2001 Toxics Use Reduction Information Release

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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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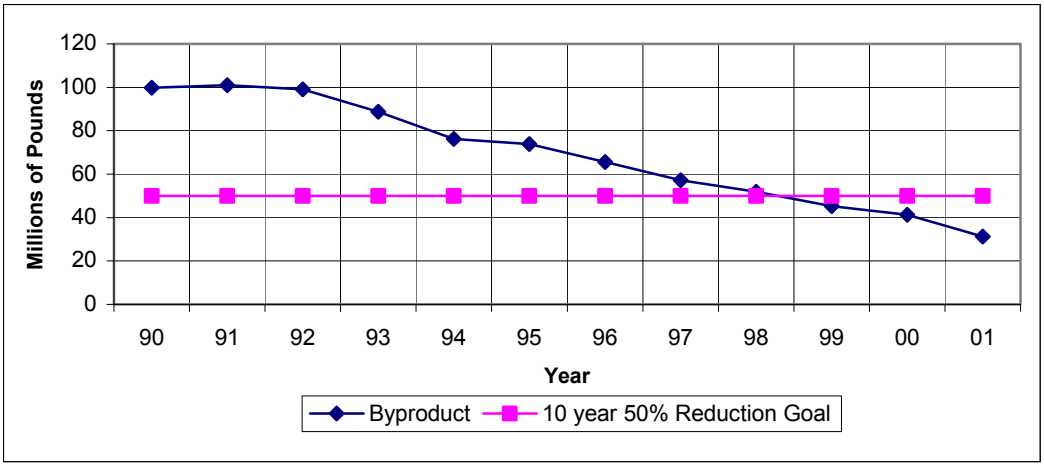
Executive Summary

The Toxics Use Reduction Act (TURA) Program now has 12 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.

In 2001, 676 facilities reported the use of 192 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. These facilities reported that they used nearly 1.3 billion pounds of listed toxic substances (down from 1.4 billion pounds in 2000), generated 112.8 million pounds of byproduct (or waste) (down from 127.8 million pounds in 2000), shipped 376.8 million pounds in or as products (down from 424.4 million pounds in 2000), released 8.9 million pounds to the environment (down from 10.8 million pounds in 2000), and transferred 35.5 million pounds off-site for further waste management (down from 42 million pounds in 2000).

One of TURA's original goals was to reduce the generation of toxic byproducts (or waste) by 50 percent. That goal was met in 1998 and stands at 69% in 2001 (see Figure 1).

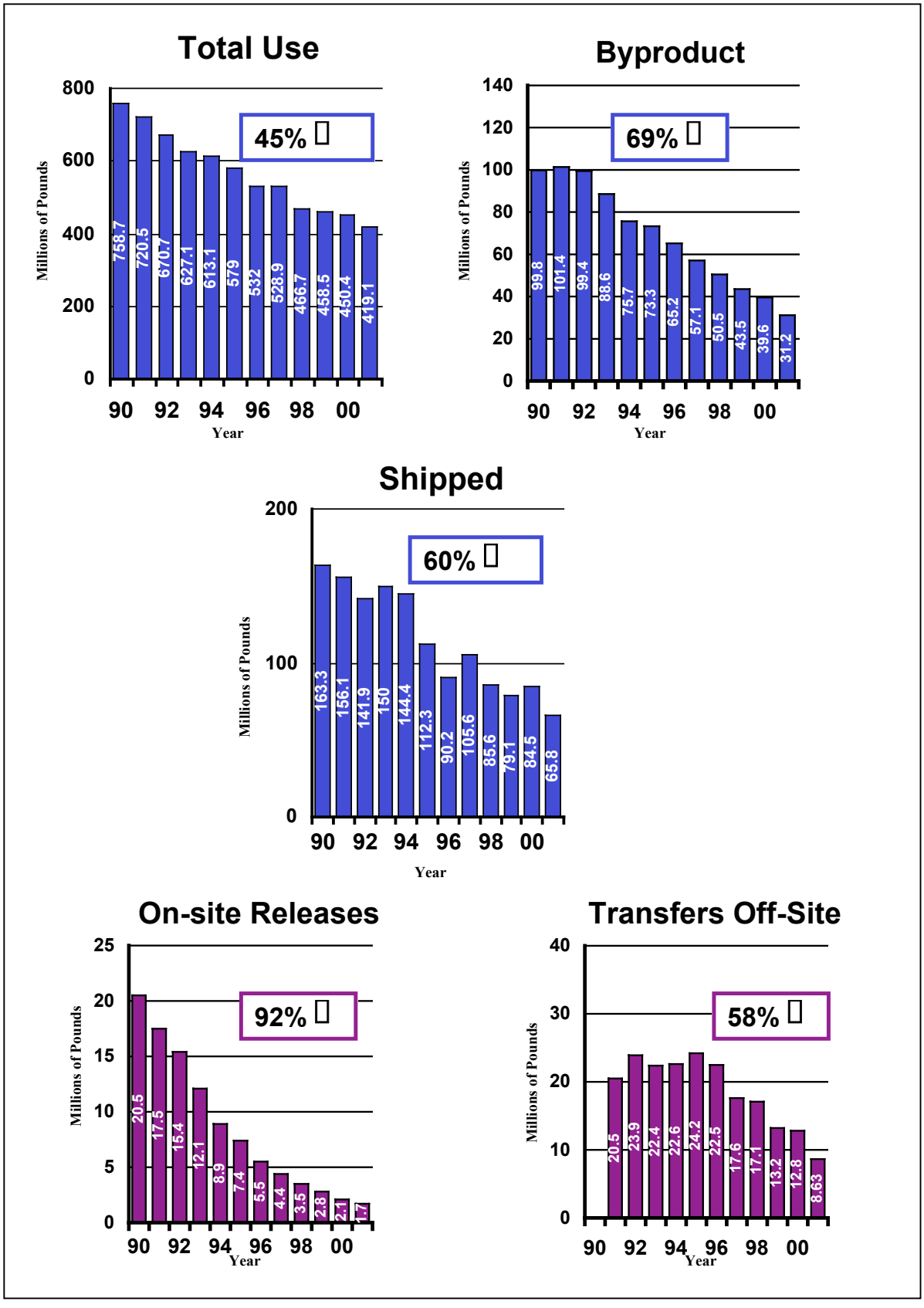
Figure 1 - Core Group Byproduct Reduction From 1990 to 2001 – Production Adjusted



TURA's byproduct reduction goal is measured using data normalized for changes in production that is reported by a Core Group of industries that have been subject to reporting since 1990 (this data excludes trade secret data). In 2001, the Core Group comprised 323 facilities and used 582.6 million pounds, or 53% of the total toxic chemicals reported (i.e., 1.1 billion pounds excluding trade secret data). Taking into account a 39% increase in production, from 1990 to 2001 the Core Group facilities reduced toxic byproducts by 69% (up from 58% in 2000), toxic chemical use by 45% (up from 40% in 2000), quantities shipped in product by 60% (up from 47% in 2000), on-site releases to the environment by 92% (up from 90% in 2000), and transfers off-site for further waste management by 58% (up from 36% in 2000) (see Figure 2).[1]

[1] Data shown for years prior to 2001 have been adjusted to reflect changes in the Core Group of TURA facilities, and therefore may differ slightly from the same information reported in the 2000 Toxics Use Reduction Information Release.

Figure 2 – Core Group Toxics Use Reduction Progress From 1990 to 2001 – Production Adjusted



Even when Core Group data is not adjusted for changes in production, between 1990 and 2001 Core Group filers still decreased their total use of reportable chemicals by 23% (from 758.7 million pounds in 1990 to 582.6 million pounds in 2001), reduced their byproduct generation by 57% (from 99.8 million pounds in 1990 to 43.3 million pounds in 2001), reduced their shipped in product by 44% (from 163.3 million pounds in 1990 to 91.5 million pounds in 2001), reduced their on-site releases to the environment by 88% (from 20.5 million pounds in 1990 to 2.4 million pounds in 2001), and reduced their transfers off-site by 38% (from 20.4 million pounds in 1991 to 12.6 million pounds in 2001).

2001 was the second year TURA facilities reported on chemicals now classified as persistent bioaccumulative toxic (PBT) chemicals by the U.S. Environmental Protection Agency (EPA) under the Toxics Release Inventory (TRI) Program (see Table 1). The use and release of PBTs and other highly hazardous substances has received increasing attention in recent years. PBT chemicals are of special concern because they are highly toxic and they remain in the environment for long periods of time, are not readily destroyed, and build up in the food chain. Two PBTs now appear in the top 20 chemicals used by TURA facilities (polycyclic aromatic compounds and benzo(g,h,i,)perylene, both of which are contained in fuel oils). Due to new lower reporting thresholds of 100 pounds in 2001, the number of facilities filing for lead increased from 15 to 136, and the number filing for lead compounds increased from 32 to 115. The TURA Program is developing a strategy to focus attention on specific PBTs and other highly hazardous chemicals. This strategy will challenge and assist Massachusetts facilities to pursue aggressive reductions in these areas.

Table 1
2001 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.	145	86,623,441	9,014	354,407	1,950	5,785
Benzo(g,h,i)-Perylene	10 lbs.	121	7,413,404	145	27,140	17	81
Mercury	10 lbs.	12	9,298	609	8,620	3	634
Mercury Compounds	10 lbs.	5	676	443	0	236	174
Poly-Chlorinated Biphenyls (PCBs)	10 lbs.	2	83,890	83,871	19	0	83,871
Tetrabromo-Bisphenol A	10 lbs.	1	115	109	6	0	109
Dioxin and Dioxin-like Compounds	0.1 Grams	8	12.11	11.90	0	11.46	0.35
Lead	100 lbs.	136	1,031,855	129,681	902,494	1,427	146,703
Lead Compounds	100 lbs.	115	7,212,595	1,464,930	4,515,861	5,379	1,388,990

The TURA program has achieved its dramatic 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. In the future, Massachusetts facilities will be challenged to target reductions of PBTs and other high hazard chemicals.

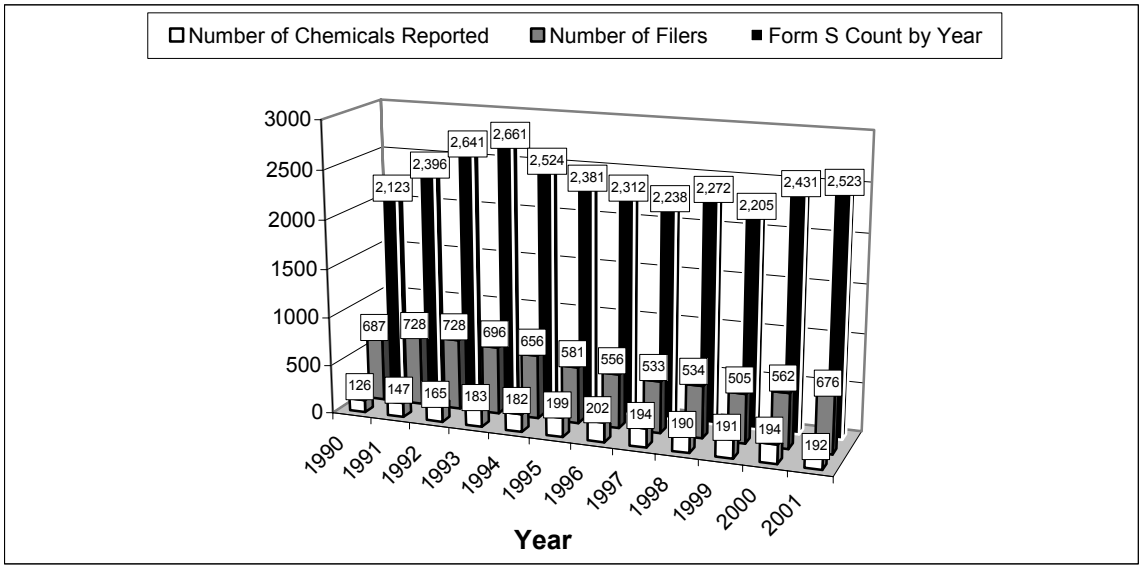
I. TURA Progress 1990-2001

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 delisted. For example, effective reporting year 1999, the Administrative Council on Toxics Use Reduction delisted pure copper in solid or molten metal form.

Figure 3 illustrates TURA filing trends over the past twelve years. Out of 1,422 chemicals listed under TURA, only 192 were reported in 2001. The number of facilities reporting under TURA has generally declined over time, from a high of 728 facilities in 1991 and 1992, to 505 in 1999. The number of reporting facilities increased to 562 in 2000 due in part to the new requirement to report PBTs at lower thresholds. The number of reporting facilities increased to 676 in 2001 due to the new requirement to report lead and lead compounds (both PBTs) at lower 100 pound thresholds. The number of individual Form Ss declined from a high of 2,661 in 1993, to 2,205 in 1999, increased to 2,431 in 2000, again due partly to the reporting of PBTs [2], and increased to 2,523 in 2001 due to the new reporting requirement for lead and lead compounds.

Figure 3 - TURA Filer Trends 1990 –2001



[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.

In 2001, 72 facilities left the TURA reporting universe and 186 entered the reporting universe, for a net increase of 114 facilities. Generally, facilities left the reporting universe due to either a decline in business or chemicals which were eliminated or reduced below reporting threshold. Of the 186 entering the reporting universe, 104 were new filers due to the lower reporting thresholds for lead and lead compounds.

Core Group Progress

The overall progress of the TURA program is best reflected by toxics use reduction progress within the Core Group of TURA filers. In order to allow for a consistent picture of TURA progress, a Core Group has been defined, consisting of industries and chemicals that were subject to reporting in 1990 and which remain subject to reporting in 2001. The Core Group includes any facility whose Standard Industrial Classification (SIC) code is within the manufacturing SIC codes (20 to 39, inclusive), and all chemicals in the 1990 TURA reporting list that have not since been delisted. The criteria for inclusion in the Core Group do not change. However, there are yearly changes in the Core Group due to chemical delistings and new filers. The following rules apply to the Core Group data:

- If a chemical is delisted, it is removed from the Core Group for all reporting years.
- New filers are included in the Core Group if their SIC codes and chemicals meet the Core Group criteria.
- If a Core Group facility drops below the reporting threshold, its prior year records remain in the Core Group.
- The Core Group does not include chemicals for which a facility claimed trade secret protection in any year.

The Core Group included 323 (or 48%) of the total number of facilities reporting in 2001 (see Figure 4). The Core Group used 582.6 million pounds (or 53%) of the total toxic chemicals reported in 2001 (see Figure 5).

Figure 4 – Number of Facilities: Core Group vs. All TURA Filers

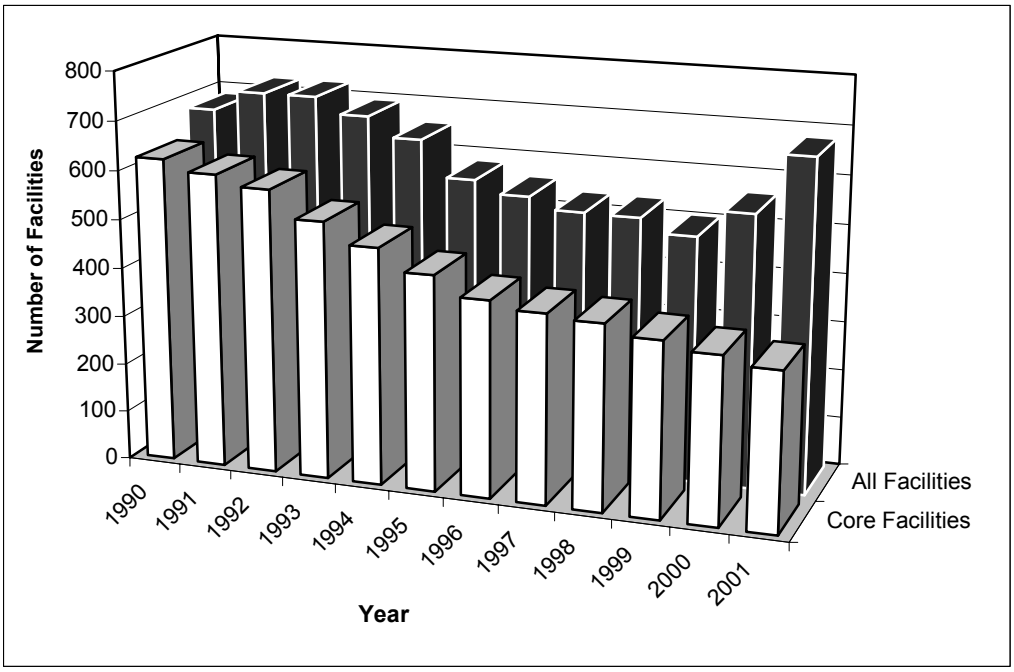
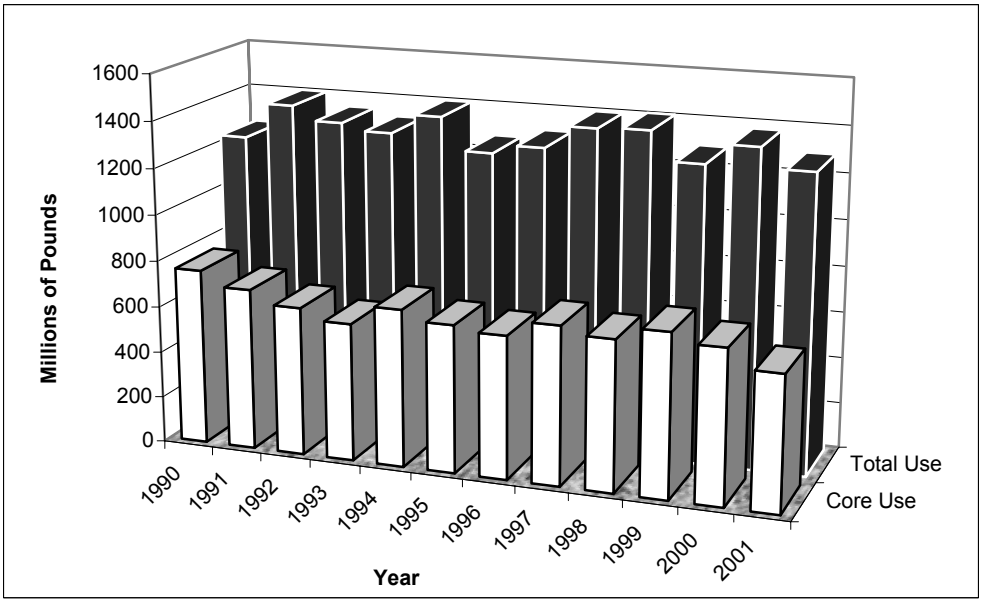


Figure 5 – Amount of Total Use: Core Group vs. All TURA Filers

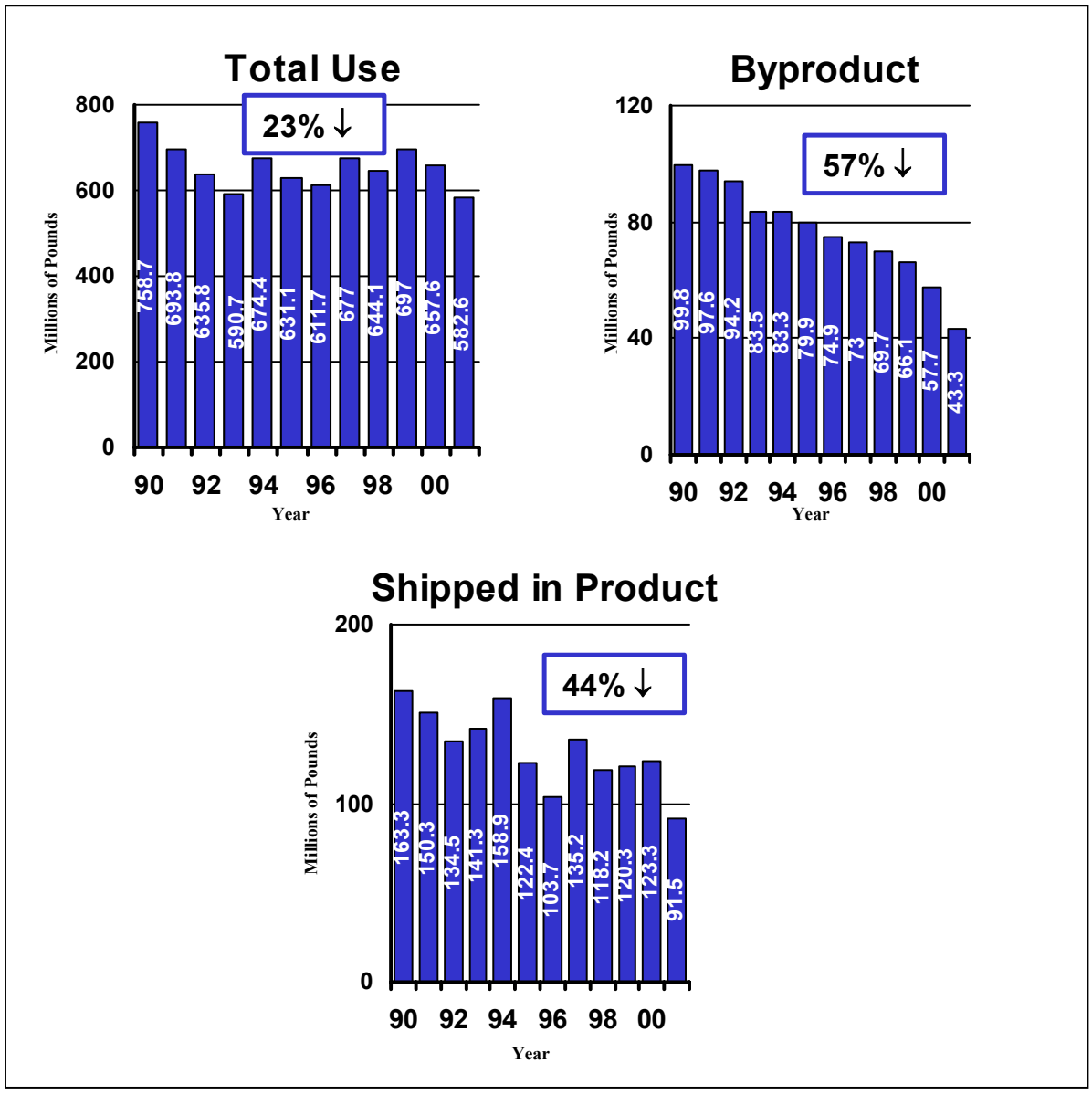


Core Group Progress – Without Adjusting for Production

The changes in total reported Core Group quantities over the period 1990 to 2001 are shown in Figures 6 and 7. These quantities have not been adjusted for changes in production.

From 1990 to 2001, Core Group filers decreased their total chemical use by 23% (from 758.7 million pounds in 1990 to 582.6 million pounds in 2001), reduced their byproduct generation by 57% (from 99.8 million pounds in 1990 to 43.3 million pounds in 2001), and reduced the quantity of chemicals shipped in product by 44% (from 163.3 million pounds in 1990 to 91.5 million pounds in 2001).

Figure 6 – Core Group Quantities 1990 – 2001
(not production adjusted)

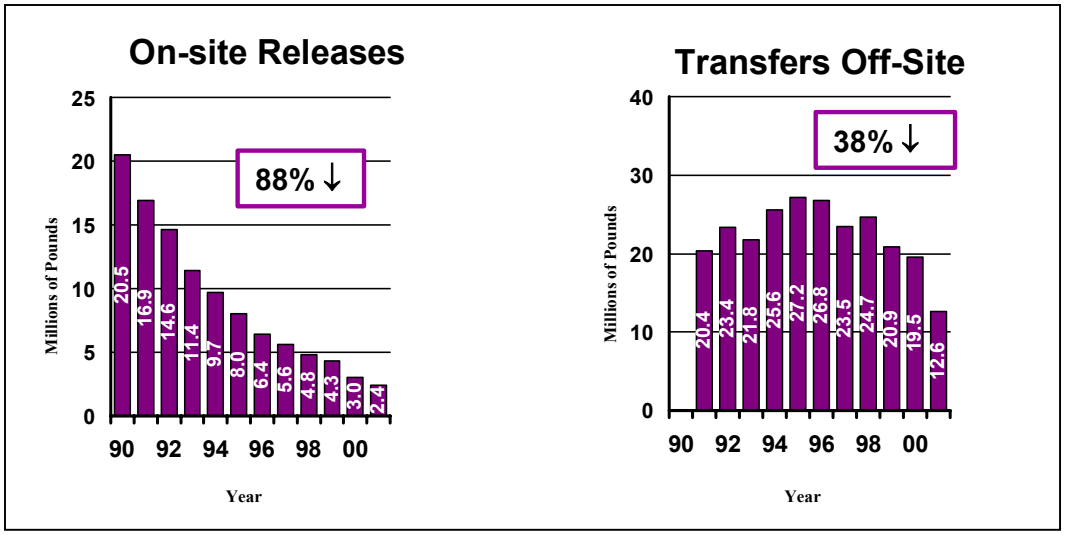


Core Group filers also have been very successful in achieving reductions of on-site releases as defined by the federal Toxics Release Inventory (TRI) program. These

releases have been reduced by 88%, from 20.5 million pounds in 1990 to 2.4 million pounds in 2001.

Finally, Core Group filers reduced their transfers off-site (byproducts that are transferred off-site for energy recovery, recycling, treatment or disposal) by 38%, from 20.4 million pounds in 1991[3] to 12.6 million pounds in 2001.

Figure 7 – Core Group Quantities 1990-2001 (not production adjusted)



Core Group Progress - Production Adjusted Data

Between 1990 and 2001, Core Group filers reported a 39% increase in production. In order to more accurately measure progress, the TURA data is adjusted or normalized to eliminate the effects of changes in production using production ratios reported by the Core Group facilities.

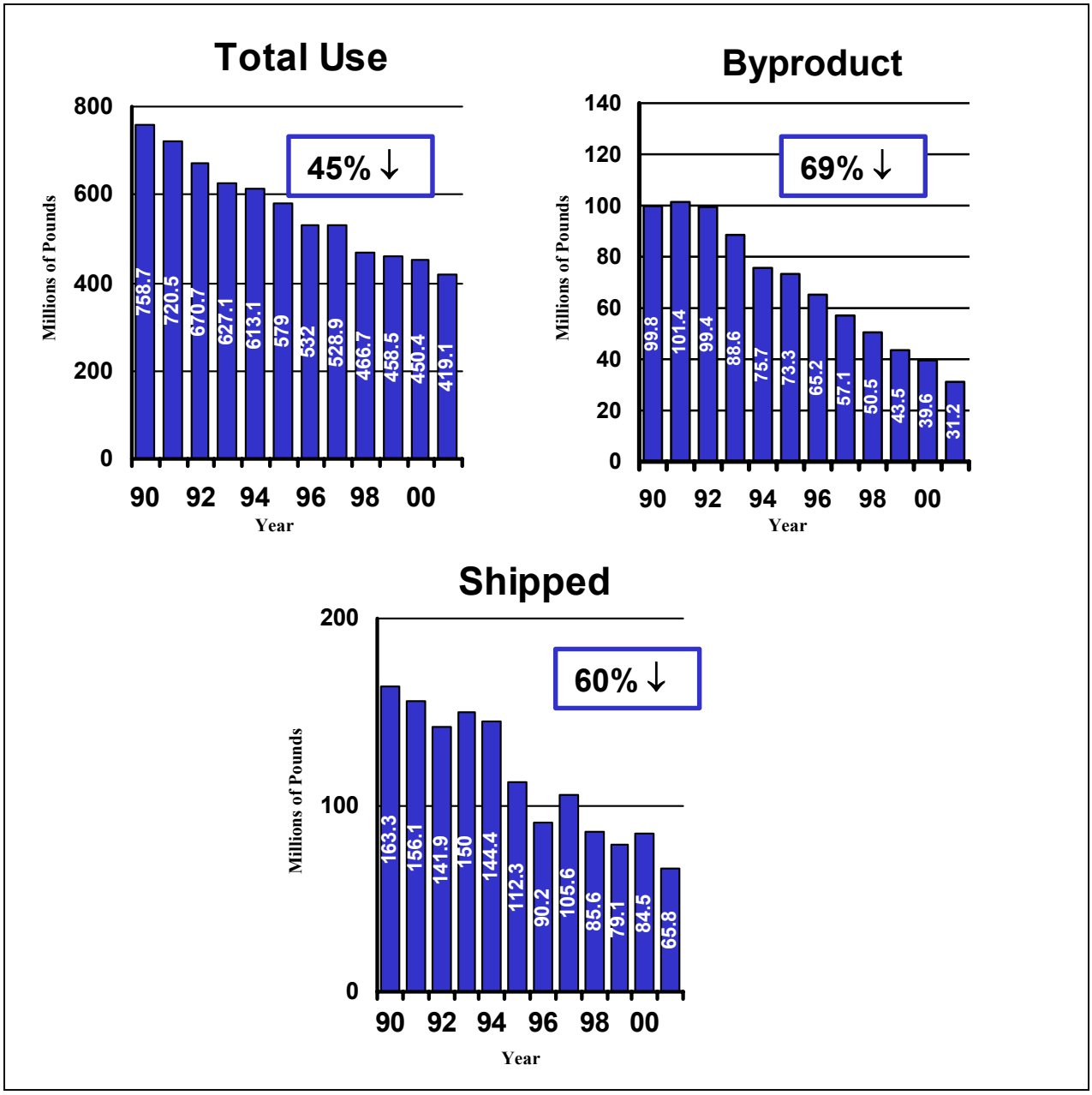
The following example illustrates how data is adjusted to reflect changes in production:

- In year 1, a facility produces 1,000 machine parts, and generates 100 lbs. of byproduct.
- In year 2, the facility produces 25% more machine parts (1,250). Therefore, the production ratio is 1.25. However, the facility still generates 100 lbs. of byproduct.
- The production adjusted byproduct for year 2 is 100 lbs./1.25 = 80 lbs.
- The production adjusted percent change from year 1 to year 2 is [100-80]/100 = 0.20, or a 20% reduction, while its actual byproduct reduction is 0%.

When the Core Group data is adjusted to account for changes in production since 1990 (see Figures 9 and 10), Core Group filers have reduced their toxic chemical use by 45%, have generated 69% less byproduct, and have shipped 60% fewer chemicals in product.

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

Figure 8 – Core Group Quantities 1990-2001 (production adjusted)



Core Group filers also have reduced their on-site releases by 92%, and have reduced their transfers off-site by 58%.[4]

[4] Trends are measured from 1991 due to a change in the definition of transfers off-site that year.

Figure 9 - Core Group Quantities 1990-2001 (production adjusted)

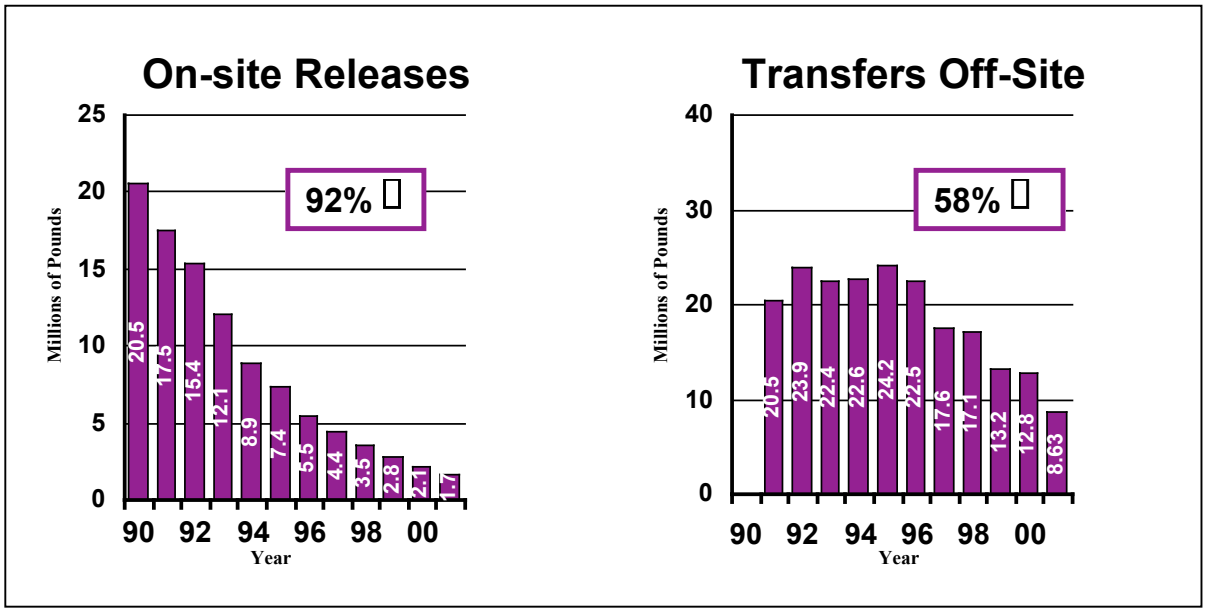


Table 2 summarizes TURA data from 1990 to 2001, showing both **reported** and **production adjusted** quantities. For each category, each year's production adjusted quantity is normalized to the base year production level, thus providing a comparison of production-adjusted quantities to base year quantities.

Table 2 - CORE TURA DATA - 1990 -2001 TREND SUMMARY
(Does Not Include Trade Secret Quantities)
Quantities are in Millions of Pounds

	TOTAL USE		BYPRODUCT		SHIPPED IN PRODUCT		ON-SITE RELEASES		TRANSFERS OFF-SITE		ACTIVITY INDEX
1990	758.7	758.7	99.8	99.8	163.3	163.3	20.5	20.5			
1991	693.8	720.5	97.6	101.4	150.3	156.1	16.9	17.5	20.4	20.4	0.96
1992	635.8	670.7	94.2	99.4	134.5	141.9	14.6	15.4	23.4	23.9	0.98
1993	590.7	627.1	83.5	88.6	141.3	150.0	11.4	12.1	21.8	22.4	0.99
1994	674.4	613.1	83.3	75.7	158.9	144.4	9.7	8.9	25.6	22.6	1.17
1995	631.1	579.0	79.9	73.3	122.4	112.3	8.0	7.4	27.2	24.2	0.99
1996	611.7	532.0	74.9	65.2	103.7	90.2	6.4	5.5	26.8	22.5	1.06
1997	677.0	528.9	73.0	57.1	135.2	105.6	5.6	4.4	23.5	17.6	1.12
1998	644.1	466.7	69.7	50.5	118.2	85.6	4.8	3.5	24.7	17.1	1.08
1999	697.0	458.5	66.1	43.5	120.3	79.1	4.3	2.8	20.9	13.2	1.10
2000	657.6	450.4	57.7	39.6	123.3	84.5	3.0	2.1	19.5	12.8	0.96
2001	582.6	419.1	43.3	31.2	91.5	65.8	2.4	1.7	12.6	8.6	0.96
% Change 1990-2001	23% Reduction	45% Reduction	57% Reduction	69% Reduction	44% Reduction	60% Reduction	88% Reduction	92% Reduction	38% Reduction	58% Reduction	39% Increase

Note: Quantities in shaded boxes are indexed for changes in manufacturing activity (level of production) using the facility-reported TRI Production Ratio/Activity Index.

II. 2001 TURA Chemical Data

In 2001, TURA filers manufactured, processed, or otherwise used nearly 1.3 billion pounds of TURA listed chemicals. Pursuant to 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).

Table 3 summarizes the 2001 data for all TURA filers. These companies reported using almost 1.3 billion pounds of chemicals and generating 113 million pounds of byproduct.

Table 3 - 2001 Data for All TURA Filers (in Pounds)	
Total Use	1,262,000,000
Generated as Byproduct	113,000,000
Shipped in Product	377,000,000
On-Site Releases	9,000,000
Transfers Off-Site	35,000,000

Manufactured Chemicals

Figure 10 shows that relatively little manufacturing of TURA chemicals occurs in Massachusetts. Chemicals reported as "manufactured" accounted for 6% of the total use statewide (or 60 million pounds). 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.

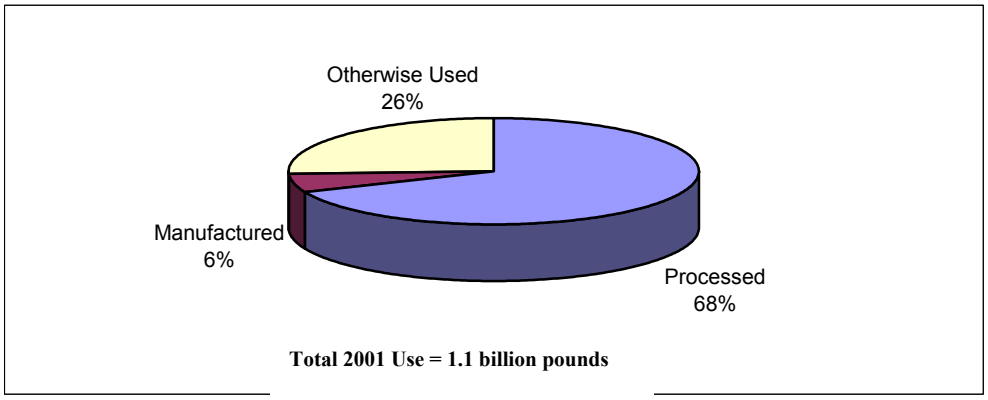
Processed Chemicals

In Massachusetts, the predominant chemical use is "processing," which includes incorporating a listed chemical into a product. Processing of chemicals accounted for 68% of total use (or 728 million pounds). Styrene, which is used in the production of plastics, accounted for 46% (or 337 million pounds) of total chemicals processed.

Otherwise Used Chemicals

Chemicals "otherwise used" accounted for 26% of total use (or 274 million pounds). 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 10 – 2001 Chemical Use (does not include trade secret data) *



* In this Report, when total use is broken down by type of use (i.e., manufactured, processed, or otherwise used), trade secret data is not included. Thus, the total use in figure 11 is 1.1 billion pounds, rather than 1.3 billion pounds (which includes trade secret data).

Top 20 Chemicals

In 2001, 186 chemicals were reported out of 1,422 TURA-listed chemicals. Of the 186, 20 chemicals accounted for 70% of the total use reported statewide, or 905 million pounds (not including trade secret information) (see Table 4). Styrene monomer was the chemical with the largest quantity reported in 2001, accounting for 26% of total use reported (or 337 million pounds). Styrene monomer is the building block for various plastics.

Sodium hydroxide was the second highest used chemical with 201 facilities (or 30%) reporting its use, and it had the highest byproduct amount reported statewide. Since the reporting thresholds for persistent bioaccumulative toxic (PBT) chemicals were lowered effective reporting year 2000, polycyclic aromatic compounds (PACs) was the chemical category with the third largest quantity of chemical use in 2001, accounting for 7% of total reported use. PACs is otherwise used during the combustion of fossil fuels. Of the 676 facilities that reported, 145 (or 21%) reported PACs.

Table 4 - 2001 Top 20 Chemicals

Total Use
These quantities do not include Trade Secret

Chemical Name (CAS #)	Total Use (Lbs.)
Styrene Monomer (100425)	337,422,110
Sodium Hydroxide (1310732)	100,959,162
Polycyclic Aromatic Compounds (1040)	86,623,441
Hydrochloric Acid (7647010)	51,355,121
Sulfuric Acid (7664939)	42,731,390
Methanol (67561)	40,347,584
Copper (7440508)	31,967,932
Toluene (108883)	26,937,760
Potassium Hydroxide (1310583)	21,387,104
Nitrate Compounds (1090)	19,076,684
Sodium Hypochlorite (7681529)	18,147,077
Ammonia (7664417)	17,964,615
Zinc Compounds (1039)	17,214,453
Methyl Ethyl Ketone (78933)	13,743,617
Ethyl Acetate (141786)	10,558,475
Phthalic Anhydride (85499)	10,203,391
Phosphoric Acid (7664382)	10,189,256
Methyl Methacrylate (80626)	9,891,209
Ethylene Glycol (107211)	9,470,389
Acetone (67641)	9,207,240

The following four chemicals would appear in the top 20 chemicals Total Use list if trade secret quantities were included: Butyl Acrylate, Butyraldehyde, Formaldehyde, Vinyl Acetate.

Table 5 shows the top 20 chemicals generated as byproduct in 2001, which accounted for 85% of the total byproduct generated statewide (or 95 million pounds). Table 5 also shows the top 20 chemicals shipped in product in 2001, which accounted for 69% of the total shipped in product (or 259 million pounds).

Table 5 - 2001 Top 20 Chemicals

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.)**
Sodium Hydroxide (1310732)	12,960,476	Sodium Hydroxide (1310732)	57,132,797
Toluene (108883)	12,021,630	Methanol (67561)	36,063,659
Sulfuric Acid (7664939)	11,437,502	Copper (7440508)	31,790,739
Ethyl Acetate (141786)	9,990,604	Potassium Hydroxide (1310583)	19,028,395
Nitrate Compounds (1090)	9,700,283	Toluene (108883)	16,693,010
Hydrochloric Acid (7647010)	5,818,574	Sodium Hypochlorite (7681529)	12,137,667
Methyl Ethyl Ketone (78933)	5,333,683	Zinc Compounds (1039)	11,894,045
Methanol (67561)	4,135,069	Sulfuric Acid (7664939)	9,705,704
Acetone (67641)	4,106,403	Methyl Ethyl Ketone (78933)	7,140,767
Formaldehyde (50000)	3,547,714	Ethylene Glycol (107211)	6,884,432
Ammonia (7664417)	3,335,574	Ammonia (7664417)	6,047,842
Nitric Acid (7697372)	2,176,442	Glycol Ethers (1022)	5,600,697
Acetic Acid (64197)	1,590,718	Antimony Compounds (1000)	5,444,403
Lead Compounds (1026)	1,464,930	Acetone (67641)	5,436,608
Phosphoric Acid (7664382)	1,404,382	Formaldehyde (50000)	5,148,720
Sodium Hypochlorite (7681529)	1,386,180	Dichloromethane (75092)	5,080,358
Dichloromethane (75092)	1,375,555	Phosphoric Acid (7664382)	4,618,097
Copper Compounds (1015)	1,345,317	Lead Compounds (1026)	4,515,861
Ethylene Glycol (107211)	1,266,050	Copper Compounds (1015)	4,497,717
Nickel Compounds (1029)	1,113,835	Hydrochloric Acid (7647010)	3,766,414
		The following chemical would appear in the top 20 chemicals Shipped in Product list if trade secret quantities were included: Ethyl Acetate.	

Table 6 shows the top 20 chemicals reported as on-site releases in 2001, which totaled 93% of the total on-site releases (or 8 million pounds). Hydrochloric acid had the highest amount of on-site releases reported statewide, accounting for 40% of total on-site releases. Almost 3.6 million pounds of hydrochloric acid or 76% of total on-site releases of hydrochloric acid was attributed to power plants.

Table 6 also shows the top 20 chemicals reported as transfers off-site in 2001, which totaled 81%, or 29 million pounds of the total transfers off-site. Nitrate compounds had the highest transfers off-site reported statewide, accounting for 13% of total transfers off-site. Nitrate compounds were primarily coincidentally manufactured during neutralization of nitric acid in wastewater treatment.

Table 6 - 2001 Top 20 Chemicals

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)	3,559,328	Nitrate Compounds (1090)	4,764,617
Ammonia (7664417)	714,232	Formaldehyde (50000)	3,415,684
Toluene (108883)	705,881	Toluene (108883)	3,043,423
Sulfuric Acid (7664939)	519,708	Ethyl Acetate (141786)	1,809,310
Acetone (67641)	473,978	Methanol (67561)	1,577,590
Ethyl Acetate (141786)	346,342	Copper Compounds (1015)	1,450,193
Glycol Ethers (1022)	319,319	Lead Compounds (1026)	1,388,990
Butyl Alcohol (71363)	252,040	Acetone (67641)	1,322,861
Methanol (67561)	236,539	Zinc Compounds (1039)	1,303,366
Methyl Ethyl Ketone (78933)	203,338	Nickel Compounds (1029)	1,113,884
Hydrogen Fluoride (7664393)	197,829	Methyl Ethyl Ketone (78933)	1,108,074
Vanadium Compounds (1041)	98,882	Sodium Hydroxide (1310732)	1,073,342
Trichloroethylene (79016)	95,607	Dichloromethane (75092)	1,026,308
Methyl Isobutyl Ketone (108101)	95,588	Ethylene Glycol (107211)	998,874
Acetic Acid (76197)	84,420	Chromium Compounds (1012)	816,225
Hexane (110543)	77,135	1-Methyl-2-Pyrrolidone (872504)	610,363
Zinc Compounds (1039)	71,037	Vanadium Compounds (1041)	574,721
Xylene Mixed Isomer (1330207)	62,192	Sulfuric Acid (7664939)	510,853
Dichloromethane (750920)	56,029	Butyraldehyde (123728)	483,509
Dimethylformamide (68122)	51,378	Acetonitrile (75058)	466,790

Persistent, Bioaccumulative, Toxic (PBT) Chemicals

For reporting year 2001, the U.S. Environmental Protection Agency (EPA) classified lead and lead compounds as persistent bioaccumulative toxics (PBT) subject to reporting thresholds of 100 pounds (except when lead is in alloy form, then the higher thresholds apply). TURA automatically adopts any lower reporting thresholds that are promulgated by EPA. Toxics use reports for 2001 were the first to include lead and lead compounds at the 100 pound thresholds.

PBT chemicals are of particular concern because they are highly toxic and they 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**,** and actions should be taken to reduce their use and release.

For 2001, Massachusetts facilities reported the use of nine PBT chemicals/chemical categories (see Table 7). It should be noted that TURA data is 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 does 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. It also does not capture the use of toxic chemicals in consumer products that are not manufactured in Massachusetts.

Table 7
2001 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.	145	86,623,441	9,014	354,407	1,950	5,785
Benzo(g,h,i)-Perylene	10 lbs.	121	7,413,404	145	27,140	17	81
Mercury	10 lbs.	12	9,298	609	8,620	3	634
Mercury Compounds	10 lbs.	5	676	443	0	236	174
Poly-Chlorinated Biphenyls (PCBs)	10 lbs.	2	83,890	83,871	19	0	83,871
Tetrabromo-Bisphenol A	10 lbs.	1	115	109	6	0	109
Dioxin and Dioxin-like Compounds	0.1 Grams	8 Grams	12.11 Grams	11.90 Grams	0 Grams	11.46 Grams	0.35 Grams
Lead	100 lbs.	136	1,031,855	129,681	902,494	1,427	146,703
Lead Compounds	100 lbs.	115	7,212,595	1,464,930	4,515,861	5,379	1,388,990

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

In 2001, polycyclic aromatic compounds (PACs) and benzo(g,h,i)perylene were the largest PBT chemical category and chemical used. A total of 145 facilities reported on PACs and 121 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 8 shows a breakdown of PACs use and Table 9 shows a breakdown of benzo(g,h,i)perylene use.

Table 8
2001 PACs Summary
(in pounds)

Activity / Facility Type	Number of Facilities	Total Use	Byproduct	Shipped in Product	On-site Releases	Transfers Off-site
Fuel Combustion	130[5]	86,262,437	2,553	120	567	2,061
Power plants	(11)	(84,500,186)	(457)	(0)	(17)	(506)
Other Facilities	(119)	(1,762,251)	(2,096)	(120)	(550)	(1,555)
Waste Oil Processing	1	28,800	3,503	25,297	0	3,503
Abrasives Manufacturers	3	10,389	972	9,161	42	221
Paper Recycler	2	202,836	0	202,836	0	0
Asphalt Manufacturers	9	118,979	1,986	116,993	1,341	0
Total	145	86,623,441	9,014	354,407	1,950	5,785

[5] The majority of reporting facilities included information identifying fuel combustion as the reason for reporting PACs; however, some facilities lacked this information but are assumed to be reporting due to fuel combustion. The fuel combustion facilities have been sub-categorized into power plants and other facilities. The numbers shown in parenthesis reflect this sub-categorization and should not be added to the totals.

Table 9 2001 Benzo(g,h,i)perylene Summary (in pounds)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-site**
Fuel Combustion	110[1]	7,389,828	11	2,186	3	13
Power Plants	(10)	(7,356,975)	(6)	(0)	(1)	(6)
Other Facilities	(100)	(32,853)	(5)	(2,186)	(2)	(7)
Waste Oil Processing	1	308	37	271	0	37
Abrasives Manufacturer	1	1,088	31	1,057	0	31
Asphalt Manufacturers	9	22,180	66	23,626	14	0
Total	121	7,413,404	145	27,140	17	81

The 11 power plants that reported PACs (10 of which also reported benzo(g,h,i)perylene) accounted for 98% of total PACs use and over 99% of benzo(g,h,i)perylene use (84,500,186 pounds and 7,356,975 pounds, respectively). The other facilities that reported due to fuel combustion accounted for only 2% of PACs and .4% of benzo(g,h,i)perylene use (1,762,251 pounds and 32,853 pounds, respectively). The majority of facilities, including the power plants, 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.

Nine asphalt manufacturers reported 116,993 pounds of PACs and 23,626 pounds of benzo(g,h,i)perylene shipped in product as a result of incorporating petroleum products into the asphalt products. Eight of the 9 asphalt manufacturers produce asphalt for paving; one is an asphalt shingle manufacturer. A waste oil processor reported 25,297 pounds of PACs and 271 pounds of benzo(g,h,i)perylene shipped in product as a result of the collection and transfer of waste oil. The byproduct reported by this processor is comprised largely of sludge removed from the oil. Abrasive manufacturers reported the incorporation of PACs and benzo(g,h,i)perylene into their products.

Mercury and Mercury Compounds

Twelve facilities reported the use of mercury, and five facilities reported the use of mercury compounds. Table 10 shows a breakdown of mercury use by activity. 90% of total mercury use was due to the recycling of fluorescent lamps by a single facility.

Table 10 2001 Mercury Summary (in pounds)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-site**
Lamp / ballast recycler	1	8,409	17	8,392	3	14
Manufacturer: incorporated mercury into products	3	692	567	56	0	595
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.	7	172	0	172	0	0
Manufacturer: used mercury in analytical lab	1	25	25	0	0	25
Total	12	9,298	609	8,620	3	634

Table 11 shows a breakdown of mercury compounds use. All of the use was due to the coincidental generation of mercury compounds due to fuel combustion at power plants. The total use of mercury compounds in reporting year 2000 was 90,009 pounds. However, that total included a one-time shipment of the compounds by a licensed hazardous waste facility.

Table 11 2001 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	5	676	443	0	236	174

Polychlorinated Biphenyls (PCBs)

For 2001, 2 facilities reported the use of polychlorinated biphenyls (PCBs). Table 12 shows the breakdown of PCB use. Over 99% of total use of PCBs was attributed to one facility that recycled fluorescent light fixture ballasts. 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 document on PCBs.

Table 12 2001 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	83,871	83,871	0	0	83,871
Manufacturer: coincidentally generates PCBs in manufacture of organic pigments	1	19	0	19	0	0
Total	2	83,890	83,871	19	0	83,871

Tetrabromobisphenol A

One facility reported the use of tetrabromobisphenol A. This facility incorporated tetrabromobisphenol A into their product, which was an epoxy flame-retardant molding compound. The facility's total use was 115 pounds, their byproduct was 109 pounds, their shipped in product was 6 pounds, and their transfers off-site were 109 pounds. The facility reported no on-site releases.

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 0.1 gram.

For 2001, 8 facilities reported the use of dioxin and dioxin-like compounds, seven due to the coincidental manufacture of dioxin from combustion (97% of total use) and one due to the bleaching of paper. Table 13 shows the breakdown of dioxin and dioxin-like compounds use.

Table 13 2001 Dioxin and Dioxin-like Compounds Summary (in grams)						
Activity / Facility Type	**Number of Facilities**	**Total Use**	**Byproduct**	**Shipped in Product**	**On-site Releases**	**Transfers Off-site**
Power plants: dioxin coincidentally generated via combustion	7	11.63	11.42	0	11.42	0
Pulp and Paper Manufacturer: dioxin coincidentally generated via paper bleaching	1	0.48	0.48	0	0 .04	0.35
Total	8	12.11	11.90	0	11.46	0.35

Lead and Lead Compounds

Beginning with the 2001 reports, the reporting thresholds for both lead and lead compounds were lowered to 100 pounds (except for lead contained in stainless steel, brass, or bronze alloys which remains at 25,000 lbs for manufactured or processed and 10,000 lbs for otherwise used). Under the new threshold, 136 facilities reported the use of lead (compared to 15 in 2000) and 115 filers reported the use of lead compounds (compared to 32 in 2000). Of the 136 lead filers, 68 of these facilities were first-time TURA filers. Of the 115 facilities that filed for lead compounds, 36 were first-time TURA filers.

The largest use of lead was in the fabricated metals sector (570,799 pounds or 55% of the total reported use), where the metal is used in a variety of applications. The second largest use was in the primary metals sector, which typically processes lead in alloys and uses it in heat stabilizers (198,005 pounds). Lead and lead compounds are used in heat stabilizers to protect plastic and rubber polymers from degrading during heat processing.

The electronic equipment industry (e.g. printed circuit boards, semiconductors) represented the largest number of filers (48) as well as the largest number of new filers (27), primarily because of the use of lead solder in this sector. Concrete producers (lead is a naturally occurring contaminant in cement and in fly ash that is used to make concrete) also represent a significant group of new filers (included in Table 14 under "Other Industries"). Twenty of the 21 concrete producing facilities were first time filers. However, this industry sector only accounted for one percent of the total lead use.

Table 14
2001 Lead Summary
(in pounds)

Activity / Facility Type	Number of Facilities	Total Use	Byproduct	Shipped in Product	On-site Releases	Transfers Off-site
Fabricated Metals Manufacturers	24	570,799	36,663	532,938	16	54,811
Primary Metals Manufacturers	10	198,005	16,123	182,052	236	16,077
Electronic Equipment Manufacturers	48	150,728	67,620	84,285	360	67,390
Other Industries	54	112,323	9,275	103,218	815	8,425
Total	136	1,031,855	129,681	902,494	1,427	146,703

The largest reported use of lead compounds was by facilities in the wire and cable industry, where they are mostly used as heat stabilizers in the wire insulation (2,822,332 pounds or 39% of total lead compounds use). The second largest use was in the rubber and plastics sector (2,515,713 pounds, or 35% of total lead compounds use), where they are mostly compounded into resins. The third largest use was the fabricated metals sector (763,611 pounds, or 11% of total lead compounds use). The 30 facilities in the wire and cable and rubber and plastics sectors accounted for 74% of the total lead compounds use (or 5,338,045 pounds). Several of the facilities - especially in rubber, plastics, and resins

- that report for lead compounds also use lead in amounts above the 100 pound threshold, however they report the combined use under the lead compounds category.

Table 15
2001 Lead Compounds Summary
(in pounds)

Activity / Facility Type	Number of Facilities	Total Use	Byproduct	Shipped in Product	On-site Releases	Transfers Off-site
Wire & Cable Manufacturers	17	2,822,332	210,242	1,596,100	122	217,319
Rubber and Plastics Manufacturers	13	2,515,713	32,772	2,326,664	261	5,516
Fabricated Metals Manufacturers	14	763,611	687,768	69,871	129	599,407
Other Industries	71	1,110,939	534,148	523,226	4,867	566,748
Total	115	7,212,595	1,464,930	4,515,861	5,379	1,388,990

III. 2001 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 it exceeds certain thresholds.

Figure 11 shows the number of TURA reporting facilities in each industry sector. The Chemical and Allied Products sector represents approximately 15% (102 facilities) of the number of TURA reporting facilities, and uses approximately 67% of the reportable TURA chemicals (see Figure 12). This sector is a diverse group of industries, and includes companies that manufacture or formulate adhesives, paints, pharmaceuticals, and plastic materials and resins. Approximately 39% 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. There was an 11 million pound decrease in styrene chemical use for this sector from 2000 to 2001. One facility accounted for a 10 million pound decrease in the use of styrene.

Figure 11 - Number of Facilities By Industrial Sector

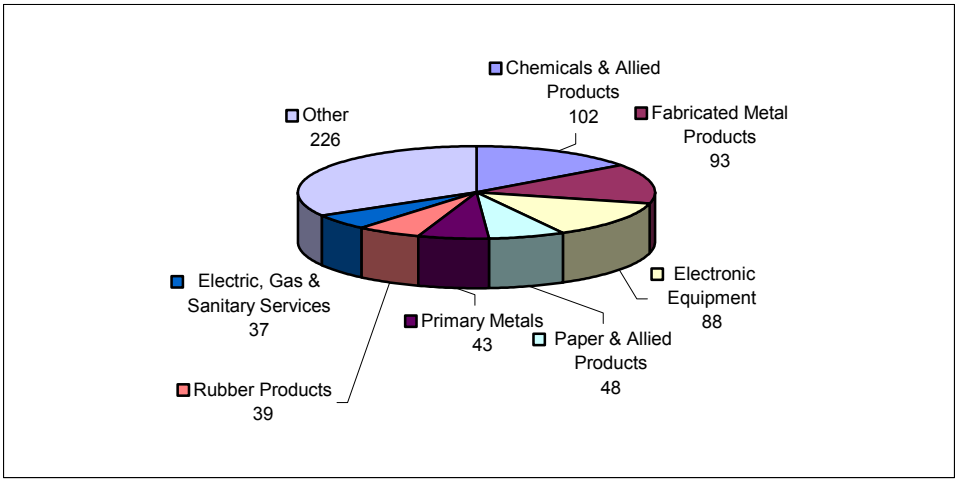
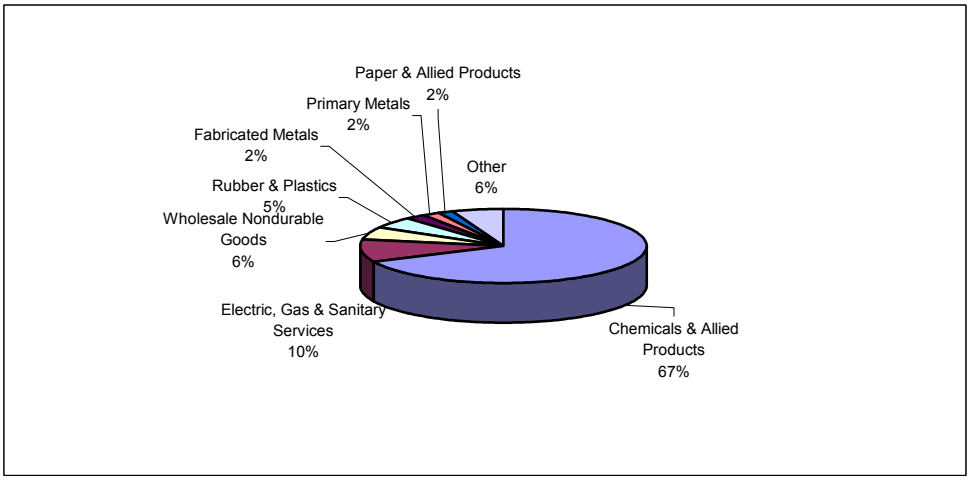


Figure 12 – 2001 Chemical Use By Industrial Sector
Total Use = 1,284,000,000 Pounds



The Electric, Gas and Sanitary Services sector was the second largest chemical user, accounting for 10% of total statewide use. The 37 firms reporting in this sector are primarily involved in the production of electricity. In 2001, polycyclic aromatic compounds (PACs) accounted for 70% of total chemical use for this sector and benzo(g,h,i)perylene accounted for 6% of total chemical use for this sector. The vast majority of these chemicals, which are naturally occurring in fuel oil, are destroyed in the combustion process.

The Wholesale Nondurable Goods sector accounted for 6% of chemical use. The activities of this sector involve repackaging of chemicals for sale to other sectors. Chemical use by facilities in this sector is very efficient with byproduct generated at 0.2% of use. This translates into a chemical use efficiency of 99.8%.

The Rubber and Plastics sector also accounted for 5% of chemical use. The Fabricated Metals, the Primary Metals, and the Paper and Allied Products sectors each accounted for 2% of chemical use, leaving the balance of statewide use (6%) to a variety of sectors.

Figure 13 shows byproduct generation by industrial sector. While the Chemical and Allied Products sector accounted for 67% of total statewide use, this sector produced 29% of the total byproduct generated in 2001. In contrast, the Rubber and Plastics sector, which accounted for 5% of total statewide chemical use, accounted for 11% of the byproduct generated.

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

Figure 13 – 2001 Byproduct Generation By Industrial Sector
Total Byproduct = 113,000,000 Pounds

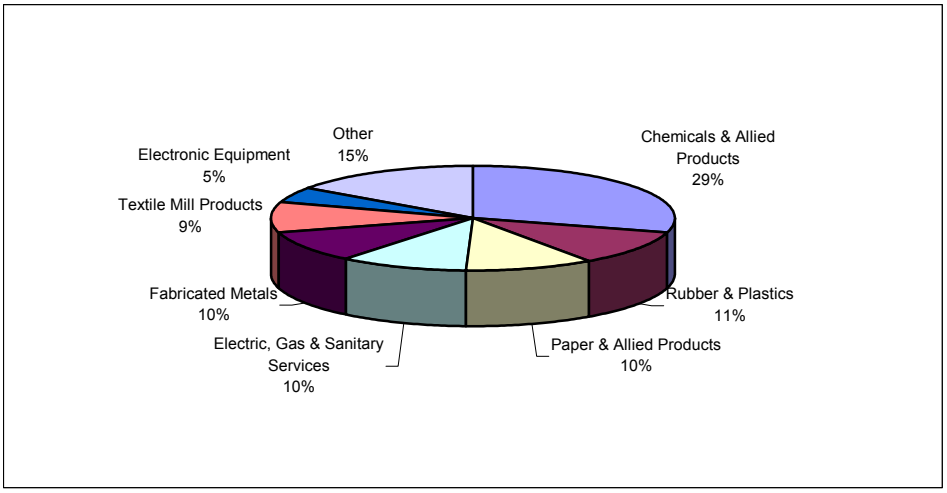


Figure 14 shows on-site releases to the environment. The Electric, Gas and Sanitary Services sector, which represented 10% of total statewide use, was the largest source of on-site releases, accounting for 55% of all on-site releases. This sector provides power for Massachusetts businesses and citizens. Sixty-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 67% of total chemical use and only 8% of total on-site releases. The Fabricated Metals sector accounted for 7% of total on-site releases. The Rubber and Plastics and the Paper and Allied Products sectors each accounted for 6% of total on-site releases. The Textile Mill Products sector was responsible for 5% of total on-site releases and the Primary Metals sector was responsible for 2% of total on-site releases.

Figure 14 - 2001 On-Site Releases By Industrial Sector
Total On-Site Releases = 9,000,000 Pounds

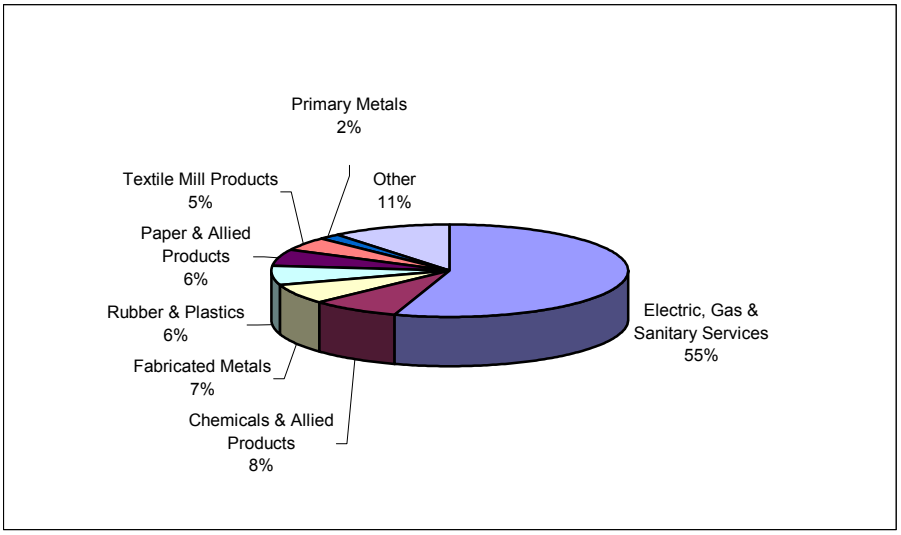
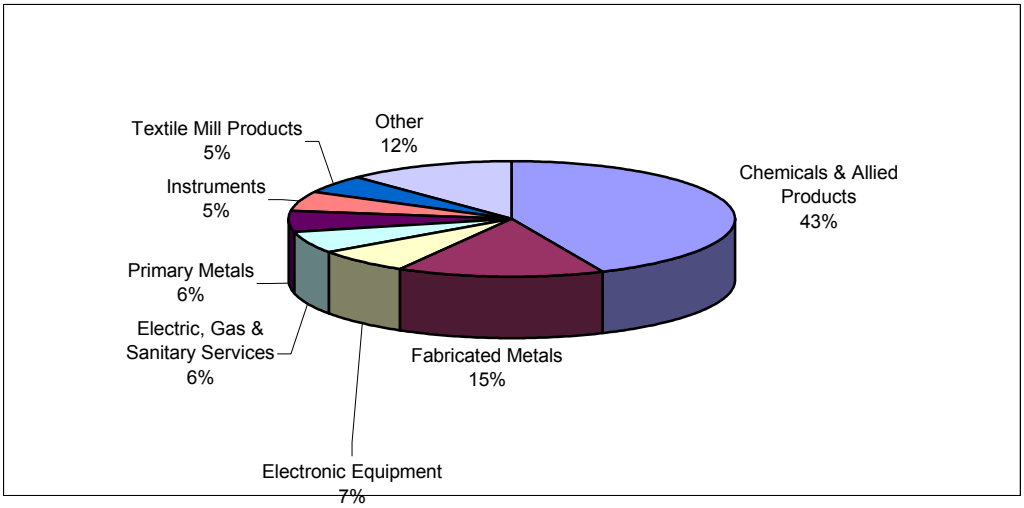


Figure 15 shows transfers off-site by industrial sector. Chemical and Allied Products accounted for 43%, and Fabricated Metals accounted for 15% of transfers off-site. The third largest sections in this category, the Electric, Gas and Sanitary Services and Primary Metals sectors each accounted for 6% of transfers off-site. The Instruments and the Textile Mill Products sectors each accounted for 5% of total transfers off-site.

Figure 15 – 2001 Transfers Off-Site By Industrial Sector
Total Transfers Off-Site = 35,000,000 Pounds



IV. 2001 Major TURA Facilities

Top 20 Facility Lists

Table 16 lists the 20 facilities that used the largest quantity of chemicals. These 20 facilities used 952 million pounds, or 75% of total statewide use.

Table 16 – 2001 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	252,362,000
Solutia Inc. – Indian Orchard Plant	Springfield	157,634,293
Borden & Remington	Fall River	87,470,762
American Polymers	Oxford	82,451,592
USGEN-New England Inc. – Brayton Point	Somerset	64,215,948
Eastman Gelatine Corporation	Peabody	59,654,627
Elite Consumer Products	Ludlow	39,575,896
Holland Company Inc	Adams	34,985,100
General Cable	Taunton	31,744,501
Astro Chemicals Inc.	Springfield	25,393,187
USGEN New England Inc.	Salem	23,013,554
Houghton Chemical Corp.	Boston	14,331,494
Ashland Distribution Co.	Tewksbury	11,939,902
Polymer Latex Inc.	Fitchburg	11,347,215
Teknor Apex Co.	Attleboro	10,492,420
Monson Companies Inc.	Leominster	10,056,319
Mirant New England Inc.	Sandwich	9,802,605
Univar USA Inc.	Salem	8,900,771
Hercules Inc.	Chicopee	8,565,957
Shipley Co. Inc.	Marlborough	7,854,208

Table 17 lists the 20 facilities that generated the largest quantity of byproduct. These facilities generated 62 million pounds of byproduct, or 55% of total statewide byproduct. The 20 facilities with the largest quantity shipped in product shipped 304 million pounds in product, or 81% of total shipped in product statewide.

Table 17 - 2001 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 Corp.	Peabody	11,495,521	Borden & Remington	Fall River	84,118,978
Solutia Inc. – Indian Orchard Plant	Springfield	10,366,783	Solutia Inc. – Indian Orchard Plant	Springfield	39,940,650
Flexcon Co. Inc. – Plant 2	Spencer	6,388,134	General Cable	Taunton	31,577,226
Intelicoat Technologies	South Hadley	3,312,121	Elite Consumer Products	Ludlow	26,644,110
Venture Tape	Rockland	3,028,146	Astro Chemicals Inc.	Sprinfield	24,310,264
Crane & Co Inc. - Pioneer Mill	Dalton	2,564,601	Houghton Chemical Corp.	Boston	14,326,865
Mirant New England Inc.	Sandwich	2,384,564	Ashland Distribution Co.	Tewksbury	11,909,902
Polaroid Corp.	Waltham	2,358,520	Monson Companies Inc.	Leominster	10,049,497
Madico Inc.	Woburn	2,271,300	Univar USA Inc.	Salem	8,878,157
Precision Lithograining Inc.	South Hadley	2,147,104	Shipley Co. Inc.	Marlborough	7,349,296
Ideal Tape Company	Lowell	2,114,230	Callahan Company	Walpole	7,270,755
Bostik Findley Inc.	Middleton	2,031,419	North Win Ltd.	Leominster	5,866,214
Chemdesign Corp.	Fitchburg	1,854,639	BIW Cable Systems	North Dighton	5,261,465
USGEN New England – Brayton Point	Somerset	1,677,638	WEBCO Chemical Corp.	Dudley	5,060,029
BBA Nonwovens – Griswoldville Plant	Colrain	1,528,337	Engineered Materials Solutions	Attleboro	4,240,142
Allegheny Rodney Strip Division	New Bedford	1,369,284	Bostik Findley Inc.	Middleton	3,721,598
Holyoke Water Power – Mount Tom Station	Holyoke	1,359,243	Surface Coatings Inc.	Wilmington	3,530,317
Cranston Printworks	Webster	1,357,889	Spalding Sports Worldwide	Chicopee	3,480,591
Engineered Materials Solutions Inc.	Attleboro	1,158,587	Alphagary	Leominster	3,187,297
Reflek Corp.	Fall River	1,104,358	Advance Coatings Co.	Westminster	3,084,123

Table 18 lists the 20 facilities that had the largest quantity of on-site releases and transfers off-site. The 20 facilities with the largest quantity of on-site releases released 6 million pounds, or 71% of total releases statewide. The top 5 facilities with on-site releases were power plants, accounting for 4 million pounds, or 49% of total on-site releases. Over 3 million pounds, or 78% of the power plants' on-site releases was 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 (7%), ammonia (6%), metal compounds (5%), and hydrogen fluoride (4%).

The 20 facilities with the largest quantity of transfers off-site transferred 22 million pounds, or 62% of the total transfers off-site statewide.

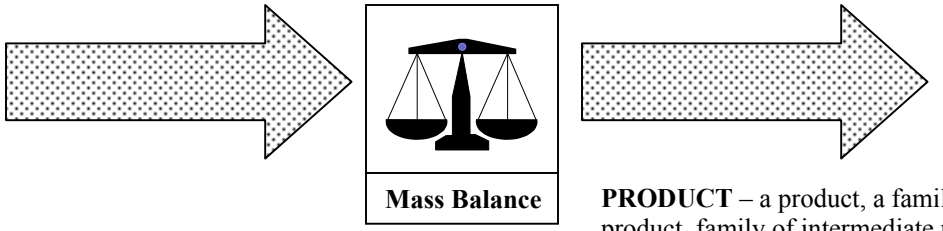
Table 18 – 2001 Top 20 Facilities
(Largest Quantity of On-Site Releases and Transfers Off-Site)

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.)**
USGEN New England Inc – Brayton Point	Somerset	1,163,336	Solutia Inc. – Indian Orchard Plant	Springfield	7,915,650
Holyoke Water Power – Mt. Tom Station	Holyoke	1,097,465	Chemdesign Corp.	Fitchburg	1,639,603
Somerset Power LLC	Somerset	944,927	Polaroid Corp.	Waltham	1,395,093
USGEN New England Inc.	Salem	743,333	Engineered Materials Solutions, Inc.	Attleboro	1,130,627
Mirant New England Inc.	Sandwich	458,065	Texas Instruments	Attleboro	1,041,930
Crown Cork & Seal	Lawrence	411,000	Clean Harbors Environmental Services Inc.	Braintree	801,825
Solutia Inc. – Indian Orchard Plant	Springfield	263,011	Ideal Tape Co.	Lowell	763,812
Ideal Tape Company	Lowell	178,119	Borregaard Synthesis Inc.	Newburyport	754,734
Macdermid Graphic Arts	Adams	170,890	Genzyme Corp.	Boston	671,204
Intelicoat Technologies	South Hadley	134,023	Metal Tronics Inc.	Haverhill	587,797
Hollingsworth & Vose Co.	West Groton	103,199	Waters Corp.	Taunton	587,484
Alliance Leather Inc.	Peabody	90,842	ISP Freetown – Fine Chemicals Inc.	Assonet	586,740
Adden Furniture Inc.	Lowell	84,379	Duncan Galvanizing Corporation	Everett	578,067
Flexcon Co. Inc. – Plant 2	Spencer	82,690	USGEN New England Inc. – Brayton Point	Somerset	553,210
Proma Technologies Inc.	Franklin	76,518	Brittany Dyeing & Printing Corp.	New Bedford	523,576
Waters Corp.	Taunton	69,910	Intelicoat Technologies	South Hadley	470,539
Polaroid Corp.	Waltham	68,136	Flexcon Co. Inc. – Plant 2	Spencer	454,876
Exelon Mystic LLC	Everett	64,403	Avecia Biotechnology Inc.	Milford	453,727
Pittsfield Generating Co. LP	Pittsfield	63,685	Sanmina SCI Corp.	Wilmington	419,827
Majilite Manufacturing LLC	Lowell	63,100	HC Starck Inc.	Newton	388,870

This section contains the definitions of key TURA terms. Additional information regarding TURA and TRI, as well as general chemical information, can be obtained from the Internet web sites noted on the next page.

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 is presented in aggregated form. Aggregated data does not include the names and amounts of chemicals subject to claims of confidentiality.

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.

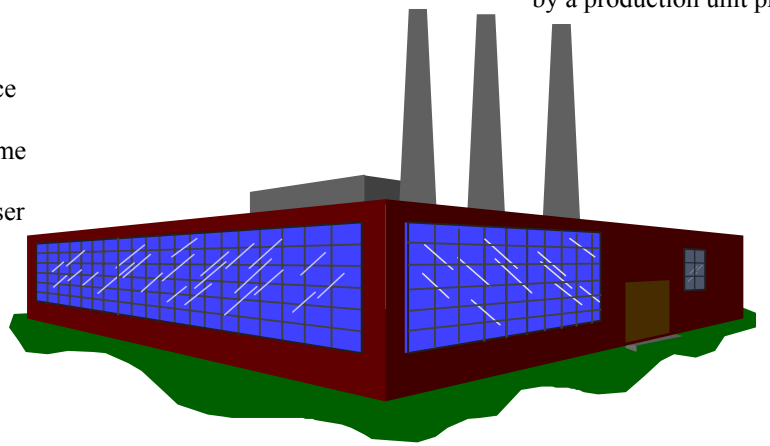
OTHERWISE USE – any use of a toxic substance that is not covered by the terms "manufacture" or "process" and includes use of a toxic substance contained in a mixture or trade name product.

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.

The Following Web Sites Contain Information Regarding Chemicals, TURA and Pollution Prevention:

Massachusetts Department of Environmental Protection

Massachusetts Department of Environmental Protection, Toxic Use Reduction Program
http://www.mass.gov/dep/bwp/dhm/tura

TOXICS USE REDUCTION INSTITUTE

Toxics Use Reduction Institute (TURI)
http://www.turi.org

TURAData
A community guide to toxics information from Massachusetts' Toxics Use Reduction Act

http://www.turi.org/turadata/index.html

OTA online
Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Office of Technical Assistance

Office of Technical Assistance for Toxics Use Reduction (OTA)
http://www.mass.gov/ota

Massachusetts Department of
Environmental Protection
One Winter Street
Boston, MA 02108-4746

Commonwealth of Massachusetts
Mitt Romney, Governor

Executive Office of Environmental Affairs
Ellen Roy Herzfelder, Secretary

Department of Environmental Protection
Robert W. Golledge, Jr., Commissioner