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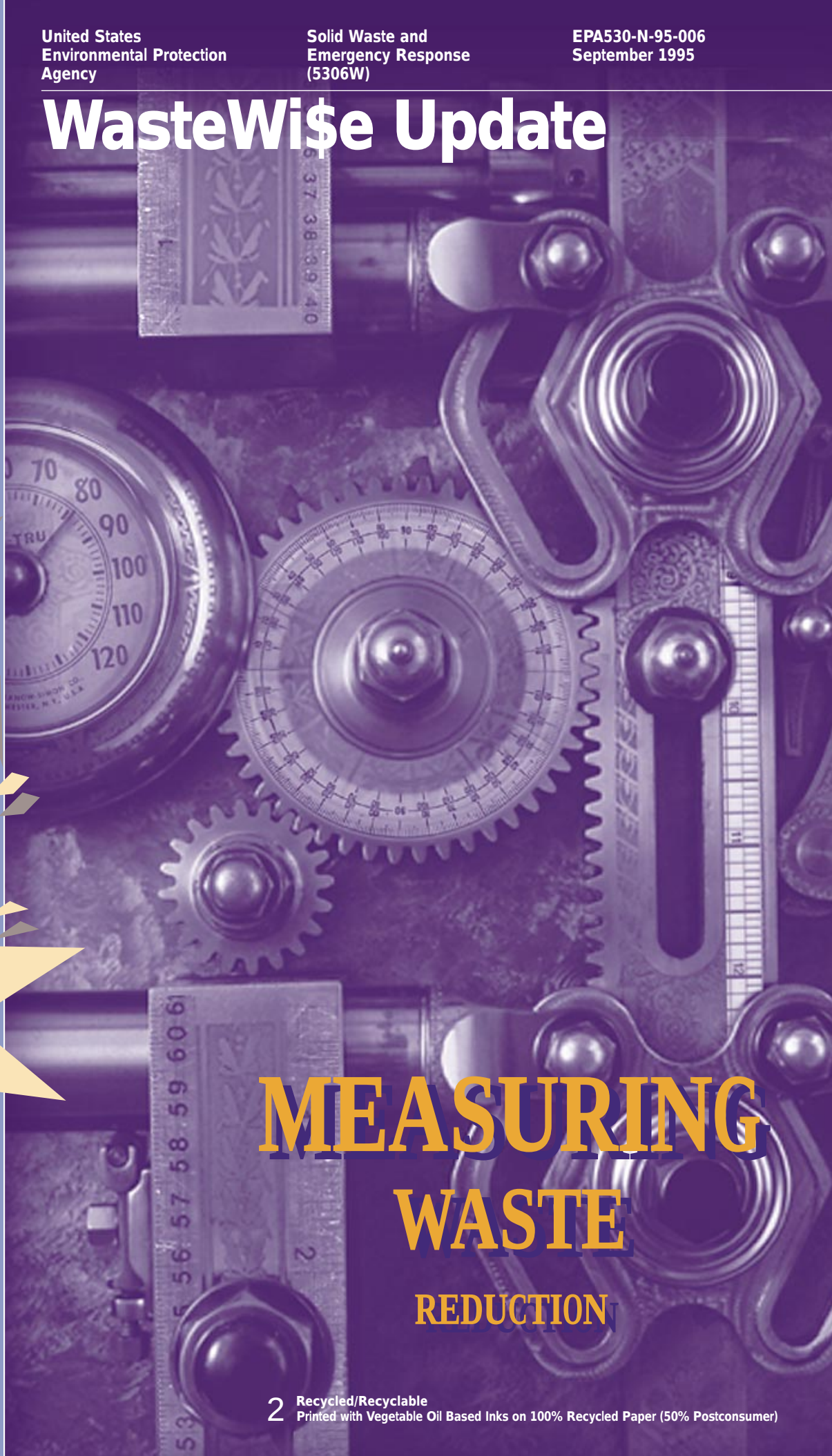
WasteWi$e Update

WASTE WI$E



MEASURING WASTE REDUCTION

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Making Cents of Waste Prevention Measurement

As part of the WasteWi$e program, partner companies measure success in preventing waste, recycling, and buying or manufacturing products made with recycled content. WasteWi$e partners' 1994 achievements will be highlighted in the WasteWi$e First-Year Progress Report to be published this fall (see notice on page 9). While most partners have launched recycling programs and understand how to measure results in this area, many of the methods used to quantify waste prevention benefits are not well developed or documented.

This issue of the ***WasteWi$e Update*** is dedicated to sharing information about techniques and tools for measuring the effectiveness of **waste prevention**. Waste prevention is using less material to get a job done, creating less waste before recycling. For companies, this can involve cutting waste that goes into their own dumpsters as well as eliminating materials that can become waste for customers. Waste prevention offers opportunities to conserve materials and reduce costs. Because it encompasses many different types of activities (substituting or reusing materials and purchasing in bulk, for example), there's no "one size fits all" measurement technique.

Nonetheless, more and more companies are gauging the results of their waste prevention efforts. Many are using this information to improve their programs and to invest scarce resources in the most effective waste prevention efforts. In this issue, we share the experiences of several WasteWi$e partners and report on the results they've achieved.

WasteWi$e charter partners **General Motors** and the **Eastman Kodak Company**, for example, explain the value that measurement adds to their waste reduction activities. You'll see how companies tailor measurement approaches and tools to fit their own structure, operations, and WasteWi$e goals. And you'll discover a wide array of measurement systems currently being used by companies.

> "By measuring our progress and sharing results, we:
>
> - Document and better understand our accomplishments
> - Generate pride, participation, and momentum
> - Identify areas for improvement
> - Stimulate friendly competition
> - Justify the need for additional resources."
>
> —Larry Long, Manager of safety and environmental initiatives, Anheuser-Busch Company

WasteWi$e partners measure waste prevention for a variety of reasons. First, measuring progress helps partners distinguish between efforts that work and those that don't. It allows companies to replicate successes, set realistic goals for future projects, and invest their efforts in initiatives that work. Measuring the amount of waste prevented also helps companies determine how much money these initiatives save each year. Reporting these figures to upper management and employees helps build momentum for waste prevention. Promoting waste prevention achievements to stockholders, customers, and the general public also can enhance a company's image. In most cases, precision is not necessary; reasonable estimates can be very useful for gauging progress.

Voluntary programs like WasteWi$e depend on measurement of partners' progress to demonstrate that creative, nonregulatory approaches to environmental protection deliver tangible results. Measurement also enables us to showcase the successful efforts of our WasteWi$e partners and to identify high-impact waste prevention actions from which others can benefit.

Waste prevention measurement is a relatively new and evolving field. WasteWi$e will continue to look for more effective ways to measure results and will share them with our partners and endorsers. We would also like to hear from you about your successes in measuring solid waste reduction.

GM Meets the Measurement Challenge

General Motors (GM), headquartered in Detroit, Michigan, is one company that has worked hard over the past few years to measure its waste reduction progress more accurately. The company's resulting benefits include cost savings, increased efficiency, and a heightened sense of corporate responsibility. "We look at waste reduction as one big cost-savings opportunity," says Sandra Brewer of GM headquarters' Worldwide Facilities Group, Environmental Regulatory Support. "Measuring helps us manage our business better by showing us where we're saving money and where we're not."

With 330,000 employees, several divisions, and 125 manufacturing and assembly plants nationwide, however, measurement has not been easy. "Until recently, we've been a few years behind with the numbers," said Brewer. "We're so big that it takes a long time to pull information together. There were always initiatives taking place somewhere within the company, like a change in packaging or manufacturing, that we didn't know about."

When GM's waste reduction program began in 1990, measurement was an inexact science. The company had only a "rudimentary" waste reduction survey form that a limited number of plants filled out (on paper) and returned to headquarters. When the waste reduction program went corporatewide in 1991, the company revised the survey to better focus on measurement.

"Assembly and manufacturing plants generally hate surveys," Brewer said, "so we knew we had to keep it simple." The new survey continued to ask for figures on waste generation, waste types, and management methods. But to better measure the company's waste reduction progress, the survey also requested basic information on recently implemented waste reduction projects, including type and amount of waste prevented, cost savings, and initial capital outlay for the projects. The survey now picks up on most of the new initiatives that previously went undetected by headquarters. Brewer said, however, that a large company shouldn't worry about discovering every last initiative that could be reducing waste. "If it's successful enough, you'll hear about the activity sooner or later."

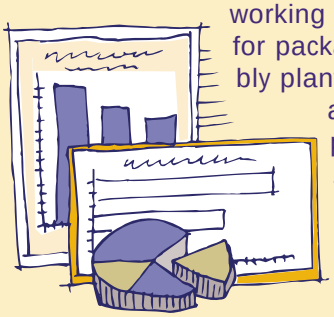
GM began computerizing the survey in 1993 to streamline the data collection and management process. More than 100 GM environmental engineers across the country now update and return data to headquarters on disk, saving time and labor for data entry and minimizing data inconsistencies.

The key to measuring successful waste reduction efforts for a big company like GM? Simplicity. "We ultimately plan to utilize a corporatewide computer system to transfer all survey data electronically to headquarters. This would mean no paper," Brewer said. "We're constantly seeking more efficient ways to collect and analyze our waste reduction data, and an important part of that is keeping the survey quick and simple, no matter how far our waste reduction program has evolved."

GM Drives Home Waste Prevention Message

Here are some of the waste prevention activities measured and reported through GM's waste reduction survey:

- Eliminating printing of 1.5 million service parts catalogues a year by converting to a paperless system that provides auto parts information to GM dealers across the nation on microfiche. This action conserves nearly 2 billion pages of paper annually. GM has also found that microfiche is cheaper to update and distribute than the printed catalogs.
- Supplying Material Safety Data Sheets (MSDS) to dealers through a computer network that connects GM dealers across the country. Instead of updating and redistributing the binders whenever product changes are made, dealers now have "up to the minute" MSDS information at their fingertips. This initiative eliminates the need for 8,000 printed binders and 2.3 million pages of paper annually.
- Increasing the use of reusable/returnable shipping and packaging containers and adopting environmental guidelines for expendable packaging suppliers. Several major GM divisions are even working toward zero-landfill goals for packaging wastes. GM assembly plants, for example, achieved a 50 percent reduction in packaging wastes between 1993 and 1994 through redesigning packaging, using returnable packaging, and recycling.



Measuring Waste Reduction:

A Spotlight on Our Partners

Each company encounters its own unique challenges in measuring waste reduction. Large organizations often struggle to identify and quantify a range of waste reduction activities spread out over a number of facilities. Smaller companies sometimes lack resources to collect data. Those companies that have risen to the challenge, however, will tell you that measurement is worth the effort. Many WasteWi$e partners use measurement information to keep employees motivated, announce results to stockholders and customers, and evaluate and improve their efforts.

The methods used to measure progress are as diverse as the companies that make up the WasteWi$e roster and range from examining purchasing records to using computerized tracking tools. Here's a sampling of how some WasteWi$e partners are measuring their progress.

Banking on Waste Prevention

Boston-based **State Street Bank & Trust Co.** conserved the equivalent of 10,000 corrugated boxes in 1994 by renting reusable plastic crates for interoffice relocations and moving. Invoices from the crate rental agency indicated that plastic crates were used for 25,000 trips during the moving process. To determine how many corrugated boxes would be needed to make the same number of trips, State Street Bank and its moving consultants estimated that a single corrugated box could be used an average of 2.5 times. With this information, State Steet Bank made the following calculation to determine the quantity of boxes not consumed by renting reusable plastic crates:

$$\frac{\text{Total number of trips made by plastic crates}}{\text{Average number of trips made by a single corrugated box}} = \text{Total number of corrugated boxes not used}$$

$$\frac{25{,}000 \text{ trips}}{2.5 \text{ trips/corrugated box}} = 10{,}000 \text{ corrugated boxes eliminated}$$

This is a conservative figure because the volume of a plastic crate is 30 percent larger than the corrugated boxes previously used in the moving process.

State Street Bank also has found a useful home for salvaged building materials. This past year, the company sent two truckloads, or 70,000 pounds, of reusable materials from a construction and demolition project to a United Way agency for reuse in a housing project. State Street calculated the weight of material available for reuse using the hauler's estimate that each truckload contained 35,000 pounds of material.

Perkin-Elmer Packs Savings in Return Program

The **Perkin-Elmer Corporation**, a leading manufacturer of analytical, environmental, and life science systems, has developed an innovative program that enables its customers to return packing materials to the company for reuse. As a result of this program, the company, based in Norwalk, Connecticut, saved $95,000 and reused 62 tons of corrugated and foam packaging material.

To encourage customers to return product packaging, Perkin-Elmer offers free return shipping and donates $1 to environmental and wildlife organizations for each package

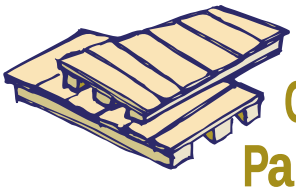
received. While staff members were initially optimistic, the program has surpassed everyone's expectations by achieving a 28 percent return rate since its inception in 1992.

Measuring cost savings and waste prevention progress resulting from the program is relatively easy for Perkin-Elmer. Because the company pays the shipping cost of all packing materials returned, it receives shipping invoices that identify the number and weight of packages returned. The company enters the data into a spreadsheet to calculate the total weight and number of packages. To calculate cost savings, the company estimated how much new packaging it would need to purchase if no packages were returned. This was done by using the net number of returned (undamaged) packages to calculate the cost of buying an equal amount of new packaging.

The cost of return shipping (from invoices)	$100,000
The cost of refurbishing some of the corrugated boxes	$15,000
Total cost	$115,000
Cost to purchase equivalent amount of new packaging	$210,000

Thus, the net savings of the package return program is $95,000.

Perkin-Elmer plans to work with its offices overseas to design uniform packaging so that packaging return can be implemented worldwide.



Cleaning Up with Pallet Reuse

Maytag Corporation, a major manufacturer of home appliances, floor care products, and vending machines, has effectively measured waste prevention associated with its wood pallet reuse program. Participating Maytag facilities (located in Illinois, Iowa, Missouri, Tennessee, and Indiana) send worn pallets to vendors that remanufacture them. Some facilities also send their wood pallets to sister plants for reuse. Combining the efforts of four facilities, Maytag reused or sent for remanufacture more than 90,000 pallets in 1994.

Maytag derived this number from company purchasing records and reports from the pallet remanufacturer. From these records, the company estimated that at 45 pounds per pallet, it eliminated more than 4 million pounds of wood waste. In a similar manner, the **Maytag-Galesburg Refrigeration Products** facility, located in Galesburg, Illinois, estimated that it recovered more than 3 million pounds of wood pallets.

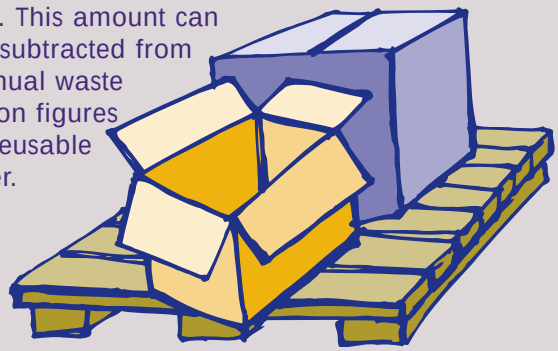
The **Maytag-Herrin Laundry Products** facility also measured the amount of waste it prevented by switching to returnable plastic containers for shipments of washer timers.

To calculate the waste prevented, the facility multiplied the weight of one of the previously used corrugated cartons [42 pounds] by the number of units delivered from the facility over a six-month period [390]. Thus, this change eliminated more than 16,000 pounds of corrugated material.

Measuring Waste Generated by Reusables

The switch to reusable packaging can reduce vast amounts of waste. Even reusables, however, generate some waste over time. For example, reusable containers will eventually wear down, at which time they must be refurbished (if possible), recycled, or discarded. Containers also can be damaged and require repair or replacement. In most cases, however, the amount of waste from reusable containers is negligible in the first year or two of use and, over time, is many times smaller than the amount of waste from single-use containers.

But how do you calculate the amount of reusables that must ultimately be recycled or disposed of? If you know the average life expectancy of the reusable container, waste generation can be amortized for the life of the container. One simple way to make this estimate is to divide an individual container's weight by its life expectancy. If a reusable container weighs 50 pounds and is expected to last 10 years, about 5 pounds of waste will be generated per container per year. This amount can then be subtracted from total annual waste prevention figures for the reusable container.



Waste Reduction Pays Dividends

In 1994, **BankAmerica**, headquartered in San Francisco, California, conserved 750,000 pounds of paper and saved more than $1 million through three paper reduction initiatives. How would you measure such an achievement?

For starters, the company reviewed warehouse distribution records to determine the effects of a 1994 paper waste reduction campaign. As part of this campaign, BankAmerica encouraged employees to make double-sided copies, carefully format documents, and pare down distribution lists. To calculate the difference in paper purchases between 1993 and 1994, the bank examined its own warehouse distribution records for past paper requests from company departments. In doing so, the company discovered that photocopy and computer paper supply requests declined by 13 percent and 18 percent, respectively, from 1993 to 1994 —a total reduction of 200,000 pounds. At the same time, the number of employees remained approximately the same.

The company reduced the amount of paper used annually by 40,000 reams. At 5 pounds and 500 sheets per ream, the corporation saved approximately 200,000 pounds, or 20 million sheets, of paper.

Secondly, the bank discovered that by eliminating company procedure manuals in branch offices, it conserved 25 million sheets of paper in one year. Instead of distributing paper copies, the company set up a centralized reference library and a telephone support center to provide procedural information.

To measure this effort, the bank compared the total number of manuals printed in 1993 to the number printed in 1994. The difference between the two years' totals times the number of pages per manual equalled the amount of paper reduced. The company determined that limiting the number of manuals reduced paper use by approximately 250,000 pounds in 1994.

Estimated decrease in the pounds of paper used: (25 million sheets of paper/500 sheets per ream) x 5 pounds/ream = 250,000 pounds

BankAmerica also began double-sided printing of the account reconciliation section of customer checking account statements. Based on warehouse distribution records, the branch responsible for generating and sending these statements requested approximately 300,000 fewer pounds of paper in 1994 as a result of this change. This reduction occurred even though the number of accounts remained approximately the same.

Estimated decrease in the pounds of paper used: (30 million sheets of paper/500 sheets per ream) x 5 pounds/ream = 300,000 pounds

The combined paper savings realized through these three initiatives totals 750,000 pounds. Easier than you thought, right?

A Drumroll Please...

If you have a standard delivery system established with a vendor, your company might find measurement as easy as **Southern Mills** did with its drum take-back program. One of the finishing plants of this textile manufacturer, based in Atlanta, Georgia, established a purchasing contract with its dye and chemical vendor. The contract requires the vendor to take back empty metal and fiber drums for reuse. Prior to the take-back program, Southern Mills landfilled the drums.

Southern Mills receives a standard shipment of 883 metal drums and 334 fiber drums per year to accommodate its production schedule. The same number of drums is now returned to the vendors. An empty 55-gallon metal drum weighs approximately 40 pounds; a similar fiber drum weighs approximately 22 pounds. To determine the amount of waste prevented, Southern Mills performed the following calculations:

883 metal drums	334 fiber drums
x 40 lbs/drum	x 22 lbs/drum
35,320 lbs of metal drums	7,348 lbs of fiber drums

By adding these two figures, Southern Mills found that it prevented 42,668 pounds of metal and fiber waste in 1994.

To promote safe packaging reduction, the Institute of Packaging Professionals (IoPP) has prepared Guidelines for Responsible Chemical Packaging Management and Guidelines for Disposition of Used Packaging. This guide helps companies determine the best strategy for managing containers that have been used to store hazardous materials. The guide includes sections on:

- Residue minimization
- Recycling
- Reconditioning
- Returnable packaging
- Consumable chemical packaging

Each section contains an introduction, a description of the strategy, its pros and cons, and specific examples.

The guide is available from IoPP for a fee of $25. To order, contact IoPP at 703 318-8970.

Wood-Be Alternatives to Landfilling

Some disposal facilities and haulers provide (or require) weight information on recycling collection and waste loads. If your company has a waste reduction baseline such as disposal or hauler records, measuring waste prevention could be just a simple calculation away.

Measuring the success of its 1994 wood waste prevention and recycling efforts revealed significant savings for **Ingersoll-Rand Company**—an industrial equipment manufacturer headquartered in New Jersey. In 1994, 16 of Ingersoll-Rand's 46 facilities located across the nation explored waste reduction opportunities for wood, using landfill records as a baseline for measuring. To reduce the generation of wood waste, all but one of these facilities switched to reusable totes instead of wood pallets and skids where possible. The majority of these totes are collapsible plastic shipping containers with built-in handles.

One of Ingersoll-Rand's facilities, located in Shippensburg, Pennsylvania, took a different approach and sent 1.2 million pounds of wood skids and pallets to a private landfill—but not for disposal. Rather, the landfill chipped the wood and sold the chips as landscaping material or used them as road cover at the facility. The Shippensburg facility measured the amount of wood chipped by placing the pallets and skids in designated hoppers and weighing them prior to chipping.

Measuring the amount of wood conserved by switching to reusable totes required a different approach. With consistent production levels in the 16 facilities for 1993 and 1994, Ingersoll-Rand assumed that it would have generated and disposed of roughly the same amount of wood in both years. Thus, the company started with a baseline of 4,718,000 pounds of wood landfilled in 1993 by all 16 facilities. The 15 facilities switching to reusable totes landfilled 2,740,000 pounds of wood in 1994; the Shippensburg facility chipped 1,200,000 pounds of wood in 1994. Subtracting the 1994 chipping and landfilling amounts from the 1993 baseline reveals that 778,000 pounds of wood waste were prevented by switching to reusable totes. The table below displays the figures used in this calculation.

Baseline 1993 Landfilled (16 facilities)	1994 Landfilled (15 facilities)	1994 Wood Chipped (Shippensburg only)	1994 Wood Waste Prevented by Totes (15 facilities)
4,718,000 lbs	2,740,000 lbs	1,200,000 lbs	778,000 lbs

Ingersoll-Rand plans to continue its efforts to conserve wood in 1995. Other facilities are evaluating the use of reusable totes, and facilities will reuse and rebuild pallets as much as possible and continue to work with vendors on pallet take-back programs.

Reducing Steel Scrap Through Equipment Changes

One of the benefits of measurement is being able to pinpoint inefficiencies in work practices or production. One company that used its knowledge of waste generation rates to make changes in its production process is **Virco Manufacturing** of Conway, Arkansas. Through a measurement tracking system, Virco discovered that old equipment was generating too much scrap steel. By investing in new equipment, the company not only reduced waste generation but cut costs as well.

The company's steel scrap tracking system depends on a small group of employees in the inspection department. These employees prepare monthly scrap reports that are used to measure production efficiency and to compare the reports obtained from the scrap recyclers. Basically, this entails tracking the weight of raw materials bought, the weight of these same materials in the furniture produced, and the weight of scrap materials. The weight of the materials in the furniture and the weight of the scrap materials should add up to the weight of the materials purchased. In this manner, scrap generation is monitored as an indicator of production efficiency.

In 1993, Virco's tracking system revealed a steadily rising scrap rate. Old equipment was identified as the culprit, and Virco decided to invest in new fabrication equipment. Thus, by tracking its steel scrap generation so precisely, the company was able to make an educated choice about improving its production process.

Besides saving money over the long term, the switch has increased employee safety, saved energy, improved product quality, and curtailed steel scrap generation. Comparing the 1993 and 1994 scrap reports, Virco found that it had eliminated more than 680,000 pounds of steel scrap thanks to the new equipment. This translates into a savings of approximately $270,000 in material costs alone. These reductions are significant, especially in light of the fact that Virco's production rate increased by more than 10 percent in 1994. Virco expects further reductions in its scrap steel rate in 1995.

Measuring Waste Reduction:
A Spotlight on Our Partners

Slimming Down Waste by Reducing Bulk Mail

Sometimes the best way to measure waste prevention is to go to the source. That's the approach the **Northeast Utilities Service Company** took when it launched a pilot program at its corporate center to reduce nonessential and duplicate pieces of bulk mail. By measuring the amount of incoming mail, Northeast Utilities estimated that between July 1, 1994, and December 31, 1994, the company reduced the amount of third-class (bulk) mail by 39,000 pounds and advertising by 3,000 pounds.

Prior to initiating the program, Northeast Utilities determined that its corporate center received approximately 3,200 pounds of mail per week. To arrive at this number, employees at the corporate center mail room weighed daily mail deliveries and recorded the results for a week. While sorting mail for regular internal delivery, these employees also removed nonessential mail such as consumer products catalogs, brochures, flyers, and pamphlets; mail addressed to employees who had left the company; and duplicate pieces of bulk mail. They placed this mail in separate containers for weighing. To the company's surprise, this nonessential, duplicate, and outdated mail constituted 42 percent of all mail received. This percentage was consistent with measurements conducted at three other company facilities.

To reduce its mail waste, Northeast Utilities initiated a program to remove employee names from bulk mail lists. The company contacted hundreds of trade associations and product suppliers directly by phone and letter asking them to update their mailing lists. The company also distributed kits to employees to help them remove their names from mailing lists. The kits included a supply of preprinted labels to make it easy for employees to request removal of their names. Northeast Utilities estimates that over a six-month period, the company requested that more than 15,000 employee names be removed from nonessential mailing lists.

Several months into the mail waste reduction program, the company repeated the mail measurement process to determine whether progress had been made. The company found that it was receiving an average of 1,500 fewer pounds per week of nonessential bulk mail.

To estimate the amount of nonessential bulk mail reduced in the first six months of the program, the company extrapolated the average amount of bulk mail reduced during a week of the program (1,500 pounds). Working from this figure, the company estimated that it prevented nearly 40,000 pounds of nonessential bulk mail waste over a six-month (25-week) period. Because the second round of measurements took place relatively early on in the program, additional reductions may have taken place that are not accounted for. In addition, Northeast Utilities is considering remeasuring the bulk mail to determine more accurately the long-term reductions and account for seasonal fluctuations.

Because of the initial success and employee support of the program, the company plans to expand it to additional facilities.

Northeast Utilities concluded that the avoided disposal and handling costs far outweigh the costs of measuring and program management.

For companies interested in reducing the amount of third class or bulk mail received, one good place to start is the Mail Preference Service, Direct Marketing Association, P.O. Box 9008, Farmingdale, NY 11735-9008. Companies can request the Direct Marketing Association to remove names from mailing lists or limit receipt of bulk mail.

Measurement Software

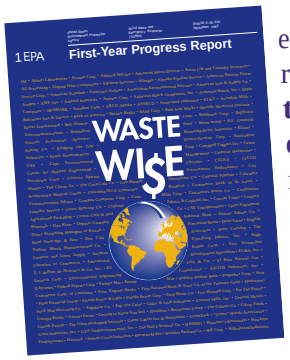
Many software packages are available to help companies measure waste reduction progress. While EPA does not endorse any particular product, two software packages are profiled briefly here.

PackTrack®,developed by **Johnson & Johnson**, tracks, measures, and reports on a company's waste reduction activities. PackTrack® can monitor the waste reduction results from alterations in thousands of products or packaging materials simultaneously. A companion software program called PackTrack Corporate® has the ability to analyze and summarize the data PackTrack® has created. At Johnson & Johnson alone, the software has tracked savings of more than 57 million pounds of materials worth more than $50 million.

Accounting Software Application for Pollution Prevention (ASAPP), developed by **Electric Power Research Institute,** allows a company to track both hazardous and nonhazardous waste generation, management, and reduction activities (e.g., reuse and recycling), as well as costs. For example, by using ASAPP one **Baltimore Gas & Electric** facility discovered it could reduce its solid waste by 35 percent and reap an estimated $17,000 in annual savings.

For more information, call the WasteWi$e helpline at 1-800-EPA-WISE.

WasteWi$e Measures Up: More Than One Million Tons Reduced in 1994



By measuring their waste reduction efforts, WasteWi$e partners were able to report **nearly a quarter of a million tons** of waste prevented and close to **one million tons** of materials collected for recycling in 1994. In total, that's enough material to fill the Houston Astrodome more than five times! In addition, WasteWi$e partners helped create stronger markets for collected recyclables by purchasing 23 different kinds of products made from recycled materials.

These impressive results were compiled from the 1994 Annual Reporting Forms submitted by 170 WasteWi$e partners. They demonstrate the power of voluntary actions to reduce waste and indicate the enormous potential of individual companies to prevent waste and recycle.

EPA congratulates WasteWi$e partners for the leadership and hard work that is making business waste reduction a success. To order the report, or for more information, call the WasteWi$e helpline at 1-800-EPA-WISE.

APPROACHES TO COLLECTING DATA

Here are a few methods that can be used to collect data for establishing a baseline and tracking progress in reducing materials and waste.

Hauler records

Strengths: Hauler records can provide accurate data on the weight or volume of waste collected at your facility, especially if the hauler provides records of weight as recorded at the landfill or only picks up when the company has verified that the containers are full.

Limitations: Hauler records provide less accurate data if they simply record the number and volume of containers emptied, without noting the degree to which each container was full. They also do not provide information on specific waste components or reduction activities, nor do they account for materials (e.g., shipped products) that are disposed of outside the company.

Purchasing records

Strengths: Company purchasing records can provide data on amounts of specific materials and products used, giving an indication of potential waste generated. Reviewing records can require less time and effort than reviewing specific activities that generate waste. Other records that may provide information are inventory, maintenance, and operating logs, as well as supply, equipment, and raw materials invoices.

Limitations: If company purchasing is not centralized, the records may be incomplete or require substantial effort to collect and analyze. Comparisons of purchases from year to year can be skewed by changes in the number of employees, level of business, number of products manufactured, etc.

Employee surveys

Strengths: Surveys can be especially useful for measuring specific waste prevention activities that involve many participants or materials that can be reduced through more than one waste prevention activity (e.g., conservation of paper by two-sided copying, reusing paper, and other actions).

Limitations: Unless they carefully record their use of a material, employees may not always assess their waste reduction activities accurately.

Waste sort

Strengths: By physically collecting, sorting, and weighing a representative sample of waste material (often from company dumpsters), waste sorts can provide quantitative information about specific types of material generated.

Limitations: Waste sorts can require significant time and effort to conduct, especially to get a representative sample of waste. They do not provide information on materials shipped or mailed out of the facility or on specific waste-generating practices.

Kodak Zooms In on Waste Reduction

Measuring the effect of solid waste reduction efforts can be particularly challenging for large companies. Numerous initiatives across many facilities can be difficult to track. Departments often have different measuring techniques, and separate divisions of the company sometimes have competing priorities that make measurement more difficult.

The **Eastman Kodak Company's Kodak Park** facility in Rochester, New York, has risen to the challenge of waste reduction measurement. With 20,000 employees in 200 buildings spanning 1,900 acres of land, the facility has found that combining several measurement techniques, taking advantage of existing data, and keeping employees informed about results have helped measurement initiatives succeed.

Many large companies facing the problem of prioritizing environmental activities might feel that measuring waste prevention is not as high a priority as, say, monitoring regulated activities. But Kodak, which spends a lot of resources tracking its progress in other environmental areas, has come to the conclusion that it pays to measure solid waste reduction. "We measure our solid waste reduction activities to see if they work and to see if they can save us money," says George Thomas of Kodak's Health, Safety, and Environmental Division and coordinator of the company's solid waste measurement program.

Taking Advantage of Existing Data

Large companies often find that gathering waste reduction measurement information can be challenging. Kodak's advice? Tap into information that's already been collected for other purposes, such as internal records and reports to local governments. For example, Kodak is required by law to report to Monroe County officials how much solid waste is disposed of, recycled, and prevented at the facility. The county then reports the data to New York State to help the state assess the impact of its solid waste management plan. Because Kodak had already determined how to collect quality data from within the company and how to avoid double counting and other pitfalls, the company didn't have to start measuring from scratch.

Measurement Systems

In 1994, Kodak formed a team of employees to evaluate and monitor the company's solid waste reduction measurement initiatives. Team participants include building service staff and representatives from various manufacturing operations that generate large amounts of waste.

The team relies on a variety of measurement techniques to gauge the success of individual initiatives as well as facility-wide achievements.

Snapshots

Kodak uses two common measurement techniques to gauge the success of individual waste reduction initiatives. In doing so, the company is able to identify its successes and reassess those initiatives with room for improvement.

The first method takes a project-specific approach to estimating waste reduction and is based on a series of simple calculations. Managers of individual waste reduction projects report on a regular basis to the Health, Safety, and Environment Department, supplying a steady stream of current measurement statistics.

For example, Kodak redesigned its shipping pallets to use less wood in each pallet. To measure waste prevented, Kodak consulted purchasing records a year after the redesign to calculate how much less wood (2 x 4s) was purchased for pallet construction in 1994 than 1993. It turned out the company purchased 1.1 million fewer board feet for pallet construction in 1994, even though a similar number of pallets was used. To translate this into pounds, the company multiplied this number by five—the number of pounds in one board foot. This works out to be a total savings of approximately 5.5 million pounds.

Using a second method known as extrapolation, Kodak gauges how much waste could be reduced if individual pilot waste reduction projects were implemented on a company-wide basis. To do this, the company calculates the weight of the material being reduced by the pilot project on a per person basis. These weights are then multiplied by the total number of employees company-wide.

For example, to assess the recycling potential of commingled paper, transparencies, newspapers, and magazines, the facility initiated a two-month pilot study involving about 300 people. Collectors weighed the recyclable materials on a daily basis during the study. The study revealed that the recycling program diverted 2.2 pounds per person per month (pppm) of commingled paper, 0.25 pounds pppm of transparencies, and 4.4 pounds pppm of newspapers and magazines. Kodak then multiplied these figures by the total number of employees (20,000) to determine the potential amount of material that could be recycled if these actions were implemented throughout the facility. It turns out the company could divert nearly 137,000 pounds of materials if these recycling activities were implemented facilitywide.

The Big Picture

Besides looking at individual initiatives, Kodak uses a sophisticated method to measure facilitywide waste reduction progress. Kodak began measuring overall solid waste reduction in 1994 by adapting an existing tool called production indexing. A team of company specialists developed the tool in 1990 to track hazardous waste generation and reduction. Kodak has found that the technique also effectively measures solid waste reduction. The company now uses this technique to track the overall percentage of improvement in waste reduction from year to year. In 1994, for example, the company determined that it had reduced its solid waste generation by 11.8 percent over 1993 levels.

How does the system work? First, the company determines the total annual solid waste generation for each of its operations categories (office waste, production waste, etc.). These figures are obtained in part from the company's Solid Waste Information Management System (SWIMS)—a computerized database system originally developed to track hazardous waste. The database is accessed and updated continuously over a facilitywide network by dozens of employees who generate or handle most of the company's solid waste. The system tracks type and amount of waste, how and where it is generated, and its method of management.

To supplement SWIMS information, the company uses a variety of other sources to compile waste generation figures, including:

- Production records.
- Waste hauling records.
- Records of recyclables collected.
- Mandatory waste generation reports to the county's solid waste management division.

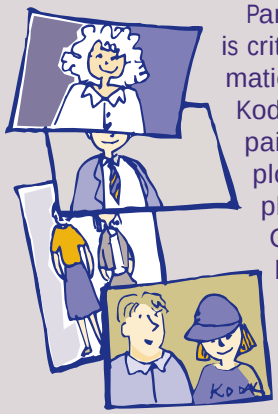
Once waste generation figures are determined for each operations category, they are divided by a common denominator such as "production levels" or "dollars spent" to arrive at an "indexed" waste rate for each category. This allows the company to view its waste generation in relation to an operations budget or how much product was produced—a much more informative number than flat waste generation figures. Using this method, Kodak knows how much waste it generates for every roll of film produced or for every dollar spent on a certain operation. These "indexed" waste rates can then be compared to waste rates from previous years to determine the percent of waste reduction progress being made.

Using a production index affords several benefits. First, fluctuating levels of production are accounted for from year to year, making indexing a consistent measurement tool over time. For example, the company might produce less waste one year merely because it is simultaneously producing less product. Indexing accounts for such variations.

Additionally, the system provides flexibility because waste reduction can be measured in relation to any kind of unit, such as pounds of product produced or units of energy expended. And because this method uses the previous year as a baseline, it demands that companies keep striving to reduce waste. "Even if you make progress in the previous year, you're back to square one as soon as a new year rolls around," says Thomas. "You can't sit back and rest on your laurels."

For more information on Kodak's measurement methods, contact George Thomas of Kodak at 716 722-5264.

Employee Participation: Crucial to Measurement



Participation of employees is critical to gathering information for measurement. "At Kodak, we try to make it as painless as possible for employees to participate," explains George Thomas. One way that Kodak has been able to elicit the cooperation of employees is by sharing results. "People are less likely to want to help if they think the information they gave you just went into a black hole," said Thomas. "They want to hear what useful and interesting things have come from the information they provided. The key to getting cooperation is creating a dialogue with people."

Polaroid Reduces Waste Frame by Frame

The **Polaroid Company**, based in Boston, Massachusetts, has designed an efficient system for shipping and receiving photographic materials that minimizes waste. For prepackaged products being sent back and forth between the company and its suppliers, Polaroid uses reusable corrugated shipping "totes." These topless boxes, which are the same size as the single-use boxes they replaced, contain no recycled materials to ensure maximum strength. (Boxes shipped by Polaroid to its customers do have recycled content because they will not be reused again and don't have to be as durable.) Empty totes are easily folded and compacted for return trips and are used an average of 20 times before they are recycled.

By using reusable totes, the company avoided the use of more than 160,000 boxes and conserved nearly 100 tons of corrugated in 1994. Reusable totes also helped Polaroid's vendors keep prices down on the various components they send to the plant. Overall, the company saved more than $70,000 in 1994 through reusables.

In addition, the company decided to standardize the size of its reusable shipping "skids" (pallets) to accommodate all of its shipping needs, including: incoming boxes packed with products; outgoing, folded down empty boxes; and outgoing boxes of consumer-ready products. This measure conserved more than 4,000 pallets (80 tons of wood) and saved Polaroid and its vendors $32,000 in 1994.

We'd Like to Hear from You!

WasteWi$e would like to hear about your efforts to measure waste prevention, whether they apply to specific waste prevention activities or to your company's overall program. Also, if you have experience with any tools or software we haven't covered in this issue, contact us at 1-800-EPA-WISE.

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