each accounted for 2% of chemical use, leaving the balance of statewide use (7%) to a variety of sectors.

Figure 10 shows byproduct generation by industrial sector. While the Chemical and Allied Products sector accounted for 76% of total statewide use, this sector produced 36% of the total byproduct generated in 2004. In contrast, the Paper and Allied Products sector, which accounted for 2% of total statewide chemical use, accounted for 10% of the byproduct generated.

The Electric, Gas and Sanitary Services sector accounted for 10% of total byproduct generated. The Textile Mill Products sector accounted for 9%, and the Rubber and Plastics sector accounted for 8% of the byproduct generated. Other major industries that generated byproduct include the Fabricated Metals sector which accounted for 7%, and the Electronic Equipment sector which accounted for 5% of the byproduct generated. The remaining 15% of byproduct was attributed to a variety of sectors.

Figure 10 - 2004 Byproduct Generation By Industrial Sector
Total Byproduct = 111,000,000 Pounds

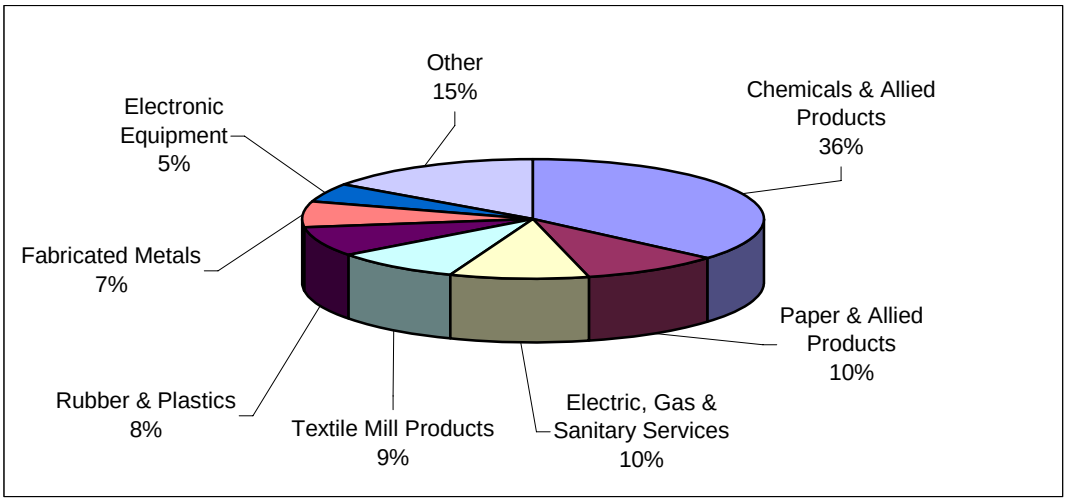


Figure 11 shows on-site releases to the environment by industrial sector. The Electric, Gas and Sanitary Services sector, which represented 5% of total statewide use, was the largest source of on-site releases, accounting for 56% of all on-site releases. This sector provides power for Massachusetts businesses and citizens. Forty-eight percent of on-site releases in this sector were attributed to the coincidental manufacture of hydrochloric acid during combustion. The Chemicals and Allied Products sector accounted for 76% of total chemical use and only 10% of total on-site releases to the environment. The other major sectors producing on-site releases were the Fabricated Metals sector, which accounted for 6% of total on-site releases, and the Paper and Allied Products and the Textile Mill Products sectors, which each accounted for 5% of total on-site releases. The remaining 18% of on-site releases was attributed to a variety of sectors.

Figure 11 - 2004 On-Site Releases By Industrial Sector
Total On-Site Releases = 9,000,000 Pounds

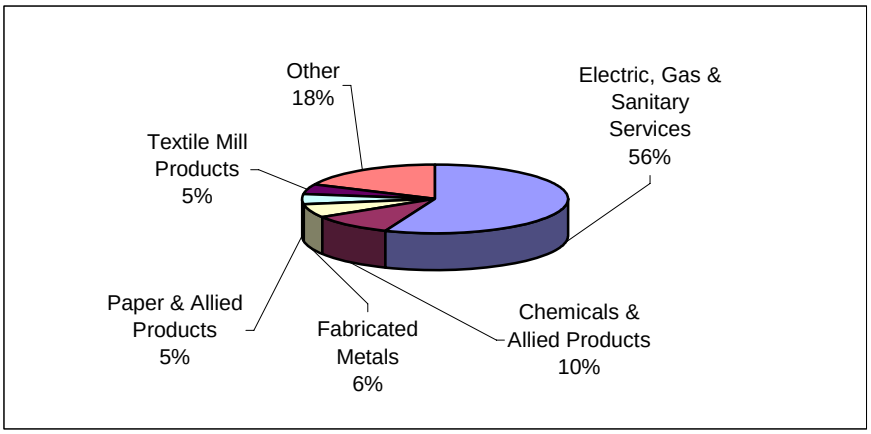
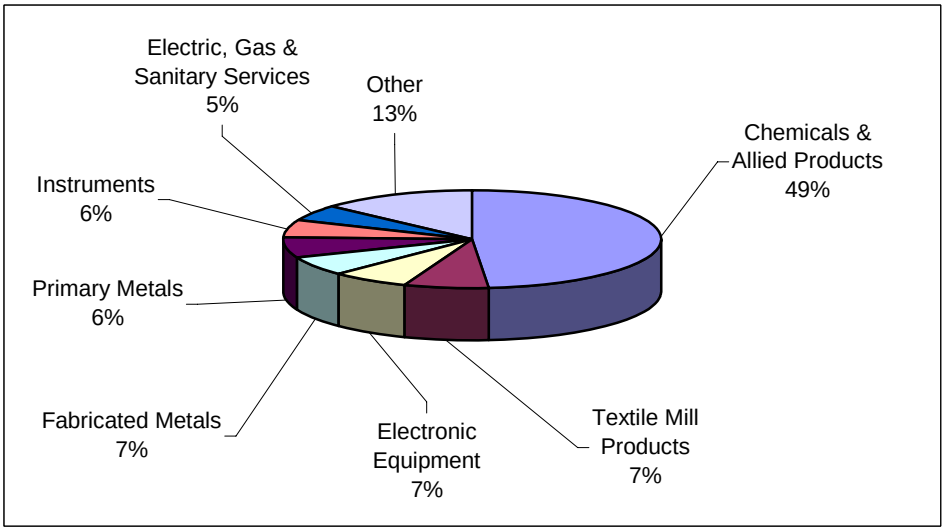


Figure 12 shows transfers off-site by industrial sector. The Chemicals and Allied Products sector accounted for 49% of transfers off-site. The second largest sectors in this category, the Textile Mill Products, Electronic Equipment, and Fabricated Metals sectors, each accounted for 7% of transfers off-site. The other major sectors accounting for transfers off-site were the Primary Metals and Instruments sectors, each accounting for 6% of total transfers off-site, and the Electric, Gas and Sanitary Services sector, accounting for 5% of total transfers off-site. The remaining 13% of total transfers off-site was attributed to a variety of sectors.

Figure 12 – 2004 Transfers Off-Site By Industrial Sector
Total Transfers Off-Site = 35,000,000 Pounds



V. 2004 Major TURA Facilities

Top 5 Facilities with the Largest Reduction in Byproduct Generation from 2003 to 2004 While Implementing Toxics Use Reduction

Table 17 lists the 5 facilities that showed the largest byproduct reductions from 2003 to 2004 attributed to toxics use reduction. While individual changes in production varied, these facilities either reported increased production or reported substantially more byproduct reduction than could be attributed to reduced manufacturing activity. Overall, this group of facilities showed an increase in production levels over 2003. Specific descriptions of toxics use reduction efforts are found below.

Table 17
Facilities with the Top Reductions in Byproduct Generation While Implementing Toxics Use Reduction (2003-2004)

Company	Reduction in Byproduct (in pounds)	Toxics Use Reduction Techniques Used
1. Schweitzer-Mauduit International, Inc. Columbia Mill (Lee)	355,540 (39% decrease)	Production Unit Modernization
2. Duro Textiles, LLC (Fall River)	250,115 (21% decrease)	Input Substitution; Improved Operation & Maintenance
3. Cranston Print Works Co. (Webster)	235,298 (17% decrease)	Improved Operation & Maintenance
4. AgriMark, Inc. (West Springfield)	171,629 (67% decrease)	Input Substitution; Improved Operation & Maintenance
5. Millipore Corporation (Bedford)	121,872 (14% decrease)	Recycling, Reuse, or Extended Use of Toxics

Schweitzer-Mauduit International, Inc., Columbia Mill

Schweitzer-Mauduit International, Inc. manufactures lightweight specialty papers for a variety of uses and has been in operation for over 130 years. The Columbia Mill location provides water and effluent treatment, steam generation, and distribution facilities that support three paper production facilities in Lee, Massachusetts.

The Columbia Mill needs high purity water to protect its boilers and ensure efficient operation. Previously, a resin system was used to purify the water that required large quantities of sulfuric acid and sodium hydroxide to regenerate. The facility has converted to a membrane purification system that uses only about two drums of chemicals per year and that has eliminated use of sulfuric acid and sodium hydroxide.

Duro Textiles, LLC

Duro Textiles, LLC prints, coats, dyes, and finishes fabrics in addition to providing numerous other textile services. Duro Textiles, LLC uses toluene and methyl ethyl ketone in its coating process. Due to improved operation and maintenance and by changing coatings, the facility has reduced over 200,000 pounds of byproduct for these chemicals alone. Likewise, it also has been successful in finding a substitute for sodium hydroxide that further reduced byproduct by nearly 50,000 pounds compared to 2003.

Cranston Print Works Company

Cranston Print Works Company prepares, prints, and finishes cotton and blended fabrics for the craft, home sewing, and interior decorating markets. Cranston is the oldest textile printing company in the US.

In the past, Cranston has eliminated the use of sulfuric acid in their wastewater pH adjustment by using carbon dioxide, to reducing water use by over 110 million gallons per year through a number of water conservation projects. For 2004, Cranston made several efforts to maximize the capabilities of their caustic recovery system to reduce sodium hydroxide byproduct by over 200,000 pounds compared to 2003. These efforts included training in running the system efficiently, some procedural changes, and better process control.

Agri-Mark, Inc.

Agri-Mark, Inc. is a dairy cooperative with over 1,300 dairy farm families as members throughout the northeast US. The main products from the Massachusetts facility include heavy sweet cream, condensed skim milk, skim milk, nonfat dry milk powder, and butter.

By making input substitutions to the cleaning process and improving process controls, Agri-Mark has reduced the use of both sodium hydroxide and phosphoric acid to less than 10,000 pounds per year each. Reducing the amount of pH adjusting chemicals used for cleaning also has resulted in less being needed for wastewater treatment.

Millipore Corporation

Millipore Corporation has been a Massachusetts-based company for over 50 years. The Bedford facility produces roll stock membrane products primarily for bioscience and bioprocess applications.

Part way through 2004, Millipore installed a distillation unit for methanol as an integral (hard-piped) part of the manufacturing process. Millipore concurrently made efforts to reduce the amount of methanol used per unit of product. The result has been over 100,000 pounds of decreased methanol byproduct compared to 2003, and the company expects to realize even greater methanol decreases in 2005.

Top 20 Facility Lists

Table 18 lists the 20 facilities that used the largest quantity of TURA chemicals. These 20 facilities used 860 million pounds, or 75% of total statewide use.

Table 18 – 2004 Top 20 Facilities
(Largest Quantity of Total Use)

Total Use *These quantities include Trade Secret*		
Facility Name	**Town**	**Total Use (Lbs.)**
Nova Chemicals Inc.	Springfield	232,871,938
Solutia Inc. - Indian Orchard Plant	Springfield	105,184,098
Borden & Remington	Fall River	95,750,880
American Polymers	Oxford	71,582,186
Eastman Gelatine Corporation	Peabody	68,230,966
Cytec Surface Specialties	Springfield	55,069,209
Holland Company Inc.	Adams	48,400,164
Astro Chemicals Inc.	Springfield	27,169,207
Northwin LTD	Leominster	23,828,002
Ashland Distribution Co.	Tewksbury	18,668,421
James Austin Co.	Ludlow	15,818,719
ITW TACC	Rockland	15,603,391
Houghton Chemical Corp.	Boston	13,434,564
Omnova Solutions Inc.	Fitchburg	13,364,315
Mirant New England Inc.	Sandwich	11,980,841
SEMASS Partnership	Rochester	10,799,346
Hercules Inc.	Chicopee	9,589,709
Callahan Company	Walpole	7,932,912
Bostik Findley Inc.	Middleton	7,628,123
Leggett & Platt Inc.	Newburyport	7,521,676

Table 19 lists the 20 facilities that generated the largest quantity of byproduct. These facilities generated 65 million pounds of byproduct, or 58% of total statewide byproduct. Table 19 also lists the 20 facilities with the largest quantity shipped in product. These facilities shipped 306 million pounds in product, or 82% of total shipped in product statewide.

Table 19 - 2004 Top 20 Facilities
(Largest Quantity of Byproduct Generation and Shipped in Product)

Byproduct Generation *These quantities include Trade Secret*			**Shipped in Product** *These quantities include Trade Secret*		
Facility Name	**Town**	**Byproduct Generation (Lbs.)**	**Facility Name**	**Town**	**Shipped in Product (Lbs.)**
Eastman Gelatine Corporation	Peabody	17,331,100	Borden & Remington	Fall River	95,697,536
Flexcon Co. Inc. Plant 2	Spencer	6,273,890	Solutia Inc. Indian Orchard Plant	Springfield	32,012,110
Cytec Surface Specialties	Springfield	5,037,670	Astro Chemicals Inc.	Springfield	25,850,627
Solutia Inc. Indian Orchard Plant	Springfield	5,013,320	Northwin LTD	Leominster	23,817,421
Venture Tape	Rockland	3,840,234	Ashland Distribution Co.	Tewksbury	18,665,421
Precision Lithograining Corp.	South Hadley	2,854,839	James Austin Co.	Ludlow	16,230,813
Mirant New England Inc.	Sandwich	2,826,981	ITW TACC	Rockland	15,401,062
Bostik Findley Inc.	Middleton	2,470,090	Holland Company Inc.	Adams	14,044,164
Intelicoat Technologies Inc.	South Hadley	2,217,304	Houghton Chemical Corp.	Boston	13,419,402
Chemdesign Corp.	Fitchburg	2,127,132	Callahan Company	Walpole	7,892,957
Polaroid Corp.	Waltham	2,116,135	Cytec Surface Specialties	Springfield	7,282,130
Intel Corp.	Hudson	1,711,710	Webco Chemical Corp.	Dudley	5,731,478
Crane & Co. Inc. Pioneer Mill	Dalton	1,695,563	Rohm & Haas Electronics Materials LLC	Marlborough	5,243,139
Dominion Energy Brayton Point LLC	Somerset	1,586,514	Surface Coatings Inc.	Wilmington	4,261,726
Ideal Tape Company	Lowell	1,417,566	Top-Flite Golf Co.	Chicopee	4,106,244
Bradford Industries	Lowell	1,326,029	Alphagary	Leominster	3,920,408
BBA Nonwovens Simpsonville Inc.	Colrain	1,316,655	Univar USA Inc.	Salem	3,422,994
Madico Inc.	Woburn	1,310,424	Advance Coatings Co.	Westminster	3,081,536
Allegheny Rodney Strip Division	New Bedford	1,288,849	Stahl USA Inc.	Peabody	3,027,724
Cranston Print Works	Webster	1,162,931	Bostik Findley Inc.	Middleton	2,960,467

Table 20 lists the 20 facilities that had the largest quantity of on-site releases and also lists the 20 facilities that had the largest quantity of transfers off-site. The 20 facilities with the largest quantity of on-site releases released 6 million pounds, or 70% of total releases statewide. Six of these facilities were power plants, accounting for 3.6 million pounds, or 59% of total on-site releases. Two million pounds, or 58% of the power plants' on-site releases, were due to the coincidental manufacture of hydrochloric acid during combustion. The remainder of the power plants' on-site releases was due to the coincidental manufacture of the following chemicals during combustion: sulfuric acid (13%), ammonia (12%), metal compounds (10%), and hydrogen fluoride (6%). Five of the Top 20 facilities were municipal waste combustors (MWCs) that reported combustion-related emissions. Of the 1.2 million pounds of on-site releases reported by MWCs, 31% of the releases was due to the coincidental manufacture of hydrochloric acid during combustion and 68% was due to lead in ash disposed in on-site lined landfills at two of the facilities.

The 20 facilities with the largest quantity of transfers off-site transferred 21 million pounds, or 61% of the total transfers off-site statewide.

Table 20 – 2004 Top 20 Facilities
(Largest Quantity of On-Site Releases and Transfers Off-Site)

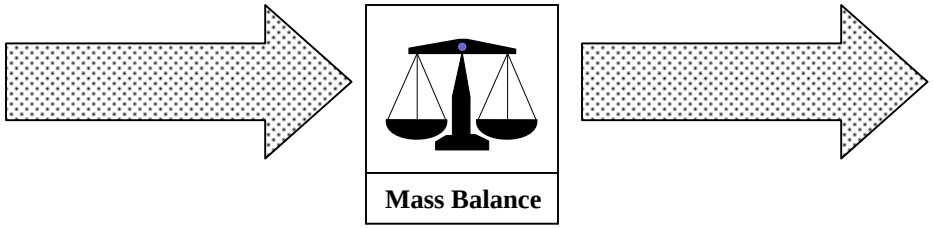
On-Site Releases *These quantities include Trade Secret*			**Transfers Off-Site** *These quantities include Trade Secret*		
Facility Name	**Town**	**On-Site Releases (Lbs.)**	**Facility Name**	**Town**	**Transfers Off-Site (Lbs.)**
Dominion Energy Brayton Point LLC	Somerset	1,305,567	Cytec Surface Specialties	Springfield	4,481,432
Somerset Power LLC	Somerset	673,217	Solutia Inc. Indian Orchard Plant	Springfield	3,363,598
Mirant New England Inc.	Sandwich	559,728	Chemdesign Corp.	Fitchburg	2,125,109
Wheelabrator Saugus JV	Saugus	531,417	Polaroid Corp.	Waltham	1,535,377
Dominion Energy Salem Harbor LLC	Salem	450,067	Lewcott Corp.	Millbury	902,241
Covanta Haverhill Inc.	Haverhill	412,775	Engineered Materials Solutions Inc.	Attleboro	839,592
Crown Beverage Packaging USA	Lawrence	364,369	SEMASS Partnership	Rochester	792,787
Boston Generating Mystic LLC	Charlestown	310,498	Intel Corp.	Hudson	728,503
Holyoke Water Power Co.	Holyoke	293,840	Ideal Tape Company	Lowell	681,659
Solutia Inc. Indian Orchard Plant	Springfield	218,976	Genzyme Corp.	Boston	666,221
Ideal Tape Company	Lowell	147,157	Intelicoat Technologies Inc.	South Hadley	655,633
Hollingsworth & Vose Company	West Groton	127,803	Sanmina Sci. Corp.	Wilmington	637,696
Wheelabrator Millbury Inc.	Millbury	115,336	Waters Corp.	Taunton	566,662
Alliance Leather Inc.	Peabody	109,344	Borregaard Synthesis Inc.	Newburyport	547,900
Rodney Hunt Co.	Orange	102,558	Brittany Dyeing & Printing Corp.	New Bedford	501,580
SEMASS Partnership	Rochester	100,365	Avecia Biotechnology Inc.	Milford	501,107
Wheelabrator North Andover Inc.	North Andover	84,932	Flexcon Co. Inc. Plant 2	Spencer	470,203
Adden Furniture Inc.	Lowell	78,757	Allegheny Rodney Strip Division	New Bedford	468,363
Venture Tape	Rockland	76,420	Precision Lithograining Corp.	South Hadley	441,734
Flexcon Co. Inc. Plant 2	Spencer	75,042	Wheelabrator Millbury Inc.	Millbury	438,618

VI. Key TURA Terms

This section contains definitions of key TURA terms.

TURA – Massachusetts Toxics Use Reduction Act of 1989 (MGL 21I)
TRI – federal EPA Toxics Release Inventory
TRADE SECRET – the information identified as confidential by TURA filers. To protect confidentiality claims by Trade Secret filers, all trade secret data in this information release are presented in aggregated form. Aggregated data do not include the names and amounts of chemicals subject to claims of confidentiality.
2000 CORE GROUP – includes all industry categories and chemicals that were subject to TURA reporting in 2000 and remained subject to reporting in 2004. The 2000 Core Group is used to measure progress from 2000 to 2004.
1990 CORE GROUP – includes all industry categories and chemicals that were subject to TURA reporting in 1990 and remained subject to reporting in 2004. The 1990 Core Group is used to measure progress from 1990 to 2004.

The terms and definitions below have been arranged in order of inputs and outputs. Chemicals that are used by companies are brought into the facility and are manufactured, processed or otherwise used. As a result of using these chemicals, a company has outputs that can include a product that is created for sale, or a byproduct or waste. The calculation of use and waste of chemicals is known as 'mass balance.' Generally the inputs equal the outputs, but there are circumstances where a chemical is used in ways that result in an imbalance between inputs and outputs. These circumstances are most often the result of: 1) chemicals are recycled on-site, 2) the product was held in inventory, 3) chemical is consumed or transformed, or 4) the chemical is a compound.



TOTAL USE – the total quantity in pounds of TURA chemicals reported as manufactured, processed and otherwise used.

MANUFACTURE – to produce, prepare, import or compound a toxic or hazardous substance.

OTHERWISE USE – any use of a toxic substance that is not covered by the terms "manufacture" or "process" and includes use of a toxic substance contained in a mixture or trade name product.

PROCESS – the preparation of a toxic or hazardous substance, including without limitation, a toxic substance contained in a mixture or trade name product, after its manufacture, for distribution in commerce: a) in the same form or physical state, or in a different form or physical state, from that in which it was received by the toxics user so preparing such substance; or b) as part of an article containing the toxic or hazardous substance.

PRODUCT – a product, a family of products, an intermediate product, family of intermediate products, or a desired result or a family of results. "Product" also means a byproduct that is used as a raw material without treatment.

SHIPPED IN PRODUCT – the quantity in pounds of the chemical that leaves the facility as product.

BYPRODUCT – all non-product outputs of reportable substances generated by a production unit prior to handling, treatment, and release.

ON-SITE RELEASES– all byproducts that are released to the air, discharged to surface waters, released to land and underground injection wells.

TRANSFERS OFF-SITE – byproducts that are transferred off-site for energy recovery, recycling, treatment and disposal.

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