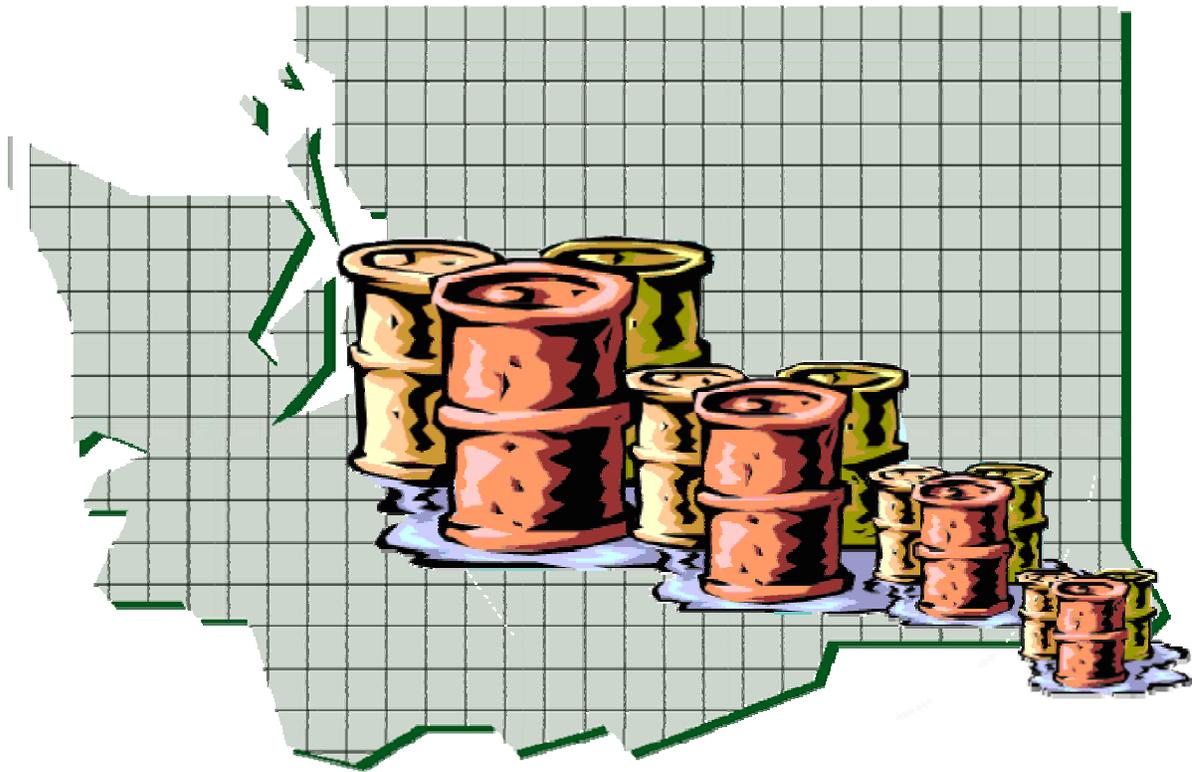




Reducing Toxics in Washington

Progress Report for 2001 through 2003

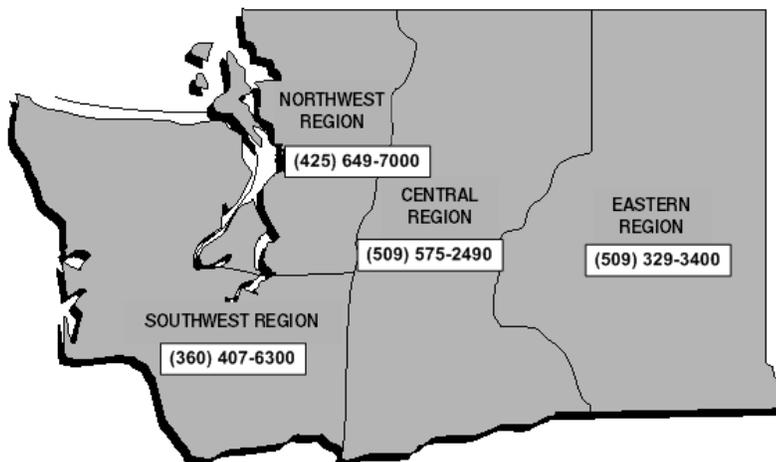


Hazardous Waste and Toxics Reduction Program
Department of Ecology
April 2006
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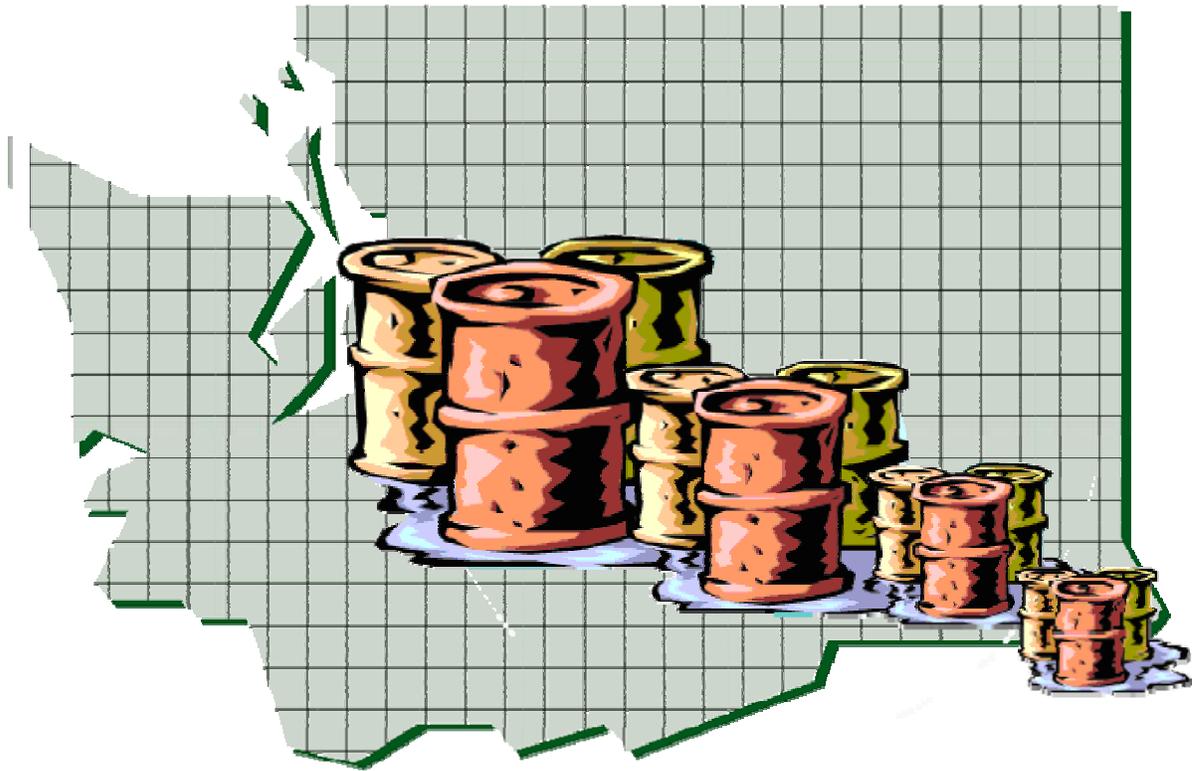


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Reducing Toxics in Washington

Progress Report for 2001 through 2003



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Executive Summary

The 1990 Hazardous Waste Reduction Act, Chapter 70.95C was established to encourage voluntary reduction in the use of hazardous substances and the generation of hazardous waste. The Washington State Department of Ecology (Ecology), as directed by the Legislature, established the Pollution Prevention Planning Program and adopted, as policy, the goal to reduce hazardous waste generation 50 percent by 1995.

Through technical assistance, Ecology assists businesses to achieve the greatest reduction in hazardous waste that is economically and technically feasible. This report shows a steady decline in the amount of waste generated indicating the 50 percent reduction goal has been met.

Pollution prevention means reducing hazardous emissions or wastes at the source, before they are generated. Pollution is the contamination of air, soil, or water by the discharge of harmful substances. Prevention is source reduction and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other resources.

Facilities that generate more than 2,640 pounds of recurrent hazardous waste¹ per year and/or who are required to report under the Toxic Release Inventory², for releases of certain toxic chemicals are required to prepare pollution prevention plan documents.

Currently, 608 facilities are pollution prevention planners. These facilities develop executive summaries, five-year pollution prevention plans and report their progress every year. Implementation of the pollution prevention plan is strongly encouraged. The plan itself may remain at the facility, but the executive summary, electronic plan, and annual progress reports must be submitted to Ecology. The data from the progress reports is analyzed to report progress towards the state's 50 percent goal.

- In 2001, 1,032 facilities statewide reported hazardous waste generation of 141 million pounds, a decrease of 66 million pounds since 2000.
- In 2002, 990 facilities statewide reported hazardous waste generation of 133 million pounds, a decrease of 8 million pounds since 2001.
- In 2003, 916 facilities statewide reported hazardous waste generation of 113 million pounds, a decrease of 20 million pounds since 2002.

¹ **Recurrent** hazardous wastes are those that come from a production process, service activity, or a routine clean up.

² For more information visit http://www.ecy.wa.gov/epcra/index_trids.html

Waste generation has continued to decrease in the metals sector led by the most significant reduction of 70.5 million pounds in 2001. This was mainly due to decreased production in aluminum smelters.

Although the data is analyzed to report progress, linking the waste generation data to Gross Business Income (GBI) data from Department of Revenue is a good way to measure economic activity in the state. It covers most industry sectors except parts of general government. For example, with Washington's economic growth, it would seem the amount of waste being generated would have gone up over time. Instead, hazardous waste generation (as reported to Ecology) has continued to decrease.

To better understand the fluctuations in waste generation, this report reviews seven industry sectors:

- Metal industries
- Chemical industries
- Aircraft and transportation
- All other industries, including public utilities, medical facilities, and a variety of large and small businesses
- Petroleum industries
- Pulp and paper industries
- Military

The largest contributing industries to waste generation were metals and chemicals. The chemical industry sector represented 36 percent of the total 2003 recurrent hazardous waste generated in the state and 7.9 million pounds of the state's reduction from 2002 levels. There was a slight fluctuation between 2001 and 2002, caused by a 10.4 million pound increase in 2002. This was due to an increase in generation of waste tar from Noveon Kalama Chemical.

The metal industry sector accounted for 26 percent of the total 2003 recurrent hazardous wastes generated in the state and 6.9 million pounds of the reduction since 2002.

Most *Other* industry categories showed a decrease in recurrent waste from 2001 to 2003, while some industries showed increases in generation amounts. One example is the petroleum industry, where amounts fluctuate due to periodic maintenance projects called "refinery turnarounds" when process equipment is replaced, repaired, and/or tanks are cleaned out.

Each year, pollution prevention planning facilities are required to submit progress reports to Ecology. In 2003, planners reported 1,106 projects that resulted in 1,522 benefits to the environment in six areas including hazardous substance use reduction, hazardous waste reduction, recycling, treatment, reduced emissions, and cost savings.

To read other examples of how these pollution prevention projects benefit the facilities go to Chapter 5 of this report.

The state hazardous waste plan, known as the Beyond Waste Plan, sets new goals for improvements to the pollution prevention planning process as well as how and what data is collected. These improvements will help close the gaps in what is known and what is being done about toxics in Washington.

The Beyond Waste Plan emphasizes how wastes can be used as resources. It focuses on five key areas: industrial wastes, small-volume hazardous wastes, organics (yard and food wastes), green building and measuring performance.

The 2005 Legislature budgeted funds for Ecology to begin work on these areas over the next two years:

- Work with the state's key business associations to develop more incentives for businesses to reduce and recycle
- Change the pollution prevention planning systems to emphasize the reduction of toxics in products
- Emphasize and develop tools for environmentally preferable purchasing
- Produce technical assistance materials to help local governments achieve their waste reduction goals
- Develop a user-friendly Web site on how to reduce and recycle key hazardous substances and wastes

Ecology and its partners are already:

- Operating an in-house food waste composting facility at the Lacey building
- Supporting a green building Web resource site focusing on residential construction
- Continuing implementation of the Mercury Chemical Action Plans

Beyond Waste Vision

We can transition to a society where waste is viewed as inefficient, and where most wastes and toxic substances have been eliminated. This will contribute to economic, social and environmental vitality.

For more information on Beyond Waste go to: www.ecy.wa.gov/beyondwaste/

Chapter 1. Introduction

Purpose of the Report

This report provides information on the progress being made in preventing pollution by reducing and eliminating hazardous wastes and hazardous substances in Washington. The report is intended to update the Legislature and other interested parties on the state's progress toward implementing the Hazardous Waste Reduction Act, Chapter 70.95C RCW. This report covers our progress during calendar years 2001 through 2003.

The 1990 Hazardous Waste Reduction Act established a goal to reduce hazardous waste generation by 50 percent. The primary means for achieving this goal is through implementation of the Pollution Prevention Planning program as established in the Act.

What is pollution prevention?

Pollution prevention means reducing hazardous emissions or wastes at the source, before they are generated. Pollution is the contamination of air, soil, or water by the discharge of harmful substances. Prevention is source reduction and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other resources, or protecting resources through conservation.

Ecology and the business community continue to develop and implement activities designed to achieve further reductions in waste generation.

Reducing the use and production of hazardous substances and operating more efficiently protects human health and strengthens economic well-being. Source reduction allows for the greatest and quickest improvements in environmental protection by avoiding the generation of waste and harmful emissions. Source reduction also makes the regulatory system more efficient by reducing the need for end-of-pipe environmental control by government.

Pollution prevention occurs when raw materials, water, energy and other resources are used more efficiently, when less harmful substances are substituted for hazardous ones, and when toxic substances are eliminated from the production process.

Who participates in pollution prevention planning?

There are currently 608 facilities in Washington state participating in the planning program. Facilities that fall into the following category(s) are required to prepare pollution prevention plans:

- Facilities that generate over 2,640 pounds of *recurrent hazardous waste* per year and/or;
- Facilities who are required to report under the *Toxic Release Inventory* of the Emergency Planning and Community Right to Know Act of 1986.

Hazardous wastes contain certain chemicals or have properties that make them dangerous to human health and the environment. In Washington State, hazardous wastes are categorized into two main groups, recurrent and non-recurrent.

- **Recurrent** hazardous wastes are those that come from a production process, service activity, or a routine clean up.
- **Non-recurrent** hazardous wastes are the result of a spill, equipment decommissioning, or other remedial cleanup activity.

NOTE: this report only covers recurring types of waste for measuring progress towards the state's waste reduction goals. This differs from another Ecology report entitled *Hazardous Waste Annual Summary Report*, which addresses both recurring and non-recurring types of waste while looking at the trends in hazardous waste generation.

What are hazardous substances?

Hazardous substances contain certain chemicals or have properties that make them dangerous to human health and the environment. Each year, under the federal Emergency Planning and Community Right to Know Act, about 650 chemicals or chemical categories are reportable as toxic under the Toxics Release Inventory.

Each year, the federal Resource and Conservation and Recovery Act (RCRA), requires facilities that generate regulated quantities of hazardous waste to complete and submit an Annual Dangerous Waste Report that summarizes what they generated and how it was managed. From these reports, the generation of recurrent waste is measured to determine progress towards waste reduction. Non-recurrent waste and waste from specialized sources, such as the US Department of Energy Hanford Facility (Hanford) and commercial treatment storage disposal recycling facilities (TSDRs) are excluded. Also excluded are special categories of waste that fall outside the scope of WAC 173-307 of the Washington State *Dangerous Waste Regulations* such as mixed radioactive waste and most waste waters. In 2003, 916 facilities reported a total recurrent hazardous waste generation of 113 million pounds.

When is pollution prevention information available to Ecology?

Three sources of information are used by Ecology in pollution prevention assessments: Annual Dangerous Waste Reports, Pollution Prevention Plans and Toxics Release Inventory reports. It takes approximately six months for Ecology to compile and analyze the data received. The following table identifies the timing of these events:

Information Source	Submittal date to Ecology	Available for use and public release
2003 Annual Dangerous Waste Reports	March 1, 2004	September 2004
2003 Toxic Release Inventory Reports	July 1, 2004	December 2004
2003 Pollution Prevention Plans	September 1, 2004	April 2005

What does pollution prevention planning involve?

Pollution prevention planning involves:

- Inventorying hazardous substances used and hazardous waste generated
- Identifying opportunities to reduce hazardous substance use and hazardous waste generation
- identifying opportunities to recycle and/or treat hazardous wastes
- Analyzing the technical and economic feasibility of these prevention opportunities
- Setting goals for hazardous substance use reduction and hazardous waste reduction, recycling and treatment.

Ecology offers an alternative to facilities required to prepare a Pollution Prevention (P2) Plan or a five-year plan update. The Environmental Management System (EMS) alternative allows a facility that has a functioning EMS to document details of that system rather than prepare a P2 plan or five-year plan update. A properly prepared EMS is environmentally equal to a traditional P2 plan.

The EMS process requires a facility to document how their system meets a set of pre-defined pollution prevention criteria, and agree to an on-site visit by Ecology staff before they are approved for this alternative. EMS facilities are still required to submit annual performance reports to document their progress towards achieving pollution prevention goals. Essentially, these annual reports are new pollution prevention plans each year and as such, five-year updates are not required by Ecology.

Pollution prevention is internationally recognized as a key and critical strategy for protecting the environment. Industry and government alike recognize the many benefits of prevention compared to end-of-pipe controls. Many factors, including cost savings, worker safety and reduced liabilities help validate pollution prevention as important to incorporate into all business practices.

To date, Ecology has approved the use of the Environmental Management System planning alternative for 32 facilities.

Ecology also promotes pollution prevention through initiatives other than planning.

Several campaigns targeting specific industries have been conducted and more are being planned in coordination with the Beyond Waste initiative. These campaigns focus on pollution prevention, regulatory compliance assistance and help target future technical assistance.

See Chapter 4, Program Highlights for Information on recent initiatives.

Chapter 2. Measuring Pollution Prevention Progress

The 50 Percent Policy Goal

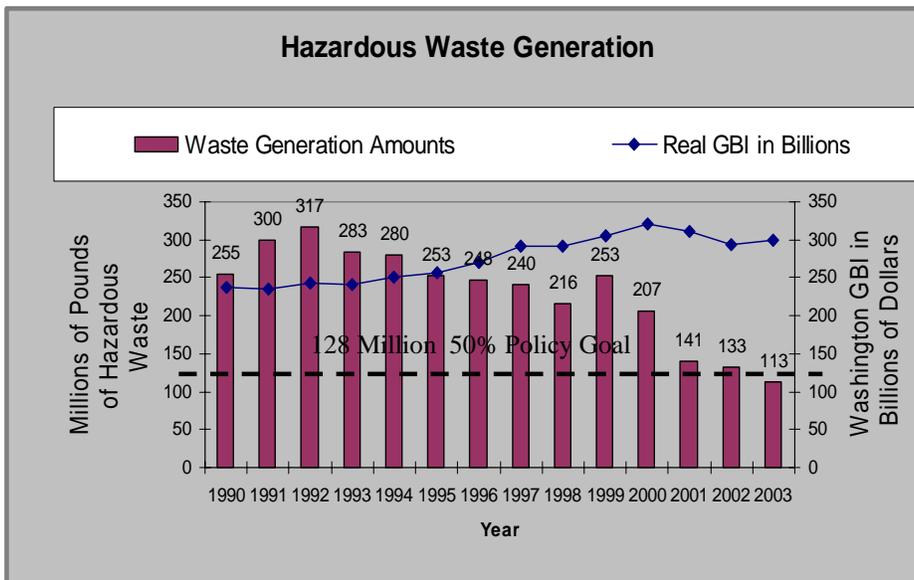
The 50 percent goal was directed toward all hazardous waste generators, not just pollution prevention planning facilities. The goal equates to 128 million pounds, which is 50 percent of the 255 million pounds generated by all reporting facilities in 1990. Annual Dangerous Waste Reports, filed by regulated generators, are used to track waste management trends over time.

Figure 2.1 summarizes the amounts of recurrent hazardous waste measured for pollution prevention planning purposes in millions of pounds. Recurrent wastes are defined as generated from a production process, service activity, or a routine cleanout. Specialized sources such as the US Department of Energy Hanford Facility (due to a special exemption) and commercial treatment storage disposal recycling facilities (TSDRs) are excluded. Also excluded from these amounts are special categories of waste that fall outside the scope of WAC 173-307 of the Washington State *Dangerous Waste Regulations* such as mixed radioactive waste and most waste waters.

The 1990 Hazardous Waste Reduction Act contains a statewide policy goal to reduce hazardous waste generation by 50 percent.

The ascending line in Figure 2.1 represents Washington's Gross Business Income (GBI) in billions of dollars. GBI is a good indicator of the level of economic activity in the state. Given economic growth, the amount of hazardous waste being generated could easily have gone up over time. Instead, the amount of waste created continues to drop.

Figure 2.1



The chart shows an overall decline in the amount of waste generated from 1992 to 2003 indicating the 50 percent reduction goal of 128 million pounds was met. However, the state's pollution prevention work is far from over as Ecology and businesses continue to pursue further waste reductions and cost savings profit abilities.

Aluminum industry slowdown

The aluminum industry historically generated 30 percent of Washington's hazardous waste. Meeting the 50 percent goal is partly due to an aluminum industry slowdown which decreased waste generation. Generation rates depend on many factors such as recession and off-shore relocation. However, the decrease in most other waste categories is steady in spite of economic growth.

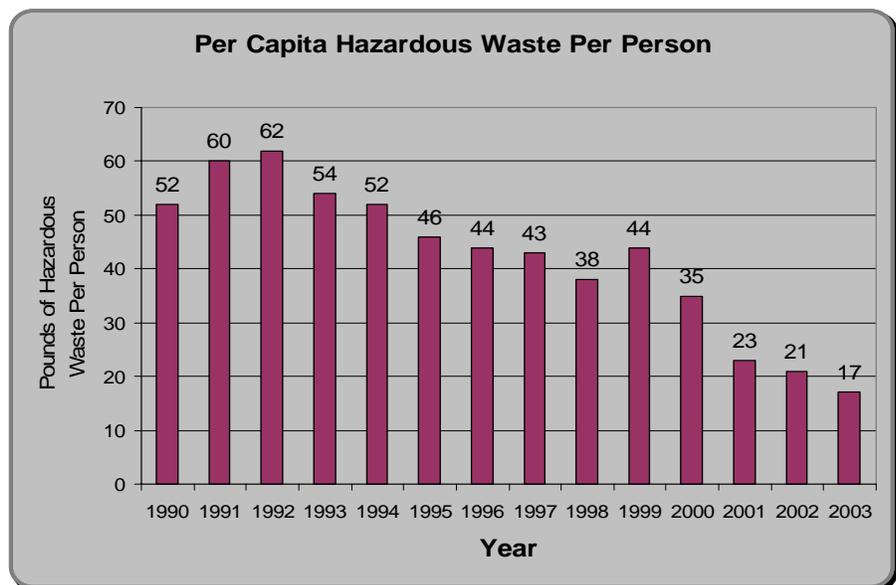
Other Measures of Progress

Per Capita Hazardous Waste Generation

A comparison of hazardous waste generation on a per capita basis, over time, is another way to view progress (See Figure 2.2). To determine per capita hazardous waste generators, waste generator data is divided by Washington State's population. The year 2003 hazardous waste per capita was 17 pounds. In 2002, the per capita amount was 21 pounds. In 2001, the per capita amount was 23 pounds.

Between the years 1990 and 2003, the population of the State of Washington has increased by 1,264,745 people or 26 percent. Over the same period, hazardous waste generation decreased from 52 lbs. per person to 17 lbs. per person, a 67 percent decrease.

Figure 2.2



Annual Progress Report Projects

Information from annual progress reports provides another measure of pollution prevention performance. The table below shows information from the annual progress reports submitted for the years 2001, 2002, and 2003. Facilities implemented 1,106 individual pollution prevention projects in 2003. These actions resulted in 1,522 separate beneficial effects reported within the six categories listed in the left column. Implementation of a project often results in benefits in more than one category. For example, when a facility substitutes a non-toxic substance for a toxic substance in an industrial process, the results may be recorded as a hazardous substance use reduction, a hazardous waste generation reduction, and a cost savings.

Annual Progress Report Projects (2001-2003)

Category	Number of Benefits Reported 2001	Number of Benefits Reported 2002	Number of Benefits Reported 2003
Reducing hazardous substances used	735	444	370
Reducing hazardous waste generated	876	562	514
Increased recycling of waste	311	150	147
Increased treatment of waste	140	88	69
Reduced air/water emissions	239	119	140
Cost savings	468	309	282
Total	2,769	1,672	1,522

Pollution prevention planning by facilities achieved significant results in the eleven years of the program. Beginning in 1992, and counting through 2003, 174 total facilities that were larger hazardous waste generators have become small quantity generators (SQG) by conscientiously implementing pollution prevention planning opportunities. Therefore, they are no longer required to submit plans.

Small Quantity Generators (SQG) are generators whose monthly waste generation is less than the Quantity Exclusion Limit (QEL) of 220 pounds for most common wastes or 2.2 pounds for acutely hazardous wastes and whose accumulation at any time is less than 2,200 pounds for waste with a QEL of 220, or 2.2 pounds for waste with QEL of 2.2 pounds.

Medium Quantity

Generators (MQG) are those who generate and/or accumulate between 220 and 2,200 pounds of hazardous waste in any one month.

Large Quantity

Generators (LQG) are those who in any one month generate and/or accumulate more than 2,200 pounds of hazardous waste, or 2.2 pounds or more of acutely hazardous waste.

Facilities that prepare pollution prevention plans (planners)

can be medium or large quantity generators and/or facilities that report under the Toxics Release Inventory. Facilities that generate more than 2,640 pounds of recurrent hazardous waste in a calendar year or are Toxics Release Inventory reporters are also required under the law to prepare a pollution prevention plan.

The data displayed in Figure 2.3 shows the number of planners has increased relative to number of large and medium quantity generators. This is due to regulation changes in the Toxics Release Inventory in 2001 that lowered thresholds for lead and lead compounds.

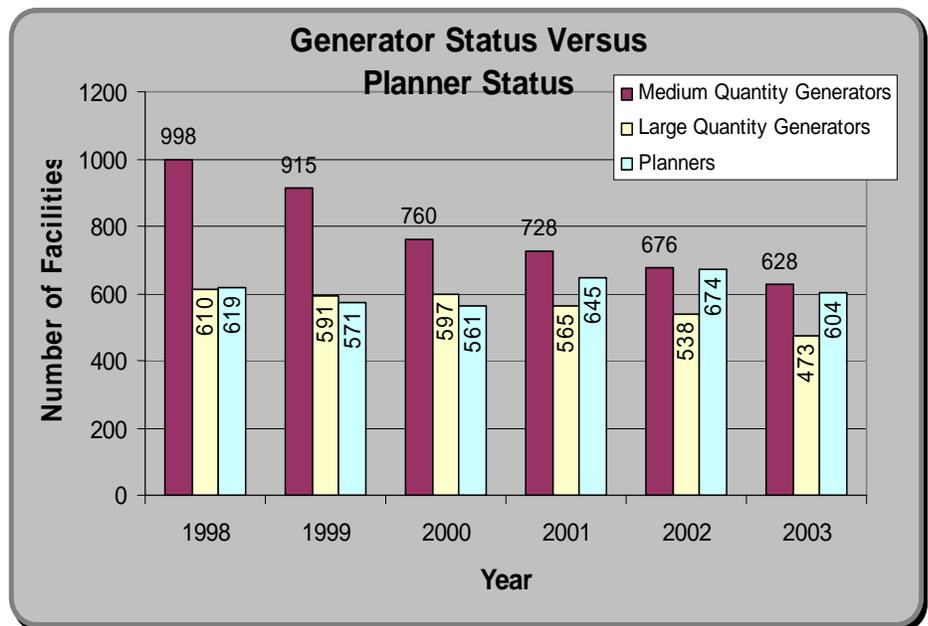
Generator Status vs. Planner Status

The comparison of medium and large quantity generators of hazardous waste and those who, due to their waste amounts, are also required to prepare pollution prevention plans, is another way to measure progress in pollution prevention. A facility's generator status is determined by the amount of hazardous waste they generate and/or accumulate in a given month. As required under the *Dangerous Waste Regulations* Chapter 173-303 WAC, these facilities report to Ecology each year how much hazardous waste they generated and how it was managed.

As explained in Chapter 1, not all wastes (i.e., waste waters, radioactive and non-recurrent wastes) that are counted in establishing a generator's status are included in this report. A total of 1,101 facilities classified as large and medium quantity generators reported generating hazardous waste in 2003. However, waste from only 916 facilities are covered in this report.

The number of generators steadily decreased from 1998 to 2003. There are incentives for companies to drop below the medium quantity generator limit and become small quantity generators. They have less regulatory reporting, they can participate in free or reduced-cost local/county hazardous waste disposal, and they can extend their waste accumulation period which helps reduce their hazardous waste management costs.

Figure 2.3

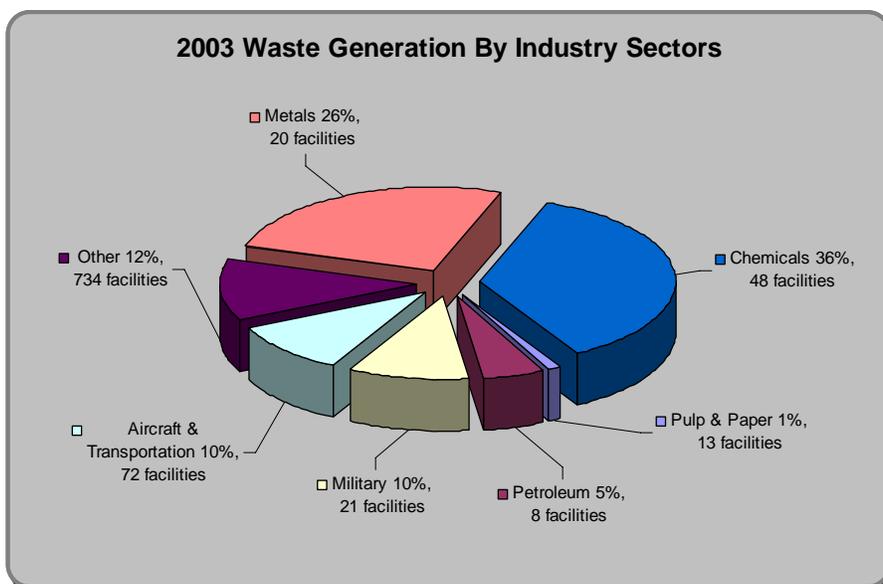


Chapter 3. Waste Generation by Industry Sectors

To better understand where and why waste is generated in Washington state, we have identified the industry groups that generate large or significant amounts of waste (specifically metals, chemicals, aircraft and transportation, petroleum, pulp and paper). The amounts of waste generated by these industry groups have been compiled for the years 1998 through 2003 to help identify trends and fluctuations in waste generation.

The pie chart below compares year 2003 waste generation among the various industry groups. The facilities represent 916 individual sites that reported recurrent hazardous waste streams in this same year. A detailed discussion on each of the industry groups follows.

Figure 3.1



Chemical Industries (36%)

This group consists of 48 facilities that produce chemicals (such as acids, salts, and organic chemicals) and those that manufacture products through chemical processes. There are three different categories of manufactured chemical products: 1) chemical products for use in further manufacturing, such as synthetic fibers, plastics, and pigments; 2) chemical materials or supplies for other industries, such as paints, fertilizers and explosives; and 3) finished chemical products such as drugs, cosmetics, and soaps.

Figure 3.2

Top 2003 Chemical Waste Generators:

- Noveon Kalama Inc
- Specialty Minerals Longview
- Morton International Inc
- Columbia Paint & Coatings
- Moses Lake Industries Inc



Waste generation in the chemical industries sector in Washington is not only dominated by one facility, Noveon Kalama Chemical, but by one waste stream at this Kalama facility – waste tar. Noveon generates waste tar in a number of chemical process units, and they use it as a fuel by combusting it on-site in their permitted industrial furnace. Because Noveon gains the benefit of using waste tar as a fuel, there may be a minimal economic incentive for them to reduce this waste stream.

In 2003, Noveon upgraded their plant's operating systems. This upgrade resulted in improvements in operating efficiencies and is reflected by the drop in the facility's 2003 tar generation.

Waste tar is a by-product of manufacturing benzoic acid and phenol. Thus, waste tar increases as production of these two products goes up. Another factor is process efficiency. As the production rates increase for two of the plant's benzoic acid and phenol products, so does the tar generation rate. The efficiency of the process is another variable. The more efficient the unit processes, the less tar waste is generated. In 2002, the elevated numbers were attributable to higher benzoic acid and phenol production rates, as well as lower unit operating efficiencies.

Noveon's trend in waste tar closely matches the trend in overall hazardous waste generated by the chemical industry sector.

Noveon's 2003 waste tar makes up over 80 percent of the total chemical industry recurrent hazardous waste in the state. This is down from 90% of the total in 1999.

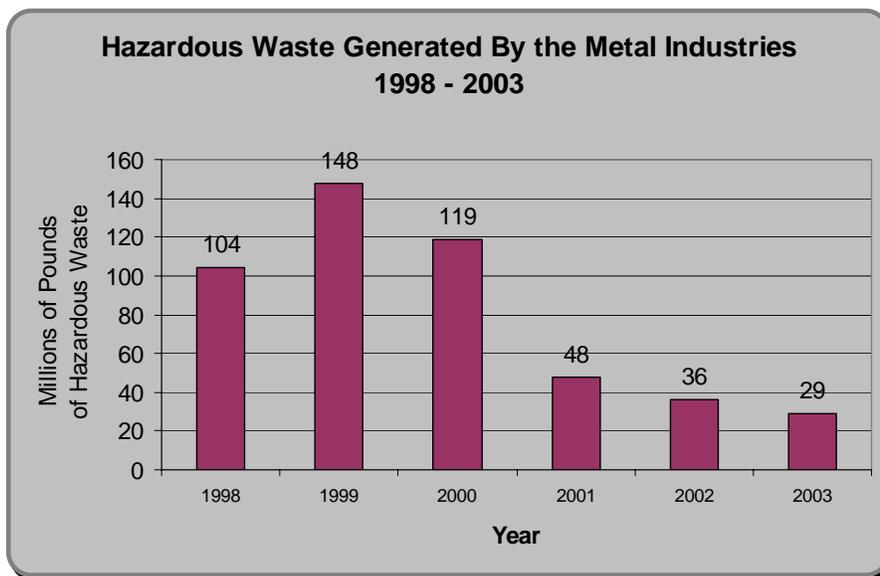
Report Year	Noveon's Waste Tar*	Chemical Industry Total Hazardous Waste*	% of Total Chemical Industry Waste
2003	33	41	80%
2002	42	49	86%
2001	34	39	87%
2000	31	35	89%
1999	37	41	90%

* In millions of pounds

Metal Industries (26%)

This group consists of 20 facilities that include companies engaged in smelting and refining ferrous and non-ferrous metals and the manufacturing of metal-based products. They were the state's second largest source of non-nuclear hazardous wastes in 2003. They include aluminum smelters, metal, and steel manufacturers.

Figure 3.3



Top 2003 Metal Waste Generators:

- Nucor Steel Seattle Inc
- Intalco Aluminum Corp Ferndale
- Alcoa Inc Wenatchee Works
- Chemi Con Materials Corp
- Goldendale Aluminum Co
- Steelscape Inc

Within the metal industry, aluminum smelters are one of the largest generators due to the high volumes of spent potliner waste that is generated when failed pots are relined. The amount of spent potliner waste generated fluctuates over time, depending on when and how often pots are rebuilt and how often they are shut down and restarted. Between 2001 and 2003, Alcoa Intalco Works, Goldendale Aluminum, Longview Aluminum, and Alcoa Wenatchee Works were the largest waste generators in this group.

The aluminum industry was hit hard by rising energy prices. Most of the companies were located in Washington state because of the proximity of low power cost through using Bonneville Power Administration (BPA) excess at a much reduced rate. When the energy shortage hit in 2000, BPA asked the smelters to curtail production and sent the power south where it brought in more revenue.

Intalco temporarily closed smelting operations from May 2001 to April 2002. Waste generation increased at Intalco in 2002 because of the number of pot failures during startup.

There were significant changes to the aluminum and magnesium industry during 2001 to 2003. Due to high energy costs and low return on metal prices, all of the smelters temporarily closed down and four plants (Kaiser Tacoma, Northwest Alloys, Kaiser-Mead and Longview Aluminum) closed permanently. During this time, waste generation at the aluminum smelters decreased since pots were not in service. However, several of the smelters reconditioned and rebuilt their pots during the shutdown and this generated potliner waste.

Other hazardous wastes generated during 2001 to 2003 related to demolition and cleanup of closed facilities. We expect to see an additional increase in waste generation as the properties are cleaned up for use by other industries.

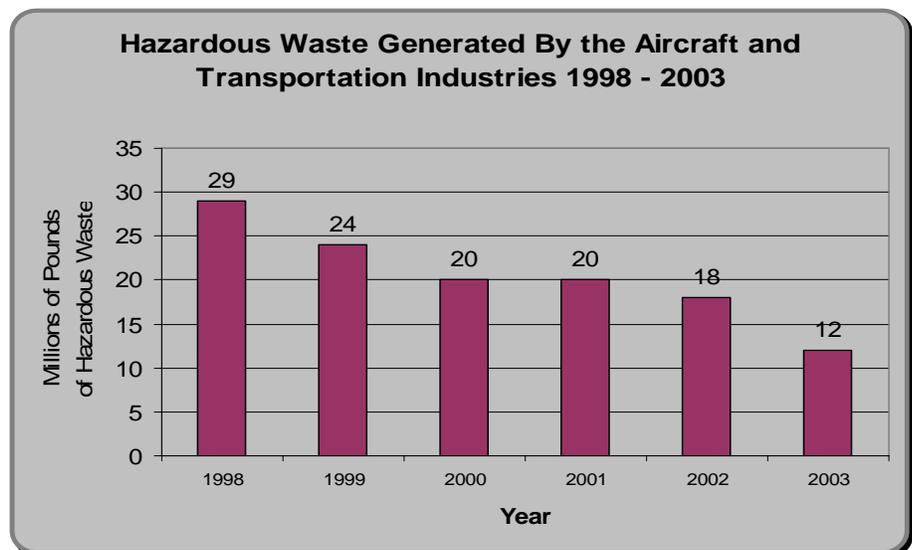
Aircraft and Transportation Industries (10%)

This group includes companies that manufacture equipment for transportation of passengers and cargo by land, air and water. In Washington, we have 72 facilities in this group which includes suppliers, vendors, and manufacturers.

Figure 3.4

Top 2003 Aircraft and Transportation Waste Generators:

- Goodrich Corp Hangers 1 & 3
- Boeing Company Auburn
- Boeing Everett
- Boeing North Boeing Field
- Boeing Renton



The fluctuations in waste amounts generated by this industry sector can largely be attributed to production changes and waste reduction measures implemented by the largest waste generator, The Boeing Company. Boeing is the world's largest commercial and military aircraft manufacturer with operations in 27 states and more than 170,000 employees.

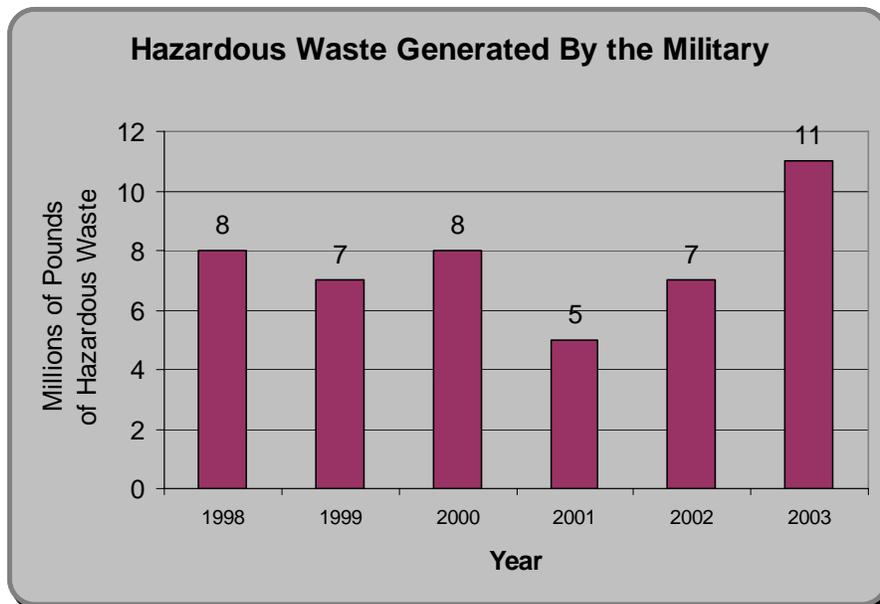
Beginning in 2001, major changes in national and international political and economic conditions produced a significant downturn in the demand for new aircraft. Due to these factors and the increased competition from European rival Airbus, Boeing decreased commercial aircraft production during this time period. In 2003, Boeing selected their Everett facility for the final assembly site for the 787 next-generation fuel efficient aircraft. This model uses newer production materials and technology. Many suppliers provide the pre-fabricated parts to Boeing for final assembly. Over time these changes in materials and suppliers are expected to significantly reduce hazardous substances used and hazardous waste generated.

In 2003, Boeing Auburn, the largest waste generating facility in this industry category, met the goals established in Ecology's "Cleaner Production Challenge," a voluntary water and waste reduction project, by reducing rinse water usage by more than 50 percent with the use of the Rinse Water Reduction Calculator. Boeing has made this software available to all its suppliers.

Military (10%)

The Military sector includes the US Departments of the Navy, Army and Air Force as well as the Washington Army National Guard and the Washington Air National Guard. For calendar year 2003, 21 military facilities reported waste generation amounting to 10 percent of the hazardous waste in the state.

Figure 3.5



Top 2003 Military Waste Generators:

- US Navy PSNS & IMP
- US Navy Submarine Base Bangor SilverSide
- US Navy Keyport OU1
- US Army HQ I Corps & Fort Lewis
- US Navy Air Station Whidbey Island Ault

Installations range in size from a few acres to thousands of square miles. Many of these installations are the equivalent of small cities. As a result they often have the entire infrastructure of a city including hospitals, sewage treatment plants, roads and airports. Much of the support activity that generates hazardous waste is industrial in nature.

Hazardous waste production from the Puget Sound Naval Shipyard (PSNS), the highest generator in this group, is dependent on the type of work assigned by the US Department of the Navy. Their largest waste streams are associated with painting and submarine recycling.

This sector is affected by the preparation for, and subsequent deployment of large numbers of troops overseas. While deployment removes troops and many of their polluting processes from the bases located in our state, return of the troops brings back significant quantities of hazardous waste. Even though activity has increased at our military facilities, implementation of innovative opportunities has reduced hazardous substance use in relation to production.

Petroleum Refineries and Related Industries (5%)

This group consists of 8 facilities primarily engaged in petroleum refining, the manufacture of paving and roofing materials, and the compounding of lubricant oils and greases from purchased materials.

Figure 3.6



The large petroleum refineries in Washington produce fuels. Most of the hazardous waste they generate consists of contaminants removed from crude oil, spent catalyst from the refinery processes, waste from the periodic or routine maintenance of refinery tanks and equipment, and sludges from wastewater treatment operations and plant sewers during periodic cleaning.

Some spent catalysts are sent to reclaimers for precious metals recovery. Oils from oily sludges are recovered and put back into the refinery process. Solid residues from wastewater treatment are either sold to cement kilns as low grade fuels or are recycled back into the refinery process and made into coke (a combustible residue from bituminous coal) products.

Between 2001 and 2002, petroleum refinery waste generation decreased by approximately 4 million pounds. Between 2002 and 2003, the decrease was close to 1.9 million pounds. These decreases are primarily due to the "refinery residuals rule" that became effective in 1999. This rule states that oily sludges and other materials recycled back into the refinery process from which they were generated or recycled at another refinery no longer have to be reported and managed as hazardous waste. Individual refinery waste generation did fluctuate during this time. Much of this fluctuation is due to periodic maintenance projects called "refinery turnarounds" (where process equipment is replaced or dismantled, cleaned, repaired, and placed back in service) and tank cleanouts. Turnarounds and tank cleanouts occur once every few years and can generate relatively large quantities of hazardous waste.

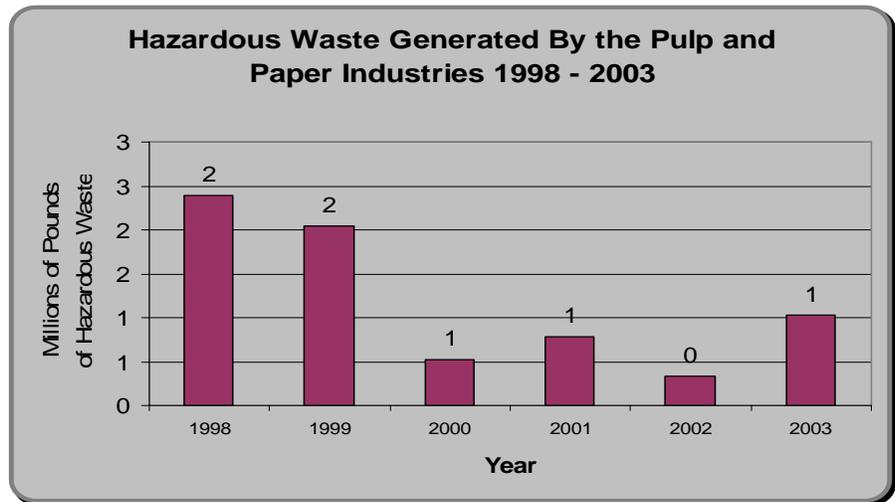
Pulp and Paper Industries (1%)

This group consists of 13 facilities that are primarily engaged in manufacturing pulp from wood or other materials (such as rags, wastepaper, etc.) and paper from wood pulp. The pulp and paper mills are relatively small hazardous waste generators by volume, but are the state's largest releaser of permitted toxic chemicals into the air, land, and water. Elevated public concern with this industry has given them a high environmental profile in the air and water arenas.

Figure 3.7

Top 2003 Pulp and Paper Waste Generators:

- Fort James Camas Mill
- Sonderen Packaging
- Longview Fibre Co Longview
- Excelsior Packaging
- Kimberly Clark World Wide



The largest waste stream from pulp and paper manufacturing is alkaline waste generated when Kraft mills recover pulping chemicals from their lime kilns. Ninety-eight percent of this alkaline material is recycled back into the process. The two percent or less that does not meet specifications for re-use becomes waste.

Some mills are able to use their alkaline wastes in place of feed stock for cement plants or as soil amendments. As a product substitute, the alkaline material is no longer considered a waste therefore the generation of this waste is not included in this report.

Other waste streams generated by pulp mills are solvents and paint waste from maintenance operations. There has been a growing trend with the mills to either recycle their solvent and paint wastes, or switch to materials that do not produce hazardous waste.

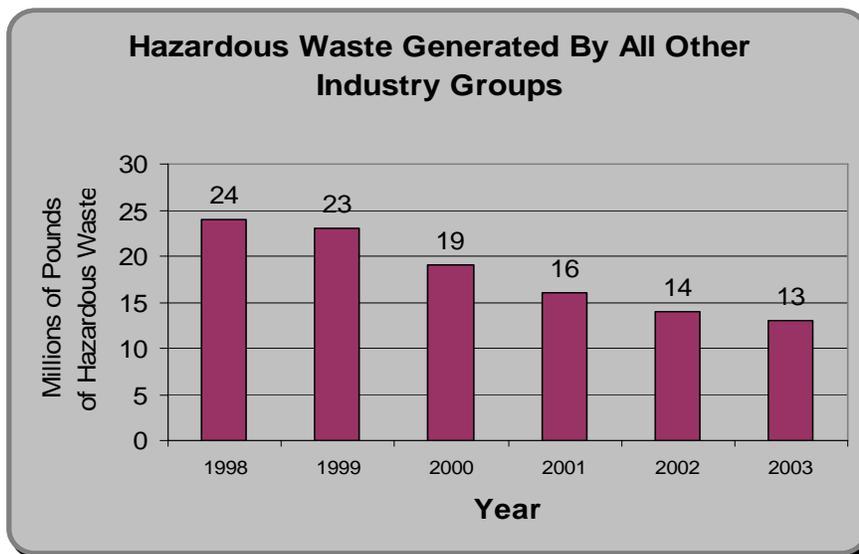
Large amounts of waste generated at Boise Cascade Paper Division Wallula in 2001 and at Fort James, Camas in 2002 and 2003 was due to the disposal of off-specification waste lime at Boise, and lime kiln slag and debris at Fort James. Although the disposal of lime kiln debris is listed as a recurrent waste for both facilities, its generation can be highly variable.

The Georgia Pacific West mill, at one time, had been the largest generator of hazardous waste in this sector, but has since closed its pulping operation and only makes tissue. With the exclusion of alkaline wastes, most of the waste generated by the pulp and paper industry has remained fairly constant.

All Other Industry Groups (12%)

The industries not covered in the above groups are represented here making up the “All Other Industry Groups” which consists of 734 facilities is a variety of large and small businesses in Washington. In 2003, 79 percent of the generators in Washington fell into this category with waste production that accounted for only 10 percent of the total hazardous waste generated that year.

Figure 3.8



Top 2003 All Other waste Generators:

- Wafer Tech LLC
- Toray Composites America
- Genie Industries Scissors Div
- WA UW Seattle Campus
- Pliant Corp
- Genie Industries

Ecology’s technical assistance resources focus on the businesses and facilities in this group. The larger industry groups, discussed previously in this chapter, typically have resources devoted to environmental programs. The smaller companies in this “all other” industry group have limited resources and request more technical assistance from Ecology in the development and implementation of pollution prevention plans.

The downward trend in hazardous waste generation of this group is attributed, in part, to the implementation of reduction techniques. Figure 3.8 shows that during the last three years, this large group of facilities continued to substantially decrease the amount of hazardous waste they generate. On average, each facility in this group reduced their hazardous waste generation by approximately 2,000 pounds. Also, in the last three years the number of facilities in this group has dropped from 929 to 734. The drop in number of facilities represents, in many cases, the great work done by these facilities in reducing the amount of hazardous waste generated.

Chapter 4. Program Highlights

General Technical Assistance

Providing technical assistance to businesses is a major component of the Hazardous Waste and Toxics Reduction Program. Ecology receives many requests for assistance. Help provided to facilities saves them significant amounts of money each year, increases their regulatory compliance rates, and decreases their liabilities.

Technical Assistance Provided	2001	2002	2003
site visits	591	390	421
phone consultations	4,727	5,711	6,131

Directed Technical Assistance

In addition to providing general technical assistance, Ecology staff also works with specific industry sectors and implements special projects. Focused technical assistance efforts for these sectors and projects provide the opportunity to collect information on how improved management practices can reduce environmental impacts. Ecology initiated several successful efforts in this area recently. They are described below:

■ TREE Project

The Technical Resources for Engineering Efficiency (TREE) team includes Ecology engineers and scientists with expertise in industrial processes and pollution prevention. The team offers free efficiency audits to businesses who want to reduce their environmental impact, but lack the expertise to identify and evaluate potential opportunities.

They evaluate their clients' use of water and chemicals, and their generation of solid waste, hazardous waste, wastewater, and air emissions. Using an economic analysis, they determine what changes the client should make to save money and reduce their environmental impact.

Some examples of the types of assistance provided include:

- Toxics reduction workshops
- Conducting reviews of hazardous substance use and hazardous waste generation
- Assistance to overcome technical, economic, and regulatory barriers to implementing pollution prevention projects
- Assisting businesses manage hazardous waste safely
- Assisting with cost analysis of pollution prevention opportunities
- Sharing ideas and techniques on alternative process technologies
- Distributing newsletters and other publications

Since its inception in 1998 through 2003, the team has made suggestions that could annually save clients \$1,080,000, reduce hazardous waste generation by 229,000 pounds, and reduce water use by 161,000,000 gallons.

• **Salmolux, Inc.**

In August 2003 the TREE team worked with Salmolux, Inc. to help them evaluate potential opportunities to reduce water use, chemical use, and solid waste generation. Located in Federal Way, Salmolux smokes salmon and other fish for commercial and retail products.

Although Salmolux, Inc. had already worked to reduce water use, TREE found other opportunities that would allow them to further reduce water use. The team also addressed solid waste generation and energy use. The TREE team estimated that Salmolux could reduce water use and wastewater generation by 270,000 gallons and energy use by 4,300 kilowatts if the additional opportunities were implemented.

One year after this project, Salmolux, Inc. had implemented three of the five main opportunities found by the TREE team: they decreased the use of floor sprayers, monitored their water use, and decreased their solid waste pickup. While they haven't tracked their monetary savings, their water use and solid waste generation has declined since the project. They have not pursued the other opportunities due to large capital expenses (heat recovery and a new tray washer) or the inconvenience (recycling paper and plastic).

After the project, Ray Crockett, the plant manager at Salmolux, Inc. stated "TREE assistance was a benefit by verifying and improving our actions regarding conservation. We would recommend TREE to other companies."

Between 2001 and 2003, the TREE team worked with the following companies:

- Basin Frozen Foods
- Welch's
- Skills, Inc.
- Saint Gobain
- Independent Foods
- Del Monte
- Encompass
- Shell Solar
- Salmolux

For more information about the TREE team and other projects, go to:

www.ecy.wa.gov/programs/hwtr/TREE/index.html

■ Governor's Pollution Prevention Award Winners

Governor Gary Locke presented 2001 – 2003 awards to the winners of the Governor's Award for Pollution Prevention and Sustainable Practices. He applauded the facilities for their successful efforts to prevent pollution by reducing the amount of hazardous substances used and the amount of dangerous waste generated.

The winners distinguished themselves by using innovative methods to ensure a clean environment for their employees, their community, and for all the citizens of the State of Washington. The winners are good neighbors, supportive of the community, and protective of human health and the environment.

2003 Winners include:

- Aaron's Bicycle Repair
- Clark County
- Mount Baker School District
- Naval Submarine Base, Bangor (Continuing Excellence)
- 2020 Engineering, Inc.

2002 Winners include:

- Bardorf and Bronson Coffee Roasters
- Columbia River Carbonates
- Madison Carnolia Cleaners
- City of Seattle
- Watson Furniture Group
- The Wenatchee World

2001 Winners include:

- A-1 Builders, Inc.
- Bemis Company
- Benard Imports, Inc.
- Circle and Square Global Car Service
- Dupont Flooring Systems
- Inflation Systems, Inc.
- Naval Submarine Base, Bangor
- Rehab the Lab
- Siemens Solar Industries

2003 Initiatives

Cleaner Production Challenge (CPC)

The Hazardous Waste and Toxics Reduction Program (HWTR) launched this project as a non-enforcement technical assistance initiative. The Challenge's main goal is to help metal finishers in the State of Washington reduce their hazardous waste and wastewater generation and lower energy, water, and chemical costs by 10 to 25 percent.

HWTR staff provided a series of training workshops that included industry experts and vendors offering the latest technologies.

All facilities rising to the Cleaner Production Challenge received certificates of recognition. Facility achievements were announced in media releases, on the Ecology Web site, and the CPC Web site. Participants have become environmental stewards by demonstrating a proactive role in protecting the environment and conserving our precious natural resources.

From 2000 to 2003, the project coordinated the efforts of Ecology, along with The Boeing Company, American Electroplaters and Surface Finishers, Seattle Puget Sound Chapter, Washington State Association of Metal Finishers, EPA Region 10, Pacific Northwest Pollution Control Assoc., and Pollution Prevention Resource Center. These businesses, agencies and organizations endorsed our project and offered invaluable help toward its success.

Over 100 technical assessment and assistance visits were made during the course of the project. By 2003, the facilities that participated in the Cleaner Production Challenge achieved overall reductions of wastewater and sludge by 46 percent and 10 percent respectively, after adjustment for production. The wastewater reductions totaled 234 million gallons of water representing an overall savings of approximately \$1.8 million dollars.

Participating facilities also reduced the amount of sludge generated by over one million pounds. Over 75 percent of the participating facilities met or exceeded the Challenge reduction goals by the end of 2003. For example, three US Navy facilities were able to meet their "Cleaner Production Challenge" goals, including:

- ✓ Naval Air Station Whidbey Island eliminated hazardous waste generated during aircraft parts cleaning at AIMD 500 Division through process improvements and product substitution. Specifically, they substituted a non-Hazardous Air Pollutant (HAP) paint remover for the methylene chloride-based remover previously used. This change has eliminated approximately 190,000 pounds of hazardous waste annually.
- ✓ Naval Undersea Warfare Center Division in Keyport reduced chromic acid wastewater from their plating plant over 50 percent by increasing their water use efficiency through employee training and wastewater tracking.
- ✓ Puget Sound Naval Shipyard commenced construction activities on a new treatment plant in late 2003. The state-of-the-art treatment plant reduces waste and spill potential. The metal precipitation process replaced an ion exchange process that will not generate hazardous hydroxide precipitation sludge. In addition, the metals removed from the wastewater in an electrowinning unit will be recycled and spill potential is reduced by the proximity of the new treatment plant to the plating shop, which eliminates wastewater pipelines.

Chapter 5. Pollution Prevention Successes

Many facilities report the successes they achieve by implementing projects identified in their pollution prevention plans. These projects often result in cost savings to the facility, improved worker safety and an improved image as a good neighbor. They always result in helping to protect our air, water and soil. We congratulate these facilities on their achievements, and we thank them for sharing their stories.

2003 Successes

Corry's Fine Dry Cleaning on Mercer Island was the first dry cleaners in Washington state to eliminate perchloroethylene by embracing the clean technology of carbon dioxide (CO₂) and aqueous cleaning. Business has increased by over 50 percent while maintaining existing water usage. Corry's strives for environmental excellence in all areas. Corry's has worked actively with the manufacturer of the CO₂ machines to increase the CO₂ recapture rate and minimize release to the atmosphere.

Exotic Metals Forming Company in Kent is an aircraft parts manufacturer. They designed and built a state-of-the-art rinsing system that is saving millions of gallons of water annually. Water use has gone down 90 percent from the previous level of 3,000,000 gallons annually. Sensors continually monitor the cleanliness of the water, so fresh water is added only when needed. The system also automatically prevents accidental discharges of water that exceed permit limits to the sewage treatment plant in Renton.

Gary Loomis in Woodland is a fishing rod manufacturer that has so successfully implemented its pollution prevention program that it has become a small quantity generator. The company generated 30,230 pounds of dangerous waste in 1995, and has reduced that amount to less than 2,640 pounds of dangerous waste in 2003, a reduction of approximately 92 percent. Production at Gary Loomis could now roughly triple without jeopardizing their small quantity generator status. Most of this waste reduction has been due to implementing pollution prevention options for its paint waste, and incorporating Lean Manufacturing techniques.

For more information on Lean Manufacturing, visit <http://www.leanmanufacturing.net/>

Molded Fiber Glass NW, in Stevenson, reduced their use of paint and solvents by converting their painting system to one that uses spray guns with small reservoirs that don't require as much flushing. Process control methods reduced use of toxic glues. This technique reduced the need to paint and has allowed the company to reduce waste from 10,650 pounds to less than 2,640, with a savings of over \$130,000. Most of this waste reduction has been due to implementing pollution prevention options and incorporating Lean Manufacturing techniques.

Naval Submarine Base Bangor, on the Kitsap peninsula, covers over 7,200 acres with more than 60 separate tenants. Bangor, a 2003 Governor's Award winner, instituted an Environmental Management System (EMS) to implement major pollution prevention opportunities. Notable achievements include: 10,333 tons of material recycled with a savings of \$600,000, reuse of 32 tons of hazardous material saving \$300,000, and installation of a powder coating operation with a saving of \$175,000. Total quantified savings exceeded \$1.1 million for 2002.

Oceanus Plastics, in Ferndale, is a manufacturer of military boat parts. They cut their use of hazardous substances in half between 2000 and 2003. They credit their successes to increased training of workers, use of an acetone recycling unit on-site, and using environmentally-friendly products from suppliers, when available.

Pacific Aerospace & Electronics in Wenatchee, reduced the concentration of their etch bath, and introduced production controls decreasing hazardous waste by 4,448 pounds, a 55 percent reduction. The company also purchased two counter flow triple rinses and added a clean water rinse tank. These innovations removed 95 percent of the hazardous substances from the process. In addition, the facility consolidated two de-oxidizer solutions, eliminating 468 gallons of hazardous materials and the rinse waters associated with this process.

Precision Aerospace in Sumner, installed smaller paint pots with removable, resealable plastic liners, to eliminate flushing and cleaning between uses. Now only about two tablespoons of solvent are needed to flush a paint gun. The company generated 30,000 to 40,000 pounds of hazardous waste a year between 1998 and 2000 and has reduced the amount to 5,310 pounds in 2003, a reduction of 85 percent.

Pollution prevention and Lean Manufacturing techniques allowed them to reduce waste generation and hazardous substance use, along with a 50 percent reduction in labor.

Trail Wagons, Inc. in Yakima, is a motor home manufacturer. During the years 1991-2001, they changed their laminating process by converting to a different type of gun. This change resulted in a reduction of hazardous chemical usage, hazardous waste generation and air emissions. In addition, they added spray shields to reduce overspray and improve efficient use of substances. They recycled 55 percent of the paint-related waste off-site. They reduced their hazardous waste generation by more than 8,000 pounds, over the five-year planning cycle.

US Naval Undersea Warfare Center Division Keyport implemented the ISO (International Standards Organization) 14000 Environmental Management System (EMS) in 2003. This included environmental awareness training for all personnel, including upper management. The facility implemented the following policies: monthly chemical reporting, improved hazardous materials tracking, increased auditing of shop areas, shop-specific informational visits, shop "Walk-About" audits, and Quarterly Formal Internal Audits.

In 2002, the Navy upgraded the plating plant. This has reduced hazardous waste generation from 1,500,146 pounds in 2002 to 717,240 pounds in 2003, contributing to a base-wide hazardous waste reduction of 48 percent from 2002 to 2003.

Washington State Ferries, the largest ferry fleet in the United States, is changing its entire fleet's fuel to a cleaner-burning low-sulfur fuel. For less than a penny per gallon, this will reduce 500 tons of emissions yearly. Even more environmentally-friendly fuels will be tested in 2005.

Biodiesel is a fuel which can be made locally from waste greases or plant seeds. One and a half million gallons will be used by just three ferries, giving a boost to the small but growing Washington biodiesel industry. The long-term effects of these changes are expected to be fewer health problems, better visibility, and fewer greenhouse emissions. Federal, state and local agencies combined efforts to move forward in fulfilling the Governor's executive order on sustainability.

2002 Successes

Ace Galvanizing, Inc. located in Seattle, zinc coats metal products at their facilities. In 2002 they improved the drainage of the molten zinc from the material being galvanized. This one process change saved them \$100,000 in zinc use and cleanup costs. Since 2001 they have implemented other opportunities, including:

- replacing conventional propane powered forklifts with hydrostatic drive units
- increasing the amount of acid inhibitor used, enabling the same amount of acid to clean more steel;
- using a wetting agent to decrease drag-out
- covering, insulating and installing thermostatic controls for an electric tank heater

In two years, Ace Galvanizing implemented changes which reduces operating costs by \$116,000 and eliminates 21,000 pounds of hazardous substances used every year.

Bio-Rad Laboratories located in Woodinville and Redmond, found a substitute for Thimerosal, a pharmaceutical ingredient containing mercury, and reduced their Thimerosal waste stream from 88,000 pounds to just over 2,000 pounds in 2002. Another 565,000 pounds were reduced from 1994 to 2002, and another nearly 185, 000 pounds recycled, which netted an estimated overall waste disposal cost savings of almost \$800,000, a substantial achievement in nine years.

Canyon Creek Cabinets in Monroe, is a kitchen and bath cabinet manufacturer. They produce wooden cabinets for the home-building and remodeling industry throughout the Northwest as well as the Pacific Rim. The company uses innovative techniques to reduce air emissions, waste generation, and energy use.

In 2002, they received the Association of Washington Business (AWB) Award for environmental excellence in air quality and the Pacific Northwest International Section (PNWIS) Award for environmental excellence. Specific objectives and targets achieved include: reformulated products, reduced volatile organic compound (VOC) emissions, continued wastewater treatment process, and reduced greenhouse gas emissions.

In 2001, they reduced the use of VOCs by 10,000 pounds and remain below the Title V Permit limit for VOCs and reduced emissions since tracking began in 1999. They have continued a wastewater treatment process which treated a total of 5,030 gallons of wastewater discharged to the POTW. They are participating in a voluntary program sponsored by EPA and Department of Energy to reduce greenhouse gas emissions. In addition, they installed a variable drive system on their dust collector which provides a 38 percent energy cost savings.

Genie Industries in Redmond, maintains specialized manufacturing plants comprising nearly one million square feet. Genie implemented the Genie Environmental Management System (EMS) at all facilities in 2002. The EMS provides opportunities for continuous improvement regarding efficiency and other environmental matters. In particular it has helped employees track the flow of materials and the reduction of hazardous chemicals used in their processes from 2,135 in 2001 to about 700 in 2004. In addition, hazardous waste generation decreased by five percent from 2002 to 2003 with a five percent increase in production.

Genie has also implemented recycling of scrap metal, wood waste, pallets and cardboard, achieving more than 30 percent reduction in solid waste from 2002 to 2003. Energy consumption decreased substantially from 2002 to 2003, with electricity and natural gas use reduced by 33 percent and 38 percent respectively.

Genie continued to make progress in water conservation projects in 2003. Through improved flow control, in-house recycling, zero discharge projects and facility consolidation, Genie successfully reduced water use by 41 percent since 2001.

Goodrich Corporation, an aviation services company in Everett, experienced decreased demand in recent years. They used their Environmental Management System (EMS) to implement water and energy conservation projects and saved the company \$270,000 in 2002. The facility provided the following statement, "We feel that in the year 2002, we had a very successful Pollution Prevention Program using the EMS Alternative even with extremely limited resources. We are very pleased with the flexibility and user-friendly EMS Alternative Program and its relative ease of implementation."

Hatch & Kirk in Seattle, is a large diesel engine repair and parts house. They switched from using a chemical solvent to a set of water-based cleaning processes in their large parts cleaning area. The cleaning processes included a hot tank, a large spray cabinet washer and a pressure-washing system. To clean the water and make it available for reuse, they captured the water and put it into a circulating system. After some trial and error, Hatch & Kirk's new system was running efficiently.

Philips Ultrasound, Inc. in Bothell, is a medical equipment facility that maintains a 371,000 square foot facility and employs 1,387 people. They develop, manufacture, and distribute ultrasound imaging systems used in radiology, cardiology, obstetrics, gynecology, and peripheral vascular diagnostic applications. Chemicals used in daily operations include epoxies and resins, adhesives, hardeners, fluxes, aerosol products, touch up paints, and research chemicals. In 2001, the company implemented 50 opportunities for waste and chemical use reduction.

Puget Sound Naval Shipyard in Bremerton, implemented the Navy Beneficial Suggestion Program as part as their Environmental Management System. It solicits employee ideas, inventions and recommendations for process changes. Of the 474 submittals in 2002, 115 were adopted. Over \$50,000 was awarded to employees for suggestions, and the shipyard's total estimated first year savings was nearly \$1.4 million.

Shields Bag & Printing, a commercial printing facility in Yakima, eliminated three solvent-based parts washers, and replaced them with one aqueous parts washer. This change eliminated 214 gallons of solvent waste. The company also reduced the use of electricity by implementing three Energy Efficiency Measures which include working with electronic ink pump motors, compressors, and receivers, and developing more efficient lighting for storage areas. The projected annual energy savings of 2,079,745 kilowatts per year, is equivalent to savings of approximately \$69,866.

Spectrum Glass Co. in Woodinville, manufactures over 160 varieties of specialty sheet glass. Spectrum began pollution prevention planning in 1991 and has implemented many opportunities including process changes to reduce baghouse fines, improved waste segregation, and reducing toxic materials in glass. Specifically, in 1996 they began re-melting and reusing waste glass generated from the production process. They have continued to use this practice and in 2002 they reduced hazardous substance use by 159,000 pounds.

Additionally, they reuse accumulated fines from the baghouse, eliminating 22,000 pounds of solid waste disposal and saving about \$2,400 per year.

Tyee Aircraft, Inc. in Everett, has manufactured structural parts, for the aerospace industry since 1966. These products are primarily aluminum and stainless steel. They began their pollution prevention program in 1990 with the Recycling Center Project. The center was operational by 1992 and they were able to effectively separate various types of waste for recycling.

Chip centrifuge machines were installed to separate waste oil and coolants from metal chip cuttings. The metal chips were then recycled and sold instead of disposing them to a landfill. They also began recycling cardboard, paper, and scrap metal.

In 1993, they invested in an aqueous cleaning process and eliminated 1,1,1-trichloroethane³, from the cleaning process.

³ 1,1,1-trichloroethane is no longer manufactured in the United States due to its effects on the ozone layer

Their previous cleaning processes generated 26,000 pounds of solvent waste. They eliminated this waste stream by substituting the previous solvent with a higher flashpoint, non-regulated solvent.

In addition, they eliminated their chlorinated coolant waste stream by substituting the previous coolant with chlorine-free coolant. Tyee has reduced their hazardous wastes from approximately 36,000 pounds to approximately 1,600 pounds per year. This reduction changed their generator status from a medium quantity generator to a small quantity generator.

Valspar Corporation in Seattle, manufactures coatings for the cabinet, door, and millwork industries. As one of their pollution prevention efforts, they actively seek out customers for their water-based paint products. They have had growing success recently, as technology improves and demand increases. Between 2001 and 2002, Valspar's production increased 12 percent, but their solvent use decreased by 100,000 pounds, saving them \$35,000.

Whidbey Island Naval Air Station had recent success treating and discharging a wastewater waste stream from their Aircraft Intermediate Maintenance Department. The facility was previously using a listed solvent for stripping paint and cleaning parts that generated approximately 300,000 to 400,000 pounds of waste that required shipment off-site through a waste management contract. The facility eliminated the off-site management of this waste through source reduction, analysis of numerous alternatives and selection of an appropriate combination of products for use, revising employee procedures for waste treatment, and a beneficial rewrite of their water quality permit.

2001 Successes

ELDEC Corporation located in Bothell and Martha Lake, is an aerospace electronics manufacturing facility. ELDEC needed an alternative for a hazardous machine coolant they were using. Ecology Toxics Reduction engineers assessed their industrial processes, conducted a cost analysis, recommended alternatives, and coordinated with environmental authorities on their behalf. Extensive testing and analysis of alternative machine coolants were conducted over the course of six months, before a suitable substitute was selected.

ELDEC also installed a conductivity flow control meter in their iridite plating line. The installation was strategically placed on the rinse tank that had the highest flow. This relatively small capital investment combined with employee training helped the company achieve a 25 percent reduction in water usage.

ELDEC will avoid spending \$46,000 on overall compliance, equipment and containment systems the first year, and \$7,000 annually on recurring hazardous waste management and hazardous waste disposal costs.

The Boeing Company, Frederickson Facility, is located in Puyallup where parts and subassemblies are manufactured for other Boeing locations. In early 2001, Boeing began segregating oils from waste water to facilitate implementation of a re-refining program for bulk used oils. Through this opportunity, Boeing reduced hazardous waste by almost 190,000 pounds. Numerous use, waste, recycle and treatment projects have been completed. Dating back to 1996, Boeing has implemented opportunities including:

- eliminating vapor degreasing;
- replacing MEK and toluene with lower vapor pressure solvents;
- washing and recycling solvent rags;
- reducing oily debris, aerosol canister waste, debris in waste water, composite waste generation, containers with residual hazardous products, rinse water and scrubber water use;
- substituting coatings;
- converting waterfall paint booth to dry filter;
- recycling mercury vapor lamps;
- recovering silver from photographic wastewater; and
- reusing spent process chemicals for wastewater treatment.