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Pollution Prevention Workbook

*A Waste Reduction Guide for Facilities in the
Chesapeake Bay Watershed*



Businesses for the Bay thanks the Elizabeth River Project for granting permission to modify their “River Stars P2 Workbook”. Their hard work and dedication to protecting and restoring the Chesapeake Bay is greatly appreciated.

Businesses for the Bay also thanks the Chesapeake Bay Program’s Pollution Prevention Workgroup for their assistance in preparing this document.



Businesses for the Bay is the Chesapeake Bay Program’s voluntary pollution prevention program for businesses, industries, government facilities, and other organizations within the Chesapeake Bay watershed.



The Chesapeake Bay Program is a unique regional partnership that has been directing and conducting the restoration of the Chesapeake Bay since the signing of the historic *1983 Chesapeake Bay Agreement*. The Chesapeake Bay Program partners include the states of Maryland, Pennsylvania and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the U.S. Environmental Protection Agency, representing the federal government; and participating advisory groups.

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Introduction

The Chesapeake Bay watershed is one of our most important natural resources. The 64,000 square mile area that drains to the Chesapeake Bay, called the watershed, is home to a wide variety of organisms, including birds, shellfish, trees, fish, and humans. With so many dependent upon the Bay watershed, it is critical to protect and restore it.

What is Pollution Prevention (P2)?

One of the best ways to protect the Bay is to prevent pollution and waste from entering the waterways. Pollution prevention (P2) is a hierarchy of activities that eliminate or reduce the amount of chemical contaminants or other wastes at the source of production.

Source reduction is the preferred method to addressing waste issues, followed by reuse/recycling, then energy recovery. Treatment, followed by safe disposal, should be used as a last alternative.

How Can You Help?

There are a number of ways you can prevent pollution and waste at the source. This workbook outlines more than 30 different strategies that your facility can implement to help protect the Chesapeake Bay. Not only can these strategies be good for the environment, they can be good for your facility's bottom line. In many instances, preventing pollution can be less costly than treatment or disposal. Use this P2 Workbook to guide you in selecting those P2 strategies that make the most sense for your facility to implement.

Businesses for the Bay

Another way to help is by joining *Businesses for the Bay*. *Businesses for the Bay* is the Chesapeake Bay Program's voluntary pollution prevention program for businesses, industries, government facilities, and other organizations located throughout the Chesapeake Bay watershed. More than 270 facilities have joined *Businesses for the Bay* since the program began in 1996. These forward-looking facilities have all committed to help protect the Chesapeake Bay watershed by preventing pollution and waste. In 1998 alone, *Businesses for the Bay* participants prevented or reduced more than 877 million pounds of waste while saving more than \$3.9 million. That's good for the Bay and good for business!

By joining *Businesses for the Bay*, your facility gets the recognition it deserves for implementing P2 activities to protect the Bay. In addition, you will be eligible for the prestigious *Businesses for the Bay* Excellence Awards, given annually to those facilities

that have made great progress in achieving their P2 goals. *Businesses for the Bay* also hosts various technical assistance workshops to help its participants learn more about P2 and new ways that they can prevent pollution at their facilities. As a participant, you will also have access to the *Businesses for the Bay* Mentors, volunteers who can help you with your pollution prevention needs. With so many benefits to your facility and the Bay, it makes sense to join today!

Getting Started

It's easier than you may think to get started preventing pollution and waste at your facility. Begin by following these steps:

★Step 1 - Read this Pollution Prevention Workbook

Use the strategies outlined in this workbook to identify pollution prevention and waste reduction opportunities at your facility.

★Step 2 - Conduct a Self-Evaluation

Take a look around your facility and get an idea of how you're doing with your pollution prevention and waste reduction activities. By assessing where you are now, you'll be able to quickly identify new opportunities to reduce your wastes and save money. *Businesses for the Bay* and your state/district pollution prevention coordinators are available to help you with this process.

★Step 3 - Set Your Goals

Once you've identified the opportunities that exist at your facility, you can begin to set pollution prevention goals. Effective goals are achievable, measurable, observable, flexible and demanding.

★Step 4 - Take Advantage of Free Services Available to You

Businesses for the Bay Mentors are just one of many free resources that exist to help you implement your P2 activities. On-site advice, access to P2 literature, help with presentations, identifying funding opportunities, and referrals to other local, regional or national assistance providers are just a few of the services that you can take advantage of to help you achieve your goals.

★Step 5 - Document Your Success

Be sure to document your progress along the way. Keeping records will help you to see your successes in achieving your P2 goals and will help you when seeking recognition through the *Businesses for the Bay* Excellence Awards program. Be specific in recording when your goals are reached, amounts of waste reduced, and any cost savings or other tangible benefits.

★Step 6 - Bask in the Recognition

Let others know of your successes and accomplishments. *Businesses for the Bay* will help to promote the good P2 work you're doing at your facility.

Strategy 1 **Developing a Pollution Prevention Plan**

Pollution prevention (P2) should be a facility-wide effort, supported by *all* workers. It is important to write down your company's policies or goals regarding pollution prevention and to share it with all company employees.

A P2 plan should outline the strategies your facility will take to eliminate wastes and the steps needed to implement those strategies. It is important to have a plan written down so that all employees can refer to it and have a clear understanding of the facility's goals and objectives.

To be effective, a pollution prevention plan should include:

◆ *The company pollution prevention policy.* It is important to encourage all employees to read and adopt this policy in their everyday activities.

◆ *Pollution prevention goals.* You may want to include specific goals in your P2 plan, or just a process by which goals will be identified. If you develop specific goals, be sure to include target dates for achieving the goals and make sure they are part of the formal plan. Or, because the goals are likely to change and be enhanced over time, you may want to have a separate document for recording goals and progress. Goals should be achievable, measurable, observable, flexible and demanding, and should incorporate the following aspects:

- ◆ steps on how to implement the P2 plan
 - ◆ facility operations
 - ◆ environmental management systems
 - ◆ purchasing and accounting practices
 - ◆ employee awareness and training
- ◆ public relations/community involvement

◆ *A P2 Leader.* Identify one person who takes the lead on P2 efforts. Typically, this is the environmental manager, but could also be the facility owner/operator or an employee that has volunteered his/her time. The leader should be able to track progress on the goals and report the results to the group.

◆ *A process for employees to participate in on a day-to-day level.* For instance, employees could form a Pollution Prevention Team that identifies and evaluates potential pollution prevention opportunities. It is advantageous to make this team "cross functional", incorporating people from different areas of the company (engineering, accounting, etc.). Training may be necessary for

DuPont set a corporate-wide goal of zero waste and emissions. The company works with all employees to implement pollution prevention strategies throughout its operations.

participation in this team and when/if new pollution prevention strategies are implemented (such as the purchase of new equipment or when processes change).

◆ *A process for assessing the waste streams at your facility.* This is commonly referred to as a Pollution Prevention Opportunity Assessment. Waste types, volumes/amounts, impacts, and costs should be documented for each process that creates waste. This should cover wastes for all media: solid waste, water waste streams and air. Make sure to identify the true costs of waste generation - including costs associated with regulatory compliance, paperwork and reporting, loss of production potential, materials in waste stream, storage, transportation, treatment, disposal, employee exposure risks and health care, and future liability. These costs should be allocated by waste stream or process type, not buried in overhead costs. For more information on how to conduct a pollution prevention opportunity assessment and on environmental cost accounting for your waste streams, contact the *Businesses for the Bay* Coordinator at 1-800 YOUR BAY. Once you go through this process, it becomes apparent that using fewer resources and preventing pollution at the source can be less costly in the end. In other words, pollution prevention pays!

◆ *A method to track progress.* Good record keeping is essential to measuring your progress and showing your results. It is important to document specific information about waste elimination, reduction, recycling, re-use, and treatment, including types, volumes/amounts, and impacts. This information should be as detailed as possible and should be divided by process. The tracking method should be identified in the plan. However, you may want to track the actual progress as a separate document. Once goals are selected, measure baseline performance for the item so that progress can be measured. For instance, if you decide to recycle a material, measure how much material is currently recycled and how much was disposed as waste before you implemented the recycling program. Then, after the recycling has been implemented, measure the amount that each of those categories has changed. Other measurements to consider include disposal cost avoided, number of employee hours required to implement, and training cost for implementation.

Warner-Lambert Company developed an environmental management plan, which includes objectives and targets for the many projects conducted at this pharmaceutical manufacturing facility. The plan is reviewed regularly by management.

◆ *A recognition or award program for employees.* A great place to get P2 ideas is from your employees. It is important to recognize and reward employees who identify P2 opportunities and promote environmental awareness. By recognizing employee efforts, you encourage them to continue looking for P2 opportunities and boost their moral.

◆ *Information for Awards and Mentoring Efforts.* You may want to include information in your P2 plan for any awards or recognition you receive for your

P2 efforts. The *Businesses for the Bay* Excellence Awards are just one way to gain recognition. Do not hesitate to publicize your efforts or any events you host to celebrate successes. The public really wants to hear about positive environmental efforts, especially when they are voluntary! It is also a good idea to record participation in community events and other community awareness efforts such as helping another organization with P2 issues. Share information and technology with other companies that have operations similar to yours. They may have ideas you haven't considered.

Once your P2 plan is in place, periodically evaluate it and update it as needed. Ask yourself if it still meets your facility's needs. Has the company's policy changed? Does the P2 plan still reflect the company policy? Do we need to appoint another P2 leader? Should we change the format of our P2 team? Are we tracking our progress accurately and with enough detail? What is our progress? Do we need to do another assessment to look for additional P2 opportunities? Do we need to update our goals? Are there any strategies that we have overlooked for obtaining more employee support and participation? It is important to ask these questions regularly so that you can always stay ahead with your goals and progress.

If you need any assistance along the way, *Businesses for the Bay* is here to help.

How to Do Pollution Prevention

Once you have established the plan, you are ready to start preventing pollution to meet your goals.

If you want to reduce or eliminate your wastes, it is very important to know what they are, how much you are producing and where they are coming from. Waste manifests, invoices for disposal, reports to regulatory agencies, sampling programs and purchase orders, are all good sources of information about your wastes. If you do not have this type of information, you can go “Dumpster Diving.” This technique is very simple: go out to your dumpster or other waste storage area and inventory the types and amounts of waste you see.

You can do this process once, or, in order to get more accurate information, repeat the process at different times over a period of a month or two. Don’t forget to include releases to other areas, such as water or air. Make sure to inventory the waste from each process (each individual process may have independent waste storage areas). Ask yourself these questions:

- ◆What is the main component of our waste? Chemicals? Solvents? Paints? Nutrients? VOCs? Paper?
- ◆Can we make our processes more efficient (or fine tune them) to reduce the waste?
 - ◆Are there any hazardous wastes that we could minimize by substituting another, less toxic material somewhere in the process or by changing the process?
- ◆What can we do about our purchasing or inventory procedures to reduce the waste?
 - ◆Is there anything in our waste that we could reuse or recycle?
 - ◆Is there anything in our waste that someone else may be able to reuse?

As you ask these questions, use the information in the following strategies to come up with ways to reduce the wastes your facility produces. Minimizing waste should be a top management priority. By reducing waste at the source your company can save money and time and can become more efficient.

Facility Operations

Reducing at the Source

Reducing pollution at the source, also called “source reduction”, is the most effective way to prevent pollution and waste from being created during your operations. By going to the starting points of your operations, you can identify opportunities to fine tune your systems. Use the source reduction strategies (Strategy 2 - 14) to learn how prevention can be the best medicine!

Strategy 2 **New Technology**

Investigate technologies that can help you eliminate or reduce your wastes or emissions. Although purchasing new equipment may be costly, through the use of environmental accounting one can see the long-term benefits and can determine the payback for the equipment. Examples of new technology include:

- ◆ Aqueous parts washers which can remove oil and grease from metal parts as well as or better than solvent parts washers
- ◆ Wet cleaning techniques for dry cleaning, which eliminates the use of some solvents
 - ◆ Recovery systems for hazardous material used in processes
 - ◆ Efficient high volume, low pressure spray guns
 - ◆ Distillation units to recover solvents
- ◆ Compact fluorescent lighting to reduce energy demands and costs
- ◆ Energy efficient products such as appliances, parts, engines or motors, and vehicles

*Proctor & Gamble
Cosmetics
changed their
process to run
batches of
cosmetics starting
with light colors
and progressing to
dark colors. They
use fewer raw
materials, create
less waste, and
increased*

Strategy 3 **Process Re-Design**

It is not always necessary to change your equipment to improve your results. Process re-design involves changing the process in order to reduce generated waste. Examples include:

- ◆ Using a physical means for paint removal (closed blasting facility) instead of solvent based paint strippers
 - ◆ Using less packaging for the product (redesign product)
- ◆ Finding ways to extend the life of hazardous materials which will in turn minimize the amount of waste produced
 - ◆ Capturing process water for re-use

- ◆Using smaller quality control samples and returning them back into the process
- ◆Running batch processes

Strategy 4 **Product Substitution**

Substituting a less toxic material is an effective P2 technique. There are many solvents and coatings that may be substituted with less hazardous ones. Many times water can be used just as effectively. (Appendix B includes some

Internet sites that discuss alternatives to solvents and coatings.) It is important to realize that product substitution may require some re-training of staff on the procedures for use of the new product. When substituting products, consider the following:

- ◆Rather than detergents, use hot water/steam-cleaning methods for washing oil off metal parts such as engines, tools and equipment.
- ◆Use non-solvent cleaners. You can also reduce pollution by using a solvent parts washer with a recycling service or filtration unit.
- ◆Use non-chlorinated compounds rather than chlorinated ones; they are less toxic.
- ◆Use waterless hand cleaners.
- ◆Try using safe cleaning alternatives such as baking soda and vinegar.

CustomPrint, Inc. switched to soy-based inks, alcohol-free fountain solutions and low VOC blanket washes for its printing operations. The result is a quality

Strategy 5 **Energy Efficiency**

Reducing energy consumption can save money and helps to reduce pollution associated with power generation (carbon dioxide, sulfur dioxide and nitrogen oxides). Educate your employees about switching off lights and equipment when not in use. Look for office equipment and other products with the ENERGY STAR logo on them. Purchase energy efficient lighting, such as compact fluorescent bulbs, or use sensors that turn lights on only when a room is in use. Install temperature control devices on air conditioning or heating units. You could even use the money saved with energy reduction initiatives to have a party for employees that will increase employee morale and educate them about efforts they can make at home.

Strategy 6 **Washing Facilities, Vehicles and Equipment**

Prevent oil and grease, suspended solids, nutrients, heavy metals, toxics and other contaminants entering the drainage system when washing equipment or vehicles.

Select a proper location for washing. Wash vehicles and equipment at a facility (on or off site) that drains to a sanitary sewer. Options include using commercial washing facilities or inside your building with drainage to the sanitary sewer.

Properly design any unenclosed wash area. If you plan to wash vehicles or equipment outdoors, then the wash area must:

- ◆ drain to an oil/water separator and then to the sanitary sewer
- ◆ be covered and/or bermed so that an area no bigger than 200 square feet drains to the sanitary sewer
 - ◆ be paved
- ◆ be well marked as a wash area and posted with signs prohibiting oil changes and washing with solvents.

Use other options as a last resort. If it is not possible to connect a wash area to the sanitary sewer, collect the water in a dead-end sump, tank, or other device for transport to the sanitary system for proper disposal. Alternatively, place a temporary plug over the storm drain and pump the accumulated water to the nearest sanitary sewer. Call the local public works office for permission to temporarily block a city-owned storm drain.

Strategy 7 **Outdoor Pressure Washing**

Pressure washing buildings, roofs, and pavement dislodges pollutants such as oil, paint chips, and sealants. Allowing dirty or debris-laden wash water to enter the storm drainage system violates local and state law.

Avoid pressure washing if possible. Use mechanical cleaning methods such as brooms and wire brushes as much as possible.

Manage the waste water appropriately. If you can't avoid pressure washing, use sandbags or other materials to divert the flow of waste to a grassy or vegetated area which does not directly discharge to a storm drain. (NOTE:

This method should not be used if the water contains any hazardous substances.) If such a vegetated area is not available, divert the waste water to a temporary basin or other material or to a storm drain catch basin which is not in the public right-of-way and which you have temporarily blocked. Then, pump the water to a containment vehicle and decant it at an appropriate disposal site. Alternatively, the runoff may be diverted to the sanitary sewer system at the wash location if it meets your locality's discharge guidelines.

Dispose of solids. Solids remaining after the water has been removed need to

be cleaned up and properly disposed.

Strategy 8 **Vehicle Fueling**

Gas and diesel spills are common when vehicles are fueled. Fuels contain organic compounds and metals that are harmful to aquatic life. If the fueling area is improperly designed, oil and grease, metals, and toxics can be washed to the drainage system in violation of state and local law. To minimize pollution, take the following steps:

- ◆ Do not top-off vehicles during fueling. Overfilling causes spillage and vents gas fumes to the air. Make sure automatic shutoff valves on the gas nozzles work.
- ◆ Know the size of the tank you are filling and carefully watch the gauges to avoid overfilling and spills.
 - ◆ Post signs that instruct fuel pump operators not to overfill gas tanks. Overfilling causes spillage and vents gas fumes to the air.
 - ◆ Pave the fueling area with cement concrete. Fuel deteriorates asphalt.
- ◆ Design the fueling area as a spill containment pad. In other words, design it so that any spills are contained and storm water runoff from adjacent areas can't enter it.
- ◆ Cover the fueling area. This keeps rain from hitting the ground and washing away any spilled materials. Ideally, the cover should extend several feet beyond the spill containment pad.
- ◆ Keep suitable clean-up materials on-site to allow prompt clean-up of any spill. See Strategy 14 regarding spill prevention and clean-up.

Strategy 9 **Pesticide Use**

Pesticide misuse or misapplication can be a human health hazard. It can also lead to ground and surface water pollution and can be harmful to birds, fish and other animals.

Integrated pest management (or IPM) is preferred method to controlling pests in the Chesapeake Bay watershed. IPM is a pro-active approach where the best available pest management methods to prevent pest damage are used and the hazards to humans and the environment are minimized. Use of pesticides can be reduced dramatically by using IPM methods. Examples of IPM techniques include striking a natural balance by letting natural predators such as birds, bats or toads eat your insect pests and using hand removal, traps or diatomaceous earth (a dust that kills insects such as aphids) in place of pesticides. Contact your state Cooperative Extension Service for ideas

controlling unwanted pests and to learn more about IPM.

Pesticides should only be used when less toxic options are not available. If you must use pesticides, use the least toxic type and use only as directed. Avoid broad-spectrum insecticides which are generally, more toxic to non-target organisms such as birds. Take care to follow directions for proper use and disposal of the product. Be careful with leftover pesticides and their containers – they could be hazardous waste. Always read labels. Contact your local public works or environmental agency for information on proper disposal. Never pour excess pesticides on the ground into a storm drain, sink drain, or ditch.

Strategy 10 **Landscape Designs for Water Quality**

Plant selection and landscape design can significantly affect water quality through their effects on water infiltration, storm water runoff, pest control, and maintenance needs. Using native plants can help to eliminate or reduce the need for pesticides and maintenance (such as watering or mowing). Planting native species to help improve water quality is commonly referred to in the Chesapeake Bay watershed as “Bayscaping”. When turf is necessary, choose seed varieties recommended for your region. Techniques for protecting water quality include:

- ◆ Collecting runoff in bioretention areas to treat and slow water runoff before it enters the storm drains or waterways.
 - ◆ Reducing high maintenance turf by planting perennial gardens, wooded groves, hedgerows, beds of flowering and fruiting shrubs, or wildflower meadows.
 - ◆ Reducing or eliminating impervious surfaces (the paved surfaces which do not allow water to penetrate into the soil). Replace pavement with stones or pavers set in sand, or with mulched pathways.
- ◆ Create no-mow zones by planting natural buffers of trees, shrubs, flowers or ground cover to protect sensitive areas like streams and drainage areas.

For additional information about Bayscaping and landscape designs, contact the Alliance for the Chesapeake Bay at 410-377-6270 or your state Cooperative Extension Service.

Strategy 11 **Landscape Installation and Maintenance**

Landscape installation and maintenance methods affect both the amount of runoff and the pollutants potentially washed into our waterways. Choose

planting sites based on soil, slope, moisture and light conditions. Be sure to use native plant species (i.e., Bayscaping). Test the soil before you amend or fertilize it and reseed as needed. Review your application schedules for eliminating or reducing fertilizer, herbicides and pesticides. Follow state Cooperative Extension Service guidelines and keep records.

When installing new plant material, do not bury the roots too shallow or too deeply. Apply a layer of mulch no more than 3 inches deep and avoid mounding around trunks of trees and shrubs. When possible, leave existing trees and shrubs in place. Maintenance equipment and ground disturbance in the root zone can harm trees and shrubs.

Strategy 12 **Keeping a Clean Work Site**

Why is it important to keep a clean work site? Any residue (such as paint chips, metal shavings, or grease) on a surface that drains to a storm drain can be washed to waterways. Disorganized work places also increase the chance of spills. Keep surfaces that drain to the drainage system clean and organized.

Remember to:

- ◆ Keep toxic materials separated from non-toxic materials.
- ◆ Organize the work place to avoid clutter. This can help you to easily find products, will help reduce the chance of spills and can help you identify leaks immediately.
- ◆ When transferring or diluting chemicals, use a funnel and place a tray underneath to catch spills. Place drip pans under the spouts of liquid storage containers.
- ◆ Regularly sweep or mechanically remove outside wastes such as those found around the dumpster or on the parking lot.
- ◆ Place a tarp on the ground during remodeling, painting preparation work, sandblasting, or other operations that can create dust or debris.
- ◆ Drain fluids such as unused gas, transmission and hydraulic oil, brake fluid, and radiator fluid from vehicles or parts kept in storage. Recycle, reuse or dispose of these fluids properly (see Strategies 5,6 and 18).
- ◆ Fix leaks on equipment and vehicles. Maintain equipment properly and develop a system to report leaks promptly.
- ◆ Cover exposed soils with plants, gravel, or pavement depending on the use of the area.
- ◆ Don't hose down your shop floor if the water can enter a storm drain. It's best to sweep it.

Strategy 13 **Waste and Materials Storage**

Proper storage of materials and wastes is very important. If materials and wastes aren't properly stored, pollutants can leak or be washed out by rain water and carried into waterways and lakes. Consider the following options:

- ◆ Clearly label the contents of all containers.
- ◆ Don't mix different types of hazardous waste in a single container.
- ◆ Use suitable storage containers for your materials and wastes and store them in an appropriate location.
- ◆ Make sure that your storage containers are in good condition and lined with a material that won't react with the product or waste. Outdoor storage containers should be rigid, durable, water tight, and rodent-proof.
- ◆ Handle containers in ways that won't cause ruptures or leaks, and keep them tightly closed except when you're adding or removing the contents.
- ◆ Check with the fire department for containment requirements for reactive or ignitable waste.
- ◆ Place re-usable plastic sheeting over stockpiles of substances such as sand, gravel, soil, and lumber. Secure the cover with weighted objects such as sand bags or old tires. This will prevent sediments and nutrients from washing into the waterways. Better yet, build a covered areas for stockpiles. (Be sure it conforms to local and state regulations.)
- ◆ Inspect your dumpster area regularly and avoid placing liquids in the dumpster. Spills and leaks from dumpsters are a common source of pollutants, especially from facilities producing damp or oily wastes that are compacted. If the dumpster leaks, it should be replaced. Alternatively, you can isolate the area around the dumpster and drain it to the sanitary sewer system.
- ◆ Keep the dumpster lid tightly closed to keep the rain out and prevent leakage. A more foolproof approach is to build a cover over the dumpster. The dumpster should also be locked to prevent others from using it to dispose of hazardous products.
- ◆ Pave the storage area, install a drainage system, and treat the storm water runoff.
- ◆ Dike and drain liquid storage areas. For liquid products or wastes stored outdoors, surround the storage area with a curb or dike to provide volume to contain 10 percent of the volume of all the containers or 110 percent of the volume of the largest container, whichever is greater. If the storage area is permanent, install a drain. For used oil, hazardous waste, or materials controlled by the Fire Code, the liquid should drain to a dead-end sump; otherwise, connect it to the sanitary sewer, after checking with your locality for regulations.
- ◆ Obtain storage permits if needed. Businesses that accumulate or generate more than 220 pounds of hazardous waste per month (or 2.2 pounds if extremely hazardous) may also need a storage permit from the state/district environmental department. Also, check with your municipality if you plan to

construct a storage area (or structurally modify the one you have).

Strategy 14 **Spill Prevention and Clean-Up**

If you use paints, solvents, oils, gasoline, pesticides, or other materials that can spill, your facility needs a spill control plan. This is true even if you handle materials that are normally considered harmless (such as food), because only clean water belongs down a storm drain.

Take steps to prevent spills. Examine your activities for ways to reduce the chance of spills. For instance:

- ◆ Organize the delivery and unloading areas. Ideally, loading or unloading docks should have overhangs or door skirts which enclose the trailer end, and should be designed to prevent run-off of storm water (e.g., by being surrounded by a low berm).
- ◆ Use a funnel to transfer liquids from one container to another.
- ◆ Keep trays on hand to catch spills from leaking or overheating cars.
 - ◆ Store materials where they won't be knocked over.

Consider installing a spill control oil/water separator to prevent contamination if a spill does occur.

Prepare a clean-up plan. Any facility that uses oils, gasoline, pesticides, or even bulk food products should prepare for and know how to handle possible spills. Generally, a clean-up plan includes a description of the facility, contact people to be notified and specific clean-up instructions. Certain laws require facilities that generate or store regulated amounts of hazardous waste to have a spill clean-up plan. All facilities should have basic procedures to follow during a spill and these procedures should be made clear to employees.

Clean up spills immediately. If a spill occurs, respond immediately and follow your clean-up plan. Protect your safety and the safety of others. Do not enter an area with spilled toxic materials without proper clothing and gear. Be sure to:

◆ Stop the source of the spill.

◆ Contain the spill. If the spill involves a liquid, block the flow by placing absorbent materials along the edge of the spill. If there is a chance the spill could enter the storm drain or sewer, cover the drain inlet (such as with a rubber mat). If a spilled powder could blow away, contain it by covering it with plastic or, if it won't react with water, by dampening it with wet towels or a light water spray.

◆ Cover liquid spills with absorbent material. Use materials that can be swept or picked up such as kitty litter, shop rags, sawdust, or vermiculite. The idea is to contain - not disperse - the spill, so don't use emulsifiers or dispersants. For solids such as powders, sweep or wipe up the material.

◆ Report the spill to the appropriate authorities and call for help as needed. If the spill presents a hazard to public health or safety, call 911 immediately.

◆ For large spills, consider using the services of a private clean-up firm.

◆ Properly dispose of clean-up materials. Never wash spilled materials down a sanitary sewer or storm drain. Cleaning products used to absorb a hazardous waste (such as vermiculite used to soak up spilled degreasers) cannot be put in the garbage. They may be considered hazardous waste and should be disposed of accordingly. Contact your local authority for disposal requirements.

Strategy 15 **Re-Use**

If you still have pollution and waste after implementing the source reduction strategies described above, there are still options for preventing those wastes from being disposed. See if others can use your leftovers. Many times, there are other uses for those things that are considered waste. For example, used motor oil can be burned for heat in certain types of space heating equipment, a neighboring facility may be able to use leftover paint or other materials, dirty solvent from one process may be clean enough to use in another process, scrap

Canon Virginia, Inc. encourages customers to return their spent toner cartridges for reuse at

wood may be turned into mulch, or used furniture can be given to a charity or to employees.

Consider using a waste exchange service. A waste exchange service helps those looking for raw materials find them from the wastes of others. These types of services, usually operated through the Internet, will post descriptions of your wastes for others to see so that they may “shop” for their raw materials. In other words, your “trash” may be another person’s “treasure”. Fees may be associated with waste exchange services, but they should be weighed against all of the costs associated with treatment and disposal. See Appendix B for a list of waste exchanges and their web site addresses.

Strategy 16 **Recycling**

If you still have wastes after exploring source reduction and re-use opportunities, then consider recycling. Take advantage of opportunities to recycle whenever you can. Here's how to make recycling work:
Separate wastes. Keep your wastes in separate containers according to the type of product, and keep records of the container contents (if possible, keep materials in the original container). Combining different types of waste can prevent recycling and greatly increase disposal costs. For example, uncontaminated waste oil can be recycled, whereas waste oil mixed with solvents requires a much more costly and complicated disposal process.
Use recyclable materials. The following materials are potentially recyclable:

- ◆ used antifreeze
- ◆ used tires
- ◆ used car batteries
- ◆ engine and lubricating oil
- ◆ uncontaminated gasoline and brake fluid
- ◆ some solvents such as degreasing agents and paint solvents
- ◆ building materials such as concrete, asphalt or drywall
- ◆ metal scraps
- ◆ latex paint
- ◆ cooking oil, fats and greases
- ◆ paper and cardboard
- ◆ container glass, aluminum and tin

Check the Internet sites listed in Appendix B to learn more about using and purchasing recycled products.

Keep receipts. For documentation purposes, always keep receipts from the recycling vendor showing the amount and specific types of wastes recycled.
Compost landscaping waste. Consider installing a compost facility at your own site and, encourage clients and customers to compost, too. Be sure to

R.R.
Donnelley &
Sons
Company, a
commercial
printer,
recycles spent
aluminum
printing
plates, film,
fiber cores
from paper
rolls, and
scrap metal
among other

locate your compost area so that it doesn't leach into a waterway or storm drain. Leave grass clippings to decompose on the lawn. Leaves (ideally shredded first) can be used as mulch on flower beds or composted. Similarly, woody waste can be shredded for mulch. If you can't compost on-site, call your locality to find out about yard waste collection and disposal opportunities.

Strategy 17 **Waste Disposal**

Disposal should be a last option. If it is not possible to completely eliminate all waste produced, proper waste disposal is extremely important to avoid both environmental and legal problems. Remember: businesses may be financially and legally responsible for their waste disposal even if it is handled by a waste contractor. Although the business owner has ultimate responsibility for the proper disposal of hazardous and solid waste, employees may also be legally liable. When disposing of waste, follow these steps:

Identify whether your waste is considered hazardous. Proper waste disposal depends on the chemical properties of the waste. A hazardous waste is a solid, liquid, or gas that could pose dangers to human health, property, or the environment and can no longer be used for its intended purpose. Likely

hazardous wastes include:

- ◆paints, thinners and solvents
- ◆cleaning and polishing fluids
 - ◆coolants
 - ◆pesticides
- ◆petroleum products

◆rags completely saturated with gasoline or other hazardous materials.

Other materials that burn or itch on contact with skin, dissolve metals, wood, paper, or clothing, or bubble or fume upon contact with water are also likely to be hazardous. If you don't know whether a product or waste is hazardous, check shipping papers, material safety data sheets (MSDS) and product labels.

Assume a substance is hazardous until you find out otherwise. Prior to safe disposal, place the substance in a sealed container, label it, and store it in a safe place.

If wastes are hazardous, determine the quantity. Is less than 220 pounds produced per month or batch (2.2 pounds if the waste is extremely hazardous) or accumulated at any time? Businesses that generate more than this amount have greater disposal requirements and may be considered a small-quantity generator (SQG). You may be required to dispose or recycle your wastes through a recycling firm, treat them on-site or have them treated through a treatment, storage and disposal (TSD) facility. Be sure to consult federal, state, and local regulations for specific requirements.

Determine the best disposal method. Recycling or finding someone who can

use the waste are preferred over disposal. Read the disposal section of the material safety data sheet (MSDS) to determine the proper disposal of a specific product. The fact that a waste isn't hazardous doesn't automatically mean it can go into your dumpster or down your drains. There are limits on what can go down the sanitary sewer. Call your local authority for details.

Never dump wastes down a storm drain or onto the ground.

Purchasing & Accounting Practices

Purchasing and accounting practices are important to the waste reduction process. By taking a close look at your inventory purchasing and control practices, you may be able to identify additional source reduction opportunities. And, when you start to look at the costs of prevention versus the costs of treatment and disposal, you will probably see that preventing pollution pays!

Strategy 18 **Track Costs by Process or Activity**

Until all the costs for a particular process or activity are clearly attributed to that process or activity, it will be difficult to know what the *true* cost of that activity is and how much the initiation of a pollution prevention strategy in that process will save. For example, if a particular process generates hazardous waste, the waste disposal costs, regulatory compliance costs, sampling and analysis costs, reporting costs, insurance costs, worker health costs, environmental liability costs, as well as other expenses should all be attributed directly to that process when examining cost savings.

Sometimes costs can be hidden. It is important to look at all departments that may be involved in the activity or process you are examining. Be sure to work with your accounting department to obtain accurate information about costs and expenses. There are several computer programs available including P2 Finance and E2 Finance (both available on-line from Tellus Institute), that will help you to identify cost savings and cost savings opportunities. Once you can look at the whole picture, you are likely to see that the P2 activity you are considering will pay off in the long-run.

Strategy 19 **Inventory Control**

Use the following tips to control your inventory to prevent waste and save money.

Buy only what you need. Purchase products in amounts that can be used completely within a given period of time. Maintain a good inventory control system to prevent unnecessary purchases.

Purchase products that are durable. Products that will last longer are a good investment. Recommend them to your customers. Maintain equipment and products so they last as long as possible.

Buy the least toxic products available. Where possible, select those materials

White Oak Semiconductor worked with their supplier to develop a “just-in-time” inventory system to reduce their expired chemical wastes.

that do not contain toxic ingredients. Be sure to read labels and look for terms such as "non-toxic". Review Material Safety Data Sheets (MSDSs) prior to purchasing materials.

Limit or eliminate outdated materials. Make sure all inventory is dated and that there is a procedure in place to use older materials first. Consider working with your suppliers to develop a "just-in-time" delivery system, where the materials you need are delivered to you shortly before you need them. This will help you to reduce the amount of expired materials on your shelves, and your risk in handling and shoring those materials.

Strategy 20 **Damaged Materials**

If materials arrive damaged, request your supplier take them back. These materials should not become part of your waste stream. Contact your supplier to make sure they will take back damaged materials. Work with your receiving department to develop a system to return damaged materials.

Materials or supplies that become damaged in the course of your operations might be usable in another application. Be sure to consider all re-use and recycling options before throwing the material away. If materials damaged during operations are a big part of your waste stream, consider implementing an employee training program or examining the handling process/procedures to decrease the opportunity for damage to occur.

Strategy 21 **Recycled Materials**

Purchase products made from recycled materials. Look for those products with the highest post-consumer content. Purchasing of recycled products is necessary to close the recycling loop. Markets for the recycled materials collected from your business will develop only when you buy back the recyclables in the form of new products. Buying recycled products also encourages energy and resource conservation. To find out more about buying products made from recycled materials, contact your vendors or your state's pollution prevention office and visit the web sites listed in Appendix B.

Strategy 22 **Packaging**

Evaluate the amount of packaging materials used in the items you purchase. If you are generating a lot of waste as a result of over-packaged raw materials, work with your supplier to reduce these wastes. One option is to purchase items in bulk, as long as you can utilize the supply before it may expire (See Strategy 19). Another option is to work with your supplier to use reusable containers that can be sent back to the supplier for refills. Examine the amount of packaging you use in the products you make. Reduce packaging materials where feasible.

Strategy 23 **Printed Materials**

When you send off materials to be printed, support the cause of pollution prevention elsewhere by having them printed with soy-based inks on recycled paper. Encourage your customers, suppliers, and vendors to do the same.

Strategy 24 **Alternative Fueled Vehicles**

When purchasing vehicles for your facility's fleet, consider using alternative fueled vehicles. Alternative fuel vehicles use clean-burning fuels such as compressed natural gas (CNG), liquefied petroleum gas (LPG), methanol, ethanol, and electricity. They may be built by the original manufacturer or traditional vehicles may be converted to use alternative fuels. Alternative fueled vehicles include dedicated vehicles which use only one fuel, bifuel vehicles which use two different fuels at different times, or flex-fuel vehicles which can use two or more fuels (usually gasoline and methanol or ethanol) simultaneously. Financial incentives may exist in your area to encourage the purchase of these types of vehicles. For more information about incentives and alternative fueled vehicles, contact your state/district energy office or pollution prevention coordinator.

PEPCO, an electric utility, uses alternative fueled vehicles in

Employee Awareness & Involvement

Keeping your employees informed about pollution prevention issues and opportunities is critical to reducing your pollution and wastes. Use these strategies to engage employees and get them involved in the P2 process.

Strategy 25 Employee Involvement

Many of the steps you can take to prevent pollution need to be followed on a daily basis. Therefore, employee education is key to success.

"In-house" training. All employees should be aware of those practices that can prevent pollution as well as those that may create potential pollution problems. You may want to incorporate pollution prevention training into another training program you conduct on a regular basis. Remember to budget for this training. Consider incorporating the following into an "in-house" training program:

- ◆ Incorporate the strategies in this workbook into your training sessions. Be sure to provide new training when a procedure changes or when new equipment is purchased.
- ◆ Explain your company's P2 strategies and goals with employees so they understand why certain procedures must be followed. Post your goals for all to see.
- ◆ Include P2 concerns in new employee orientations and in written procedures.
 - ◆ Provide employees with proper disposal guidelines.

Once a training program is in place, monitor workers to determine the effectiveness of the training. Remember to provide daily feedback on observed behavior to encourage P2.

Solicit employee ideas. Ask your employees to identify pollution prevention opportunities. One easy way to do this is to post a "P2 Suggestion Box" where all employees have access to it (such as the lunchroom). Another is to develop employee teams and give them the responsibility of identifying opportunities at your facility.

Participate in other educational opportunities. Encourage employees to attend workshops and read educational materials to learn more about P2. Attend relevant conferences or courses such as those sponsored by your trade association or community college.

Visual Reminders. Post an explanation of your P2 policies and strategies in

Parker's Exxon, a small automotive service station, trains all of its workers and asks them to sign a contract stating they recognize their role in

Siemens Automotive uses employee teams to identify P2 opportunities throughout its facility. One team saved the company \$93,000!

areas where employees will see them. Display signs or posters with P2 tips to keep employees involved. Include P2 issues or articles in staff minutes or a company newsletter.

Strategy 26 **Employee Recognition**

It is important to offer positive recognition to employees who are preventing pollution at your facility. Recognition not only awards those who are actually "living" your company policy, but encourages others to follow their example.

It also helps to boost employee morale.

Create incentives for developing or implementing P2. Incentives help to encourage employees to prevent pollution and to get involved. Employees that identify P2 opportunities deserve special recognition. Some examples of incentives include:

- ◆ Naming an "Environmental Employee of the Month." Post their picture and story in an employee newsletter.
- ◆ Providing a gift certificate, cash awards, paid time off from work, or special parking space for employees that identify a new P2 opportunity.
- ◆ Offering an employee who contributes a pollution prevention idea a percentage of cost savings resulting from that idea.

Make pollution prevention a part of job performance. Make it known how committed your organization is to pollution prevention by incorporating contributions to your pollution prevention efforts into performance evaluations.

NORSHIPCO
awards its
"Environmental
Star of the
Month" with
\$50, a good
parking space
and recognition
in the
company's

Strategy 27 **Employee Commuting**

Reducing the number of miles your employees commute each day is important to improving the air quality in the Chesapeake Bay watershed. Encourage employees to carpool, use mass transit or walk to work. Install a bike rack to encourage cycling to work (it's good exercise, too). Offering employees the option of telecommuting is another valued employee benefit. Contact your state/district transit authority to learn about incentives such as commuter tax credits or making mass transit tickets available for sale at your business.

Public Relations & Community Involvement

Showing clients and your community what you are doing to protect the Chesapeake Bay and its rivers is good public relations. Getting your neighbors to do their part can also be good for business and the Bay.

Strategy 28 **Product Promotion**

Provide educational materials to customers. Why not share your values and pollution prevention policies or mission with your customers? You may find that many customers are glad to know that they are supporting a company that promotes pollution prevention and other environmental initiatives. If you produce a product and it is now cleaner or more "environmentally friendly" due to a product substitution or process change, let your customers know. If you recycle and use non-toxic cleaning products in your office, or use energy efficient equipment, tell your customers and patrons. Not only can pollution prevention save you money, it can improve your image and increase patronage.

Strategy 29 **Sharing Experiences—Be a Mentor**

Help other facilities learn about pollution prevention and your P2 experiences. The only way pollution prevention is going to have a significant impact on the Chesapeake Bay is if more and more facilities get involved. An excellent way to make sure participation increases is to mentor another facility. Ways you can share your expertise include:

- ◆ Become a *Businesses for the Bay* Mentor! Contact the *Businesses for the Bay* Coordinator at 1-800-YOUR BAY to learn how.
 - ◆ Give a presentation at another local business.
 - ◆ Share your pollution prevention success stories with others.
 - ◆ Help another facility develop their own pollution prevention goals.
- ◆ Assist another facility with setting up an employee recognition program or other P2 strategy.
- ◆ Sponsor a workshop on pollution prevention or good management practices.

Need help with your P2 strategies? Contact one of more than 100 of our Businesses for the Bay Mentors.

Strategy 30 **Awards and Incentive Programs**

Consider applying for the *Businesses for the Bay* Excellence Awards, or other local or national environmental awards. Receiving an award for your P2 initiatives can:

- ◆ promote these initiatives within your organization
 - ◆ improve employee awareness
 - ◆ improve your company image
- ◆ make your company more viable as a mentor to other facilities.

Contact the *Businesses for the Bay* coordinator for information on how to apply for Excellence Awards. The *Businesses for the Bay* Excellence Awards are presented annually to those facilities that have implemented outstanding pollution prevention activities and have achieved significant progress toward their P2 goals.

Are you doing great P2 work? Contact the Businesses for the Bay Coordinator for an Excellence Awards application!

Strategy 31 **Community Outreach Programs**

In addition to sharing your pollution prevention strategies with other businesses, help educate the community about P2. Put up a display at a local environmental event or give a tour of your facility to your residential neighbors. Talk to children at a local school about pollution prevention or recycling. Start a Community Advisory Panel to share facility news with the surrounding community. By getting the community involved, you help raise awareness about the benefits of P2.

Hercules, Inc., a manufacturer of cellulose derivatives, participates in a local Community and Industrial Panel.

Strategy 32 **Area Clean-Ups**

Host a “Clean the Bay Day” or other community clean-up event. This is an excellent way to market your company’s P2 efforts while encouraging others to appreciate their natural surroundings. Partner with community organizations and volunteer groups to help organize the event.

Appendix A

Environmental Contact Information

DISTRICT OF COLUMBIA

General Information

D.C. Department of Health
Environmental Health Administration
51 N Street, NE, 6th Floor
Washington, DC 20002
(202) 535-2500
www.dchealth.com

Pollution Prevention Information

Pollution Prevention & Waste Minimization Officer
Office of Special Programs and Compliance Assistance
(202) 535-2500

Small Business Assistance

Ombudsman for Small Business Assistance
D.C. Environmental Health Administration
(202) 535-2500

Reporting Spills

Contact the Mayor's Command Center to report any spills. Note the date, time and location.
(202) 727-6161

MARYLAND

General Information

Maryland Department of the Environment
2500 Broening Highway
Baltimore, MD 21224
(410) 631-3000 or (800) 633-6101
www.mde.state.md.us

Pollution Prevention Information

Pollution Prevention Coordinator
MDE Pollution Prevention Program
(410) 631-4119

Small Business Assistance

Small Business Assistance Program
(410) 631-4158

Reporting Spills

To report spills or other problems causing pollution or damaging wildlife habitat, note the location, time of day, and other pertinent information and report the problem immediately.
(410) 974-3551 (24 hours)

PENNSYLVANIA

Pennsylvania Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street
P.O. Box 8772
Harrisburg, PA 17105-8772
(717) 783-2300
www.dep.state.pa.us

Regional Offices

Northeast Regional Office, Wilkes-Barre(717) 783-9981
Southeast Regional Office, Conshohocken (570) 826-2475
South Central Regional Office, Harrisburg(610) 832-6021
North Central Regional Office, Williamsport(717) 705-4797
Northwest Regional Office, Meadville (814) 332-6816
Southwest Regional Office, Pittsburgh(412) 442-4343

Pollution Prevention Information
Pollution Prevention Coordinator
PA DEP Office of Pollution Prevention & Compliance Assistance
(717) 772-8926

Small Business Assistance
Small Business Assistance Program
(800) 722-4743

Small Business Ombudsman
(717) 772-8951

Reporting Spills
When you notice a problem that could be causing pollution or damaging
wildlife habitat, note the location, time of day, and other pertinent information
and report the problem immediately.
(800) 541-2050

VIRGINIA

Virginia Department of Environmental Quality
629 East Main Street
P.O. Box 10009
Richmond, VA 23240-0009
(804) 698-4000
www.deq.state.va.us

Regional Offices
Tidewater Region (757) 518-2007
Southwest and Roanoke Regions(540) 562-5749

Pollution Prevention Information
Pollution Prevention Coordinator
VA DEQ Office of Pollution Prevention
(804) 698-4545

Small Business Assistance
Small Business Assistance Program
(804) 698-4394

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION III

1650 Arch Street
Philadelphia, PA 19103-2029
(800) 438-2474
www.epa.gov/region03

Pollution Prevention Information
Office of Environmental Innovation (OEI)
(215) 814-2761

Small Business Assistance
Business Assistance Center
(800) 228-8711

Small Business Ombudsman
(800) 368-5888

APPENDIX B

Pollution Prevention Internet Resources

Lots of great pollution prevention information can be found on the Internet. Below is just a sampling of the many web sites available to help you implement the pollution prevention strategies outlined in this workbook. Most have links to other web sites with additional information. (Sites operational as of Summer 2000).

Businesses for the Bay

For information about *Businesses for the Bay* and how to join, go to:
www.chesapeakebay.net/b4bay.htm

Compliance Assistance Centers

Automotive Services and Repair
www.ccar-greenlink.org

Local Government Assistance Network Center
www.lgean.org

Metal Finishing
www.nmfrc.org

National Agriculture Compliance Assistance Center
www.earth2.epa.gov/oeca/ag/aghmpg.html

Painters and Coatings Center
www.paintcenter.org

Printing
www.pneac.org

Printed Wiring Boards
www.pwbrc.org

Transportation Compliance Assistance Center
www.transource.org

Energy & Water Efficiency

Department of Energy–Alternative Fuels Data Center
www.afdc.nrel.gov

Department of Energy–Energy Efficiency and Renewable Energy Network
www.eren.doe.gov

Solstice Sustainable Energy Information
www.solstice.crest.org

U.S. EPA Energy Star Programs & Products
www.epa.gov/energystar

Water Wiser
www.waterwiser.org

World Energy Efficiency Association
www.weea.org

Environmental Accounting

P2 Finance
www.tellus.org/general/software.html

E2 Finance
www.tellus.org/general/software.html

General P2 Information

Center for Sustainable Systems
www.umich.edu/~nppcpub/

EnviroSense
www.es.epa.gov

Green Hotels Association

www.greenhotels.com

Local Government Environmental Assistance Network
www.lgean.org/

Maryland Center for Environmental Training
www.charles.cc.md.us

National Pollution Prevention Roundtable
www.p2.org

Toxics Use Reduction Institute
www.turi.org

U.S. EPA Office of Pollution Prevention & Toxics
www.epa.gov/p2

Virginia Environmental Services Network
www.vesn.org

Landscaping & Bayscaping

Alliance for the Chesapeake Bay
www.acb-online.org

Maryland Department of Natural Resources
www.dnr.state.md.us/wildlife/habitatfw.html

National Wildlife Federation Backyard Wildlife Habitats
www.nwf.org/habitats/index.html

U.S. Fish & Wildlife Service Chesapeake Bay Program Field Office
www.fws.gov/r5cbfp/Bayscapes.htm

Virginia Dept. of Conservation & Recreation's Natural Heritage Program
www.state.va.us/~dcr/vaher.html

Product Alternatives

CAGE – Coatings Alternatives Guide
www.cage.rti.org

SAGE – Solvent Alternative Guide
www.clean.rti.org

Waste Reduction Resource Center's Industry Sector Information
wrrc.p2pays.org/indsector.htm

Publications

Pollution Prevention Information Clearinghouse (PPIC)
www.epa.gov/opptintr/library/libppic.htm

Waste Reduction Resource Center P2 Infohouse
www.wrrc.p2pays.org

Recycling and Buying Recycled

Buy Recycled Information
www.dep.state.pa.us/dep/deputate/airwaste/wm/recycle/Buy/Buy.htm

The Loading Dock
www.loadingdock.org

Northeast Maryland Waste Disposal Authority
www.mdrecycles.org

Recycler's World
www.recycle.net

State/District Pollution Prevention Offices

District of Columbia Dept. of Health's Environmental Health Administration
www.dchealth.com/eha

Maryland Department of the Environment
www.mde.state.md.us/permit/p2prog.html

Pennsylvania Dept. of Environmental Protection's Office of Pollution
Prevention & Compliance Assistance
www.dep.state.pa.us/dep/deputate/pollprev/pollution_prevention.html

Virginia Dept. of Environmental Quality's Office of Pollution Prevention
www.deq.state.va.us/opp/opp.html

Sustainable Building, Design, Development and Manufacturing

Maryland Department of Natural Resources Green Buildings Program
www.dnr.state.md.us/programs/greenbuilding

SUNetwork
www.sustainableusa.com

U.S. Green Buildings Council
www.usgbc.org

Virginia Center for Stewardship
www.sustainableusa.com/va

World Business Council for Sustainable Development
www.wbcsd.ch

Technology Resources

Institute for Advanced Manufacturing Sciences
www.iams.org/p2/p2.html

Manufacturing Extension Project
www.mep.nist.gov/index1.html

National Technical Information Service
www.ntis.gov

Pennsylvania Department of Environmental Protection's TechNotes
www.dep.state.pa.us/dep/deputate/pollprev/Technology/TechAlpha/index.htm

University of Maryland at Baltimore, Technical Extension Service
www.erc.umd.edu

Waste Reduction Resource Center
wrrc.p2pays.org

Waste Exchange

Directory of Markets for Recyclable Materials
p2pays.org/dmrm

ISD Central
www.tsdcentral.com

Southern Waste Information Exchange, Inc. (SWIX)
www.wastexchange.org

Waste Minimization

EPA Region 3 Waste Minimization Web Page
www.epa.gov/reg3wcmd/waste_minimization.htm

WasteWi\$e
www.epa.gov/epaoswer/non-hw/reduce/wastewise/index.htm