Guide to Pollution Prevention in Your Community

Great Lakes United

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Citizen's Guide to Pollution Prevention in Your Community
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The purpose of this guide is to help citizen advocates create and improve the environmental practices of industry and government in the Great Lakes Basin. The practices advocated here, known broadly as pollution prevention, are not simply ways of controlling pollution, which has been the basic approach of environmental protection for the last twenty years. Pollution *control* accepts the creation of pollutants, but attempts to control what form they are produced in, how they are handled, and where they are ultimately deposited.

Pollution *prevention* attempts to avoid all the difficulties of safely transforming, moving, and storing pollutants by nipping things in the bud and avoiding the creation of pollutants to begin with. This, of course, is also a tall order, but it has the advantage of avoiding unpleasant surprises. Most pollution control techniques assume that some low level of exposure to pollutants will occur. Pollution control sets itself the task of determining how low that level should be to be statistically safe (that is, hazardous to only a few people in a million). Unfortunately, after a time these levels are frequently found to be too high. In addition, most pollution control techniques end up with some byproduct, such as ashes, that must be stored in a landfill. Few landfills are certified for safety from leakage for more than a dozen years.

To help Basin citizens bring about or improve pollution prevention in their communities, this guide has several goals.

First, we attempt to make it easy to gain access to the host of public information on pollution and the polluters who release it, since knowledge must be the basis of all activity.

Second, we hope to inspire by detailing pollution prevention techniques that have worked and the success stories that have relied on them. Proof that things can be done is a great motivator and a great persuader, too.

Finally, we hope to empower local environmental advocates by detailing the actions that citizens can take to force polluters and government to live up to their responsibilities to ensure a clean environment for ourselves and our offspring.

This chapter will try to put such efforts, be they government programs or regulations, citizen campaigns, or union negotiations with management, in the context of the "big picture" of pollution prevention and zero discharge. We will define terms and detail the policies and programs that most of the Great Lakes environmental community would like to see Great Lakes governments adopt.

Chapter 2 explains the first step in any community anti-pollution effort—getting information. We take a look at how citizens in the United States can use provisions in the Superfund law, the Clean Water Act, the Resource Conservation and Recovery Act (RCRA), and

the Emergency Planning and Community Right-to-Know Act to find out about the many toxic chemical activities that may be taking place in local communities.

For Canadian citizens, the guide offers advice on how to obtain the more limited information currently available to the public in Canada.

Chapter 3 provides "nuts and bolts" advice on how to educate a community and build strong citizen campaigns for pollution prevention. Among the topics addressed in this section are establishing goals for a pollution prevention campaign, building community leadership for the effort, organizing and publicizing meetings and events, educating the public through the media, working with unions on local environmental problems, and approaches for encouraging government and industry to work with citizens for pollution prevention.

Chapters 4 through 7 discuss a number of possible pollution prevention activities, with examples and success stories, that citizens could initiate or support. Chief among these is the creation of a comprehensive pollution prevention planning process that can be used in both the public and private sectors. Such a process assesses the use and fate of toxic chemicals, identifies pollution prevention opportunities and methods, chooses specific pollution prevention options, and develops plans for implementation of the options that are chosen.

History

In 1972 Canada and the United States signed an historic document—the Great Lakes Water Quality Agreement. The treaty is the descendant of the Boundary Waters Treaty signed by Great Britain and the United States in 1909. That treaty stated that, "Boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other." The treaty created the International Joint Commission (IJC), whose purpose is to assist the governments in carrying out their promises under the treaty.

The Canadian and United States federal governments became concerned about pollution problems in the Great Lakes in the late 1960s and early 1970s, and the pollution language of the Boundary Waters Treaty was a good vehicle for acting on that concern. In the resultant Great Lakes Water Quality Agreement, the two governments promised to work together and commit substantial resources to clean up the Great Lakes.

The 1972 agreement focused on the Lakes' most publicized problem at the time—the release of excess phosphorus and other nutrients into the Great Lakes. A rampage of algae growth stimulated by those nutrients consumed much of the oxygen dissolved in the waters, which suffocated the fish. Smelly dead fish and seaweed washed up on the shores of the lakes. Construction of modern sewage treatment plants, reductions in phosphorus in detergents, and limiting runoff from rural and urban areas, all stimulated by the signing of 1972 agreement, have resulted in considerable progress towards controlling the problem.

The agreement has been revised twice since 1972, in 1978 and 1987, in the hope of updating it to reflect increased knowledge about Great Lakes pollution. Central to the agreement now are the persistent (long-lived) toxic chemicals that are the focus of most pollution prevention efforts.

Pollution prevention

In recent years, the environmental community has come to view pollution prevention as the most viable approach to protecting the environment from toxic pollution. From "scrubbing" air pollution in energy plant smokestacks to "treating" water pollution in sewage plants, years of attempting to control pollution have resulted mostly in moving pollution from one place to another, usually from the air and water to the land (the scrubbed ash and the treated sludge are dumped into landfills). In the big picture, pollution control has failed because it creates a new problem, often a more complicated, longer-term problem, for every problem it solves.

Pollution prevention avoids all the horsetrading of one form of pollution for another, of one community's well-being for another, by proposing a simple plan of action: stop the dangerous waste by-products from being made in the first place.

Pollution prevention is the approach of choice for environmental problems caused by toxic chemicals. It effectively targets the modern-day synthetic toxic substances that are often too dangerous to be allowed into the environment in any quantity. Many of these toxics are persistent (long-lived), and some of them are also bioaccumulative (adding up over the life of each individual animal to higher and higher concentrations in its tissue, and becoming more concentrated as it is carried up the food chain from simple and small to larger and more complex animals).

A lumber mill that dumps too much sawdust into a river causes a significant pollution problem (the bacteria breaking down the wood consume all the oxygen, killing all the fish), but sawdust alone contains no persistent or bioaccumulative toxic substances. Dumping the sawdust on land, or dumping it over a wider area of water, or just dumping less of it, some or all of these steps might stop killing the fish.

However, this is not the case for the persistent, bioaccumulative, toxic substances, such as wood preservative and its byproducts, that this same hypothetical mill might emit. Persistent toxic substances cannot be dumped in some other place. Since they break down slowly or not at all, many such products will eventually show up in groundwater, drinking water, and fish. This process might take twenty years, but someone, someday, is guaranteed to be forced to either clean up the mess or live with the consequences. Of course, we have no right to put our neighbors, or our children, in that position.

Dumping smaller quantities of toxic substances, or dumping them over a wider area, is a commonly offered, but insufficient solution to the problem. In the first place, only rarely do we have good knowledge of the levels at which these kinds of chemicals pose a health danger. Secondly, they often build up to very high levels in fish, and thereby in the humans (as well as the birds) that eat them. Great Lakes fish are already too toxic to eat safely. We will guarantee that this condition is permanent if we do not stop polluting the lakes with persistent toxic chemicals. Pollution prevention is required to protect us against synthetic toxic substances.

Definitions

The pollution prevention concept created by environmentalists is intuitively sensible. At least in theory pollution prevention has become widely accepted as the environmental approach of choice when dealing with toxic substances. But government, business, and the environmental movement have conflicting agendas, so conflicting definitions of the same terms have emerged. In the list presented below, many of the terms reference several other terms, so the definitions must be read as a whole to make sense.

Pollution prevention is a combination of various strategies, many of them defined below, to eliminate the use of toxic chemicals and therefore the need to dispose of them by polluting or dumping. Pollution prevention is the opposite of pollution control. The ultimate aim of pollution prevention is not to emit less of a chemical, although that is useful, of course, but to eliminate its emission entirely.

For environmentalists, one of the goals of pollution prevention is **zero discharge** of persistent toxic chemicals, with the long-term goal of virtually eliminating them from the environment. We view zero discharge of a toxic chemical as meaning no discharge of that chemical. For government and industry zero discharge usually means anything from discharges that are below the level of detection to discharges below a level considered harmful. Both levels are arbitrary, since the mere application of a few research dollars could change them, and, of course, concentrations of such "zero discharge" chemicals can and will build up to levels far above detection or harm in certain places or in wildlife at the same time as government and industry are declaring that the chemicals in question are really not being emitted at all. Simply put, it is ridiculous to define zero discharge as anything other than no discharge.

Virtual elimination is a term hampered by equally divergent definitions. Environmentalists use the term to describe almost complete cleanup, in recognition of the fact that even with the best of efforts we will never totally erase decades of unfettered discharge. Government and industry use the term in two ways, sometimes to justify half-hearted cleanups (stressing the "almost" a lot more than the "complete"), and sometimes to jump categories of meaning entirely to describe a level of allowable pollution, something along the lines of "a lot less pollution."

Of course, it makes little sense to discuss virtual elimination of pollutants before the achievement of zero (no) discharge. You don't sweep the sidewalk while your father is still beating a rug over it.

Sunsetting, which is closely associated with the concept of zero discharge, is a step-by-step process for phasing out:

1) Production and use of targeted toxic chemicals
2) Processes that create toxic byproducts
3) End products that contain toxic materials.

Sunsetting a toxic substance or product is the surest way to prevent its entry into our environment. Society must carefully decide which types of substances pose enough of an environmental and human health threat to warrant sunsetting.

In-process recycling is the reuse of toxic chemicals or their toxic byproducts by the very processes they are generated in. In-process recycling qualifies as toxics use reduction or source reduction (see below) because chemicals move only inside a production process and never emerge as waste.

Out-of-process recycling is the reuse of toxic materials or their toxic byproducts by another manufacturing process (even within the same plant), or through an offsite recycling facility. This kind of recycling is *not* a form of toxics use reduction or source reduction (see below) because toxic wastes must be transported, creating risks for workers, the public, and the environment.

Waste reduction is the variety of measures that reduce the amount of toxic wastes that enter the environ-

ment. Many are not forms of pollution prevention. The term originated in industry to describe measures taken to reduce the amount of waste that it had to pay to dispose of. Most discharges to air and water cost only the price of a permit and so were not considered candidates for waste reduction. That has changed with tightening air and water discharge regulations, however. Waste reduction includes source and toxics use reduction (see below), but it may also include measures that are little different from traditional pollution control, such as de-watering, which is often used to reduce the volume and weight of hazardous waste destined for dumping in a landfill.

Toxics use reduction is the variety of measures that can be taken to reduce the amount of toxic chemicals that *enter* a facility. If a smaller amount of toxic chemicals enters a facility, a smaller amount will probably leave as waste, a smaller amount is likely to enter consumer products, and the risks associated with worker exposure to hazardous materials will probably be reduced. Toxics use reduction fundamentally changes the way industry thinks about toxic materials, questioning their use in the first place.

Source reduction is reduction of toxic waste at the source—the manufacturing process. It is nearly synonymous with toxics use reduction in practical effect, but different in philosophy: source reduction focuses on reducing the amount of toxic waste that *leaves* a facility, not on the toxic raw materials that enter it.

Both source and toxics use reduction include in-process recycling and changes in product design and manufacture so that toxic raw materials are used less and the amount of toxic waste generated is reduced. Source and toxics use reduction do not include incineration, transfer of waste from one environmental medium to another, or out-of-process recycling.

Waste minimization is an extremely ambiguous term used mostly by industry. It can mean anything from waste reduction to source reduction. The Local Government Commission of California, muddying the waters hopelessly, defines it as toxics use reduction, source reduction, in-process recycling, and out-of-process recycling, basically anything but incineration.

The various pollution prevention terms can indicate how comprehensive or far-reaching a specific pollution prevention program is. While a waste reduction effort is not as effective as a toxics use reduction program, it is certainly better than land disposal of all company waste.

Comprehensive Pollution Prevention for the Great Lakes

A virtual elimination/zero discharge strategy is made up of two basic parts:

- **A pollution prevention/zero discharge** program to stop all future discharges of the most harmful pollutants and to substantially reduce the discharge of all other toxic chemicals; and
- **Programs to clean up** those contaminants already released into the Great Lakes Basin.

Freeze toxic dumping

No government in the Great Lakes Basin should issue or reissue a discharge permit allowing any increase in the release of any of the 362 chemicals on the International Joint Commission Water Quality Board's "1986 Working List of Chemicals in the Great Lakes Basin." This list of contaminants that the board says may threaten human health or wildlife, includes toxic organic chemicals such as chlorinated benzenes, dioxins and furans, toxic metals such as chromium, lead, and mercury, and pesticides such as chlordane, lindane, and alachlor.

Sunset the worst chemicals

Persistent bioaccumulative toxic chemicals should be banned from further use or manufacture anywhere in the Great Lakes Basin. Such a ban must be adopted as the formal policy of each of the Great Lakes state and provincial governments.

The Canadian and the U.S. federal governments should set up a joint sunset task force. The public should be consulted in all aspects of this task force's work. Specifically, the sunset task force should:

- Adopt criteria for listing chemicals to sunset.
- Determine how to measure chemicals using these criteria.
- List the chemicals to be sunset.

The U.S. and Canadian federal governments should use the criteria for banning chemicals developed by the sunset task force and for screening the use or production of new chemicals in the Great Lakes Basin.

The two federal governments should set specific timetables for phasing out all chemicals not subject to an immediate ban.

Implement a program

Each local, state, and provincial government in the Great Lakes Basin should implement a comprehensive toxics use reduction and pollution prevention policy and program containing a number of important elements.

Emphasize toxics use reduction

Effective pollution prevention policies must require to the greatest extent possible toxics use reduction programs, as opposed to weaker waste reduction or waste minimization programs. Toxics use reduction is defined as in-plant changes in production processes or raw materials that reduce, avoid, or eliminate the use of toxic or hazardous substances per unit of product. The idea is to reduce risks to the health of workers, consumers, and the environment, without shifting risks from one to any of the others. Toxics use reduction goes directly to the use of toxic chemicals in the first place. Generic toxics use reduction methods or techniques include:

- **Input substitution**—replacement of a toxic substance or raw material used in a production process with a nontoxic or less toxic substance.
- **Product reformulation**—alteration of the end product to reduce or eliminate the amount and toxicity of toxic substances used.
- **Production process redesign** or modification/transformation of production processes to reduce or eliminate the use of toxic substances and the hazardous wastes they generate.
- **Production process modernization**—upgrade or replacement of existing production equipment and methods with different equipment and methods based on the same production process, for the purpose of reducing or eliminating the use of toxic substances and the hazardous wastes they generate.
- **Improved operation and maintenance**—reduced use of toxic chemicals through improved housekeeping methods, system adjustments, and product and process inspections.
- **In-process recycling**—reuse or extended use of toxics within production process, including filtration and other closed-loop systems.

Excluded from the definition of toxics use reduction are incineration, transfer from one medium of release or discharge to another, offsite waste recycling, and end-of-pipe treatment of toxic waste.

Goals and timetables

Toxics use reduction goals, and timetables for achieving those goals, must be set for each industrial facility, each organization or other nonindustrial user of toxics, each governmental agency or body, each level of society, and each sector of society. These goals and timetables should also be set for each municipality, Area of Concern, and province or state, as well as for the Great Lakes Basin as a whole. Finally, national goals and timetables for the United States and Canada as a whole should be established. Each government should set an overall goal of 50 percent reduction in the total use of toxic chemicals by 1996, and a 75 percent reduction in the total use of toxics by the year 2000.

Planning requirements

One of the most important parts of an effective pollution prevention program is planning—industry must be required to develop pollution prevention/toxics use reduction plans for each facility it operates. These plans must emphasize toxics use reduction and include:

- **Current and projected** toxics use.
- **The use, movement, and fate** of each targeted chemical in each production process, operation, or department at the facility.
- **A facility-wide analysis** of the use, movement, and fate of targeted chemicals.
- **Economic impacts** of each chemical used:
  - Direct costs of the chemicals
  - Pollution control costs
  - Disposal costs
  - Liability costs
  - Costs of complying with environmental regulations
- **Assessment of opportunities,** methods, technologies, and options for pollution prevention and toxic use reduction.
- **Estimated net costs** over time of the various pollution prevention and toxics use reduction options.
- **Training, technologies, and procedures** to be carried out, and anticipated cost savings.

- **Schedule for carrying out** the pollution prevention detailed in the plan.
- **Quantitative two- and five-year reduction goals** expressed as a byproduct reduction index (the percent reductions in waste byproducts generated per unit of product) for each production process for each chemical, plus facility-wide reduction goals for use and byproduct generation for each chemical.
- **Statements on why** specific pollution prevention, and toxics use reduction options are being adopted or are not being adopted.

Nonindustrial users of toxics, including businesses not engaged in manufacturing, institutions such as schools and hospitals, and governmental bodies, must also be required to develop similar plans. These plans should include the same elements as the industrial plans, adjusted for nonindustrial users of toxics. For example, instead of assessments of the use, movement, and fate of chemicals in each production process, the nonindustrial plan would analyze the use, movement, and fate of chemicals within each of the various operations or activities in the business, such as groundskeeping. There should be a process for evaluating toxics use reduction or pollution prevention plans using specific criteria. Evaluations should be conducted by government-licensed "toxics use reduction planners" who must complete a specific training or educational program in order to be granted licenses. There should also be penalties for those who fail to comply with the planning requirements. The toxics use reduction or pollution prevention plans should be updated every two years or so.

Reporting requirements

All toxics users should be required to report annually on their progress toward implementing their plans and achieving reductions in toxics use and hazardous waste generation, both at the facility-wide and organization-wide levels and for specific production processes and operations.

Development of reports that include specific information on each production process or operation is important for reliably measuring both progress towards toxics use reduction and barriers to that progress. Process-specific information allows facility and organizational managers as well as government staffers to readily identify those departments achieving significant progress and those lagging behind. This information enables them to do something about problem areas.

Annual reports should be reviewed by toxics use reduction planners and other environmental agency staff, and should be available to the public.

Technical assistance

Governments implementing pollution prevention programs should establish an office for providing technical assistance to toxics users. This office should be separate from the other environmental regulatory agencies and should be prohibited from giving information to those agencies except in specific circumstances. This separation will allow industry to see that the people coming to help them develop and implement toxics use reduction plans are not the same people who will initiate enforcement action against them for noncompliance with environmental regulations. Governments can also contract out technical assistance activities to not-for-profit organizations.

Technical assistance services offered to users of toxic chemicals should include:

- **Onsite technical evaluation** of toxics use reduction or pollution prevention opportunities
- **Economic analyses** to help identify relative costs and benefits of toxics use reduction or pollution prevention options.
- **Conferences, workshops and trade fairs** to disseminate information on use reduction.
- **Staff training** to recognize toxics use reduction or pollution prevention opportunities.

Pollution prevention programs should use colleges and universities for research, development, education, and training. One or several institutions of higher education in a state, province, or region can be designated "toxics use reduction institute(s)." Some of the activities carried out by these institutes should include:

- **Research in new technologies** or methods that reduce toxics use and waste generation.
- **Development of public policy** to decrease risk to the environment and public health.
- **Training of toxics use reduction planners** and development of curricula for that purpose.
- **Scientific advice** to government for advancing pollution prevention programs.

Toxics use reduction curricula should be widely established throughout the college and university system at the undergraduate, graduate, and continuing education

levels. If we are to make a successful transition to pollution prevention and toxics use reduction, society must train a new generation of scientists, engineers, and managers to think and plan in a new way. We need to start training a new kind of environmental engineer or scientist, the "toxics use reduction specialist."

If funding for a pollution prevention program is large enough, technical assistance should be provided to all toxics users who ask for it. However, given the reality of limited resources, technical assistance should be targeted on chemicals, production processes, industries, or sectors that are priorities for toxics use reduction. Priorities can be set according to:

- The toxicity or environmental hazard of various chemicals
- The size or level of use
- The potential for achieving reductions in toxics use.

Technical assistance agencies must avoid becoming spread so thin that they are only able to offer shallow expertise. Facilities needing technical assistance need agency personnel with in-depth expertise in, or knowledge of, their production processes or operations.

Financial assistance

A good toxics use reduction program should be able to offer grants and low interest loans to help deserving firms and organizations make investments in economically viable toxics use reduction programs. Many toxics use reduction measures actually improve the profitability or economic viability of a corporation or organization over the medium and long run. However, for certain toxics users, some financial assistance is often needed if the firm is to be able to afford the required upfront capital investment.

The financial assistance program needs to be structured so that most of the help is in the form of access to money through credit insurance and low-interest loans. Some grants should be made, but these should be targeted at demonstration projects, efforts that can show a particular technology or method's usefulness to a skeptical company (or group of companies) that can make much wider use of the technology or method if convinced it will work.

Encourage worker and community involvement

A toxics use reduction/pollution prevention program must allow workers and community residents to participate in and monitor facilities' toxics use reduction efforts. Workers at a facility and residents of nearby neighbourhoods are affected by the toxics used in the operation, and should have the right to know what efforts are being undertaken to reduce their use. Both groups should also have the right to participate in the development and implementation of such efforts. Workers and community residents can strengthen the toxics use reduction activities being carried out by government agencies strapped by limited resources. Workers at a facility are in a particularly good position to offer innovative toxics use reduction ideas that may have been overlooked by management.

Several months before toxics use reduction plans are due, toxics users should notify all of their employees of the planning process, identify substances and production units or departments covered by the plan, and solicit comments or suggestions from the workers in the facility or organization.

Residents and members of the public must be allowed to obtain copies of the plan. If residents living near a facility or toxics user suspect the user's plan is inadequate, they should be able to ask the government to review the plan for adequacy. The government should then be required to report back to the residents on its findings. Citizens should have the right to inspect facilities to ensure that materials are being handled safely, and to monitor implementation of the toxics use reduction plans. A toxics use reduction program should also contain a citizen suit provision, allowing citizens to take legal action to compel enforcement of the plan. The government should provide money to help citizen groups pay for attorneys and especially to gather expert witnesses. Finally, citizens, community groups, and workers, just like the companies they deal with, can all benefit from toxics use reduction training and technical assistance. A good pollution prevention program will help provide this help, primarily through the college and university systems.

Alter regulation

Traditional pollution control or environmental enforcement efforts should be changed so that they are multimedia in nature (and include the workplace as one of the environmental media) and so they promote toxics use reduction as the preferred method used for coming into compliance with environmental regulations. Multimedia whole facility permitting programs (and inspection efforts) should be implemented, with permits for releases to air, water, and land integrated into a single document. The pollution control regulatory system

should be reviewed to identify obstacles to toxics use reduction. These obstacles should then be eliminated through the formulation of new environmental laws and regulations and through changes in existing regulations.

Dedicate funding

In order to be viable, pollution prevention and toxics use reduction programs need dedicated sources of funding through fees or taxes. Without reliable and adequate funding, even the best-designed toxics use reduction program cannot be effectively implemented. The type of funding source determines how consistently long-term funding will be available for the program. Dedicated fees and taxes are the most reliable source of funding for toxics use reduction programs. The total level of funding for a government's toxics use reduction program should be commensurate with the size of the toxics problem in that government's jurisdiction.

A scaled fee system is probably the best method of funding. Under such a system, toxics users pay a fee based on the number of people they employ and the number and amounts of chemicals they use. The system could also include a ceiling on the total amount a facility can be charged, which varies according its size, so that the fees cannot become too burdensome. This type of scaled fee system not only provides funding for implementation of the toxics use reduction program, but also acts as a direct disincentive to the use of toxics because it is based on toxics use.

Coordinate pollution prevention and economic development

The various governmental bodies engaged in pollution prevention and economic development must communicate on a regular, thorough basis with the aim of coordinating their activities. Pollution prevention must be introduced into how companies work from the beginning whenever possible. Government economic development activities must be designed to attract and promote businesses and industries that incorporate pollution prevention and toxics use reduction into their operations. Tax breaks, subsidies, infrastructural development and other benefits given to companies by governments should be conditioned in part on the effectiveness of pollution prevention efforts employed by those companies.

Measure use and release of toxic chemicals

To monitor the achievement of toxics use reduction goals, a uniform system should be established for measuring the use and release of toxic chemicals and the generation of hazardous waste. This comprehensive toxics release and use reporting system should be established as soon as possible, and should include information about releases of toxic chemicals to air, land, water, and to offsite or onsite treatment and recycling facilities. Workers and community residents should have the legal right to information reported under this program.

Make pollution prevention "best available technology"

Governments should immediately revise their traditional *technology*-based effluent standards to incorporate what we could call "process-based" standards, that is, to ensure that they are based on toxics use reduction/ pollution prevention methods. Government environmental programs should officially view toxics use reduction methods as the "best available technology" so often called for in government regulations.

Protect workers' jobs and incomes

Wide adoption of comprehensive pollution prevention programs would probably lead to changes in the kinds of jobs available to working people. Some jobs and job categories will be eliminated, and some new jobs and job categories will be created. Comprehensive pollution prevention could lead to a net loss of jobs, a net gain, or no change in the overall number and quality of jobs. Right now there is not enough information available to give us an accurate picture of how pollution prevention programs will affect jobs and income.

One proposal supported by many in the environmental and labor movements as a way to protect workers from job and income loss caused by enforcement of environmental regulations is the creation of a "Superfund for Workers." Under this program, which is based on the post WWII GI Bill of Rights, a national fund would be established to pay for the education and retraining of laid-off workers and to them find new jobs. Some money would also be used to maintain the incomes of laid-off workers until they are able to find new jobs at comparable wages. Revenue for the Superfund would be raised through a tax on toxics users.

A Superfund for workers would be a good step toward worker protection, but its effectiveness would be seriously limited by an overall lack of good jobs to retrain workers for. As a result, it is crucial for state and federal economic programs to incorporate the importance of

pollution prevention in making plans to attract new and expand existing industry.

Much more work must be done to deal with the problem of job and income loss connected with the adoption of pollution prevention, toxics use reduction, and zero discharge policies and programs. Labor, environmental, community, citizen action, and other organizations must work closely to win adoption of policies, programs, and mechanisms that will resolve the conflict between protecting the environment and protecting peoples' jobs and incomes.

This effort would have to begin with a thorough dialogue on the problem of job/income loss and possible solutions that brings together leaders of labor, environmental, community-based, and other organizations. A labor/environment/community summit might be a good way to move the dialogue forward and begin planning a "worker protection campaign".

Development of worker protection policy proposals would need good research, including information on specific job loss and dislocation due to pollution prevention programs. It would also require an assessment of worker protection policies that have already been proposed or adopted and their degree of integration into existing economic and community development efforts.

Great Lakes United believes that a labor/environment/community worker protection effort is one of the most important endeavors that the environmental movement can promote. We are committed to playing a key role in building such an effort. In early 1991, GLU formed a Labor/Environment Task Force with the mission of "building the alliance between the labor and environmental movements to the advantage of both." The task force plans to "look boldly at the question of jobs, what the impact of the struggle for source reduction and zero discharge will be on them, and how the environmental movement can support and contribute to the efforts of labor to fight job blackmail, job displacement, and job loss."

2 Gathering Information

Effective citizen efforts to prevent pollution require information on toxic chemicals—where they are manufactured, used, stored, and released to the environment. Knowing detail of local toxics use and abuse makes it possible for local pollution prevention advocates to:

1) Get an overall picture of the extent of toxic pollution in their community.

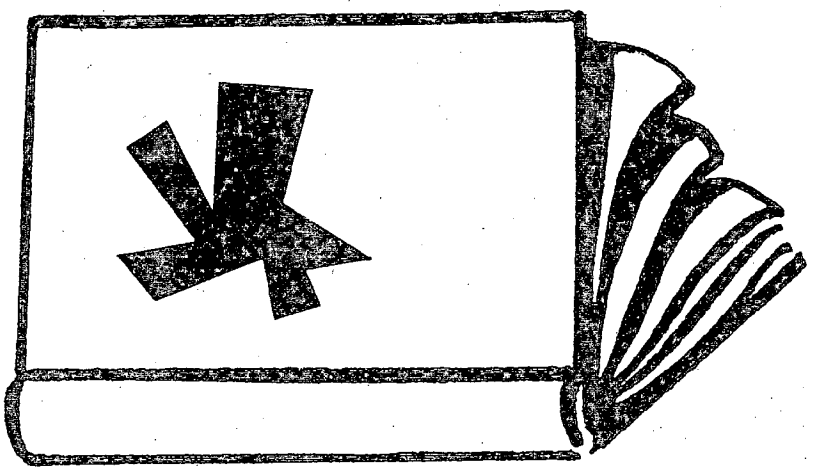
2) Assess the toxic threat posed by particular polluters.

With such facts in hand, activists can target the worst facilities for grassroots pollution prevention campaigns.

Widespread distribution of toxics information in forms that are easy to understand is essential in any grassroots effort to advocate pollution prevention programs. People affected by toxic pollution must be given clear information about the nature of the toxic threat they are faced with so that they become concerned enough to join a citizens' effort to deal with it. Unless a significant number of residents are motivated to give their time and money to a grassroots pollution prevention campaign, the campaign's prospects for success will be limited. Toxics information is an important tool to educate, mobilize, and organize a community for pollution prevention.

Information on the use and release of toxic chemicals is also needed to measure the success of pollution prevention programs that are carried out in a community. Unless citizens can obtain fairly accurate and detailed toxics information, beginning before any pollution prevention programs are launched and continuing as the programs are implemented over time, it is impossible to accurately measure the pollution prevention progress being achieved. Without quantitative information, activists are left to rely on the sight, smell, and short-term health of residents near a facility. This may be enough to provide a rough idea of whether or not pollution prevention programs are making a difference in the area's environmental quality, but it is not enough to reliably measure progress and hold the decision-makers accountable for that progress.

Much of the information needed by pollution prevention activists to organize effective grassroots campaigns is available in the United States. In Canada, the amount of information available varies with each province. The Canadian federal government is presently developing a right-to-know program. The first industry reports under this program will be available in 1994. There are many gaps in the data available in either country, but by taking pieces of information from the various sources that are available and fitting it together citizens can develop a fairly accurate assessment of toxics use and releases.



Information Available in the United States

SARA Title III

In the United States, the Emergency Planning and Community Right-to-Know Act, also known as Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA), gives citizens access to a broad range of toxic chemical and hazardous materials information. At the same time, there are serious limitations in the law that restrict what chemicals are covered, which facilities must report, and what information is reported. However, even with its limitations SARA Title III can be used as a powerful tool by pollution preventions activists in the United States.

The most important sections of the law include emergency planning (sections 301 to 303), which are required of local governments and of companies that have certain amounts of chemicals defined as "extremely hazardous"; emergency (accidental) releases reporting (section 304), required of companies that produce or store chemicals defined as "hazardous"; chemical inventory recordkeeping (sections 311 and 312), required of companies for certain chemicals, including their location, average daily amount present on the premises, and maximum amounts present on any given day during the preceding year; and the Toxic Release Inventory (section 313), which requires certain manufacturing companies to report annual discharges of certain chemicals to the air, water and land.

Emergency Planning

The emergency planning provisions of SARA Title III require the development of emergency response plans to deal with chemical emergencies, spills, leaks, accidents, fires, explosions, and other potential problems involving hazardous materials in local areas. These plans are to be prepared by Local Emergency Planning Committees (LEPCs), working under the supervision and coordination of State Emergency Response Commissions (SERCs).

LEPCs are supposed to be made up of people representing a cross-section of the community, and should serve as a primary conduit for providing toxic chemical and hazardous material information to the public. They draw information directly from industry about the nature, quantity, and location of toxic chemicals stored or spilled in the community. In addition to the specific kinds of SARA Title III information described below, under section 303(d)(3) LEPCs have virtually unlimited access to information about the toxic chemicals manufactured, used, stored, or discharged by facilities in the area. Members of the public may obtain this information once it is in the hands of an LEPC. Unfortunately, however, some LEPCs are reluctant to use their authority to obtain information critical to emergency response efforts.

SARA Title III's reporting requirements and emergency notification provisions embody the key community right-to-know parts of the law. These sections require certain industries to provide information on certain chemicals they make, use, store or release. Unfortunately, all chemicals are not covered by these provisions of the law. To make matters worse, the different sections of Title III require the reporting of different kinds of information for different lists of hazardous chemicals. For example, the law requires a polluter to report if it accidentally spills certain chemicals, but does not require facilities to report on their routine releases of some of the same chemicals to the environment. The law also requires a facility to provide information on routine releases of some chemicals, but does not require disclosure of the quantities of those same substances that are being stored at the facility.

MSDS Reporting

Regulations administered by the Occupational Safety and Health Administration (OSHA) require many companies to prepare or have on file "Material Safety Data Sheets" on toxic chemicals that their employees work with. An MSDS contains information on each chemical's identity, the specific health effects associated with various levels of workplace exposure to the chemical, and first aid procedures to be used in case a worker is exposed to high levels of the chemical.

Section 311 of SARA Title III requires facilities that must prepare or have available MSDSs and meet or exceed certain thresholds to provide copies of their MSDSs or a list of MSDS chemicals to the LEPC, the SERC, and the local fire department.

EPA has established two thresholds for reporting:

- Facilities that use, store, or have onsite less than 10,000 pounds of a *hazardous* chemical do not have to report on that chemical. Chemicals are defined as "hazardous" substances under OSHA's Hazard Communication Standard. Over 50,000 chemicals are covered by the standard, so it is safe to say that most toxic chemicals are covered by this reporting re-

quirement.

- Facilities that use, store, or have onsite less than 500 pounds of an *extremely hazardous* chemical do not have to report on that chemical. Chemicals are called "extremely hazardous" if an accidental release could lead to a serious emergency situation. EPA has established a list of such chemicals under section 302 (see appendix 1 for a list of various regulated chemicals, including EPA's extremely hazardous category of chemicals).

Appendix 2 contains a sample MSDS form.

Tier I Emergency and Hazardous Chemical Inventory Form

Section 312 of SARA Title III requires many facilities to submit Tier I Emergency and Hazardous Chemical Inventory forms to the LEPC, the SERC, and the local fire department. The threshold reporting quantities (10,000 pounds for hazardous chemicals and 500 pounds for extremely hazardous chemicals) are the same as for section 311 emergency planning.

Tier I Emergency and Hazardous Chemical Inventory forms contain:

- An estimate (in ranges such as 0 to 99 pounds and 100 to 999 pounds) of the maximum amount of chemicals in each hazard category present at the facility at any time during the preceding calendar year.
- An estimate in ranges of the average daily amount of chemicals in each hazard category that are present at the facility.
- The general location of hazardous chemicals in each hazard category.

Tier I inventory reporting facilities only report aggregate amounts in each hazard category. They do not report quantities of each chemical present at the facility. The hazard categories are fire, sudden release of pressure, reactivity, acute or immediate health hazards, and chronic or delayed health hazards.

See appendix 2 for a sample Tier I form and instructions.

Tier II Emergency and Hazardous Chemical Inventory Form

Tier II reporting is not a standard requirement of federal regulations. However, if an LEPC, SERC, or local fire department requests it, a facility must submit a Tier II form. Some states do require standard Tier II reporting without local requests.

Tier II reporting provides the following information for each chemical at a facility:

- The chemical name or the common name as indicated on the MSDS.
- An estimate in ranges of the maximum amount of the chemical present in the facility at any time during the preceding calendar year.
- A description of the way in which the chemical is stored.
- The specific location of the chemical at the facility.

See appendix 2 for a sample Tier II form and instructions.

Toxics Release Inventory (TRI)—Form R

Section 313 of SARA Title III requires the EPA to establish an inventory of routine toxic chemical releases from certain facilities. Facilities covered by this reporting requirement must complete the Toxic Chemical Release Form, commonly known as Form R. Form Rs must be submitted to the EPA and state officials by July 1 of each year.

Form Rs must be submitted by owners and operators of facilities with ten or more full-time employees, that are in the Standard Industrial Classification (SIC) codes 20 to 39 (see appendix 3 for a list of industries making up these SIC codes) and that import, manufacture, process or otherwise use a listed toxic chemical in amounts that are greater than specified threshold quantities. Facilities manufacturing or processing more than 25,000 pounds of any listed chemical in a given year must submit a Form R for that substance. Facilities otherwise using more than 10,000 pounds of any listed toxic chemical in a calendar year must submit a Form R for the chemical.

The number of chemicals on the TRI list is constantly changing. EPA adds and deletes chemicals to and from the list, which currently numbers somewhat above 300 chemicals (see appendix 1 for a list of TRI and other reported chemicals), as information on them changes. During 1992 EPA conducted a broad review of chemicals that could be considered for public reporting. Of 625 chemicals reviewed, EPA found evidence to support the listing of 586 based on acute, chronic, or environmental toxicity. Accordingly, many chemicals will probably be added to the list.

Form Rs submitted under the TRI reporting requirements contain the following information:

- The name, location, and type of business.

- Offsite locations to which the facility transfers toxic chemicals in waste, including sewage treatment plants and offsite disposal facilities.
- Whether the chemical is manufactured or processed, or, if it is used, the general category of use.
- An estimate in ranges of the maximum amounts of the toxic chemical that are present at the facility at any time during the previous year.
- Amount of the chemical entering each environmental medium—air, land, and water—annually.
- National Pollution Discharge Elimination System (NPDES) and Resource Conservation and Recovery Act (RCRA) permit numbers. (These permits regulate discharges to surface waters and land disposal. The permit numbers can be used to request further information from state and federal environmental agencies.)
- Surface waters receiving TRI chemical pollutants.
- Waste treatment/disposal methods and the efficiency of these methods for each waste stream.
- Information on source reduction and recycling activities.

See appendix 4 for a sample Form R and guide to the information it requires.

Under Section 313, the EPA is responsible for making TRI information available to the public by developing a computer database. The agency has contracted to do this through the National Library of Medicine's Toxnet system, accessible twenty-four hours a day seven days a week to anyone with a computer and modem. This database is organized so that citizens can get data categorized by company, chemical, environmental medium to which the chemical was released, waste treatment and offsite transfer, chemicals released in various areas or zip codes, and more. This organization of the data allows pollution prevention activists to find out things such as how much of a specific chemical was released by a company at its facilities across the nation during the year, or how much of a certain chemical was shipped offsite during the year.

Citizens can get information about the Toxnet TRI database by contacting the TRI representative at:

Specialized Information Services
National Library of Medicine
8600 Rockville Pike, Bethesda, MD 20894
800-638-8480, or 301-496-1131

A free *Quick Reference Guide to the Toxic Release Inventory*, available from the National Library of Medicine, will also help citizens use Toxnet.

Two other key resources are:

- EPA's Toxic Release Inventory User Support Service (TRI-US), which helps citizens locate and access TRI data. The service can be reached at 202-260-1531 from 8:00 a.m. to 4:30 p.m. EST Monday through Friday.
- SARA Title III hotline, mostly geared to providing information on reporting requirements, obtaining forms, and the like. The hotline does not do database searches. It can be reached at 800-535-0202.

Directions on how to get TRI data can also be obtained from state TRI Information contacts (see appendix 5). Many libraries are now carrying TRI data.

TRI data can also be obtained through other online computer databases and information services. One of these is the RTKnet Project, a joint effort of OMB Watch and the Unison Institute. RTKnet helps environmental organizations use TRI and other electronic databases and information services dealing with the environment. For information on RTKnet contact OMB Watch at 202-659-1711. Information on other TRI databases, networks, and hotlines can be found in the resource list.

There are a number of serious weaknesses or loopholes in the Toxics Release Inventory. Some of the more glaring ones are:

- **Only major facilities are covered.** Companies that use less than 10,000 pounds of a chemical or employ less than ten people do not have to report their releases of that chemical.
- **Entire industries are exempt** from the TRI reporting requirement. Only industries in SIC codes 20 to 39 have to comply. Significant polluting industries not required to report range from dry cleaners to (astonishingly) hazardous waste incinerators. Federal facilities are also not required to report..
- **The TRI list** of more than 300 chemicals and chemical compounds does not include many dangerous pollutants including (also astonishingly), 40 of the Clean Water Act's 126 "priority" pollutants.
- **TRI does not cover most government facilities.** Military bases and Defense and Energy Department laboratories are completely exempt.
- **Reported chemical releases** are often estimates, not actual measurements.

Clean Water Act Permitting

The Clean Water Act establishes the regulatory framework for protecting bodies of water in the United States. The act requires permits and sets standards and monitoring protocols for all point source discharges into water bodies. These permits are called National Pollution Discharge Elimination System, or NPDES, permits. In states where the federal government has given the state's environmental agency responsibility for enforcing the Clean Water Act, the permits might be called SPDES, for State Pollution Discharge Elimination System, or the first word might be the name of the state itself, as in KPDES, the Kentucky Pollution Discharge Elimination System.

Discharge permits are renewed every five years. NPDES permits, permit applications, and other related documents contain important information on the polluters being regulated. All of these documents can be obtained from the water division of a state's environmental agency by filing a Freedom of Information Act request.

Every Great Lakes state has freedom of information statutes. The laws vary in scope and most states charge a fee for copying the requested documents. There is also a federal law called the Freedom of Information Act, which is used to obtain documents for federal agencies such as EPA.

See appendix 6 for a sample freedom of information request letter.

Permit applications

Permit applications include the following information:

- The name and location of the facility.
- The nature of the business the facility is engaged in, including what it manufactures.
- The facility's manufacturing processes and maximum production levels.
- A drawing showing flow of water through the facility.
- The exact location, flow rates, flow frequencies, and chemical composition of each discharge associated with facility. The amounts of each pollutant in each discharge is indicated both in concentration and in mass.
- The wastewater treatment employed for each waste stream.

NPDES permits

NPDES permits include the following information:

- Effluent limitations for specific pollutants, expressed as the weight of the pollutant discharged per ton of raw material used or product produced, or per volume of wastewater discharged.
- Details of permit compliance or noncompliance.
- The requirements imposed on the polluter to monitor discharge of each pollutant limited by the permit.

Monthly discharge monitoring reports

Monthly discharge monitoring reports are part of a permit's reporting requirements. They contain information on the levels of each regulated pollutant found in the wastewater discharged.

A priority pollutant scan

A priority pollutant scan is required by most states as part of the permit application process. A scan is a chemical analysis of a wastewater discharge that determines levels of each priority pollutant found in each chemically contaminated discharge.

Releases of pollutants to water reported as part of the discharge permit process can be compared to releases reported under the SARA Title III TRI. Documents required under the NPDES can also be used to figure out releases to water of pollutants that are not covered by the TRI.

Simple calculations can be used to translate the average daily amounts of each pollutant reported under the NPDES process into the annual amounts reported in the TRI. Take the average daily amount of each pollutant indicated in mass and multiply it by the number of days the facility operates during the year to get the average annual amount of the pollutant that is discharged to water. If only the average daily concentration of a pollutant is available, multiply it by the average daily volume of the discharge containing the pollutant to arrive at the average daily mass of the pollutant that is discharged.

For example, if the average daily concentration of chloroform in a discharge is 1 milligram per litre, and the average daily volume of the discharge is 1,000 litres, the average daily mass of chloroform in the discharge is 1000 milligrams. Multiply that figure by the number of days the facility operates during the year to get the average annual amount of chloroform released to water by the facility.

Unfortunately, the use of different units of measure-

ment (for example, litres versus gallons) can complicate the picture. Information on unit conversions and ways to convert pollution statistics into different forms can be found in appendix 7.

Information obtained through the Clean Water Act permitting system is a useful supplement to the TRI data. Comparisons of the two types of information can be used to uncover a company's failure to accurately report its releases under TRI requirements, or a company's noncompliance with the effluent limitations in its discharge permit. This is how it was discovered in 1991 that half or more of the substantial emissions by Kodak Corporation's Rochester, New York, operations were unpermitted.

NPDES documents are another source of toxic release information for chemicals not covered by the TRI.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act is the primary federal law regulating the generation, transportation, storage, treatment, and disposal of hazardous and nonhazardous solid waste. RCRA includes:

- Standards for entities that generate, transport, treat, store, or dispose of wastes defined as hazardous by the act.
- Standards for underground storage tanks containing petroleum or hazardous substances that are not classified as hazardous wastes under the act.
- A citizens' suit provision giving any person the right to sue any corporation violating RCRA, or to sue the EPA for failing to enforce RCRA.

RCRA requires that individuals or firms handling hazardous wastes maintain a number of internal reports on facility operation at the plant. These documents can be obtained by LEPCs and therefore by citizens. Permits, groundwater monitoring reports, manifests and other documents required under RCRA may be obtained from either the states or EPA by filing a freedom of information request. Many states do not have complete authority for implementation of RCRA; consequently, some documents must be obtained from EPA.

The following RCRA-generated information is the most useful:

- **Groundwater monitoring reports,** which contain evidence of the migration of toxic pollutants from a site into the nearby groundwater for many facilities not covered by TRI.
- **Manifest forms,** which indicate which hazardous chemical wastes are shipped out of a facility.
- **Generator annual reports,** which indicate quantities of various types of waste generated by a facility.
- **Waste analyses,** which detail the chemical composition of wastes at a facility.
- **Operating records,** which show the locations, quantities, and names of on-site hazardous wastes.

RCRA information can be used to further improve the assessment of a facility's use and release of toxics. RCRA can be used to obtain additional information on the release of toxic chemicals covered by SARA Title III, as well as release or disposal information on substances not covered. RCRA also provides information on many facilities that are not required to report under SARA.

Clean Air Act

In the United States the Clean Air Act requires a permit for all air emissions. Under the National Emissions of Hazardous Air Pollutants program, a permit is specifically required for toxic air emissions. It might be worthwhile to request copies of air permits, permit applications, and related air monitoring reports for facilities of concern. These documents can be obtained by filing a freedom of information request with the air division of a state environmental agency, or with the EPA.

Freedom of Information Act

In the United States, FOIA gives citizens access to most information that is not considered confidential business information or part of a legal action being undertaken by a government agency. The eight Great Lakes states and the federal government all have freedom of information laws. The federal law allows citizens to obtain information free (actually, have the fees waived) by demonstrating that the use of the documents is in the public interest. Most state freedom of information laws do not have fee waiver provisions.

See a sample letter in appendix 6.

Information Available in Canada

The information on toxic use and pollution available to citizens in Canada is much more limited than that available in the United States. However, resourceful and persistent pollution prevention activists can gather some of the information they need in Canada.

Access to Information Laws

There are different federal and Ontario laws concerning information citizens can acquire from government files. Packets of information on these laws, including appropriate forms for filing information requests, can be obtained by contacting:

- Information Commissioner of Canada, 1-800-267-0441.
- Information and Privacy Commissioner of Ontario, at (416) 326-3330.
- Information from your Medical Officer of Health.

Each of Ontario's municipal governments has a medical health officer. Under amendments to the Occupational Safety and Health Act, the officer is required to give any citizen who requests it lists of chemicals used at each facility in an area, along with their Material Safety Data Sheets. Unfortunately, information on the quantities of each chemical that are used or released are not available.

Annual Water Discharge Reports

The Ontario Ministry of the Environment publishes an annual report on direct dischargers, "Report on Industrial Direct Discharges in Ontario," which includes industry and sewage treatment plants. However, the report is not comprehensive. It deals primarily with conventional pollutants and only some toxic chemicals.

The report can be obtained through the MOE's Water Resources Branch at (416) 323-4941.

MISA

The Municipal Industrial Strategy for Abatement, known simply as MISA, is the water discharge control program for Ontario. MOE has required all industrial sectors to conduct baseline monitoring of their effluent in order to begin developing discharge regulations. Some of the monitoring reports have been completed and these are available to the public, once again through MOE's Water Resources Branch. Also often helpful in efforts to obtain information is MOE's Communications Branch, which can be reached at (416) 323-4648.

Air Emissions

There is no overall regulatory program for air emissions in Canada. The extent of the information available depends upon the local air pollution problem and the amount of attention it has received. For example, in the Windsor area there is a great deal of information on air quality and air emissions. Air emission information is stored in MOE's regional offices. Contact the MOE's Air Resources Branch at (416) 965-6343. Then contact the Air Resources Branch in the regional MOE office nearest you.

Hazardous Wastes

The Environmental Protection Act provides for a system to track hazardous wastes from their generation to their disposal, through the manifests written out when hazardous substances are moved. From compilations of manifests made by the government, citizens can obtain information on the total amount of various types of hazardous wastes that are shipped offsite by companies in an area. Unfortunately, hazardous waste information within individual companies or facilities is not available to the public. Contact the MOE's Waste Management Branch at (416) 323-5200.

Other Information Sources

Many companies do internal audits that may contain valuable information on the use and release of toxic chemicals. Often, a polite request to the facility will yield these reports.

Some industries in Canada are beginning to voluntarily develop toxic release inventories. Members of the Chemical Producers Association are now required to begin doing TRIs as a condition of membership in the association. These TRIs should be ready by early 1993.

Before launching a grassroots campaign to win adoption of a pollution prevention program by a specific user of toxics, it is important to know what, if anything, is being done already to prevent pollution at the facility. If a truly comprehensive program is already in place, an intensive citizens' campaign is not necessary. Community leaders might only need to monitor the facility to make sure the pollution prevention program is imple-

mented and is achieving results.

One important way to obtain pollution prevention information about a facility is to conduct an interview with the facility's management. The research and education organization INFORM has developed a very good questionnaire for such an interview. See appendix 8.

Touring a facility with an independent industrial hygienist can also provide a good picture of how the facility could be operated more safely.

Working closely with the union representing workers at a facility can assist local pollution prevention activists in gathering information on the facility. Union leaders may have information on quantities of chemicals used or stored beyond that provided in the MSDSs.

An important goal of Great Lakes United and other organizations is the adoption of a comprehensive community right-to-know program for Canada. When we are successful in reaching this goal, an applicable information-gathering supplement to this guide will be produced.

For a list of offices and publications that can provide information in Canada, see appendix 9.

Integrating Multisource Information

Each source of information detailed in this chapter can be tapped to provide a piece of a puzzle describing the use, storage, and release of toxic chemicals and wastes by a facility. By bringing together the information from these sources a fairly complete toxics or environmental assessment or audit can be developed for a facility. Information on health risks associated with each chemical or waste can also be added to the assessment.

Appendix 10 summarizes the health effects associated with each substance covered by the TRI reporting requirements. Other sources of information on health effects can be found in the resource list.

In order to develop a toxics assessment for a facility, organize the information obtained into a table listing quantities of each chemical or waste used, stored, or released to each environmental medium, by information source. See appendix 11 for a sample "toxics assessment table." This makes the data easier to understand and also makes it easier to compare quantities of toxic chemicals reported by different sources of data.

A comprehensive environmental assessment has many uses. Most importantly, it can be presented to area residents as part of efforts to mobilize the community in support of a pollution prevention program at the facility. Good, comprehensive information supported by community mobilization can encourage facility management to sign a "good neighbor agreement" containing a pollution prevention program. The information in the assessment provides a benchmark against which the progress achieved through implementation of the pollution prevention program at the facility can be measured.

A comprehensive environmental assessment of a facility can have very specific uses as well:

- **Activists can uncover permit violations** by comparing data indicating quantities of toxic chemicals released by a facility to the limits in the facility's permits. Such violations can be used to win state, provincial, or federal agency action or to get a company to sign a good neighbour agreement.
- **Community support can be generated** for stronger permits when they come up for renewal.

In addition to developing environmental assessments addressing routine long-term pollution as described above, toxics information available under SARA Title III can be used to assess the potential threat posed by an

unplanned, sudden, and massive release of toxic substances from a facility. This can be done by preparing "plume maps" showing the areas in a community that would be at risk in the event of an emergency release of a substance. For instructions on how to develop plume maps, refer to "How to Create a Toxic Plume Map," published by the Citizens' Environmental Coalition (see the Resouces section at the end of this chapter).

Information is critical to any grassroots citizens pollution prevention effort. It is needed to assess the nature of the problem posed by facilities and toxics users. It is needed to educate the community on the magnitude of that threat. And it provides a means for measuring the success of pollution prevention programs that are adopted as the result of a citizens campaign. In protecting community health from the threats of toxic pollution, knowledge is the indispensable basis of any progress.

Resources 2

Canadian resources—for information specific to Canada, see appendix 9.

A Citizen's Guide to Promoting Toxic Waste Reduction, Lauren Kenworthy and Eric Schaeffer, INFORM Inc., 381 Park Ave. S., New York, NY 10016, 212-689-4040. Planned to be updated, expanded and published as *Preventing Industrial Toxic Hazards* in spring 1993.

A Citizens' Guide to Understanding Measurements of Toxic and Radioactive Concentrations, James Chapman, Citizens Environmental Coalition, 33 Central Ave., Albany, NY 12210, 518-462-5527.

A Citizen's Toxic Waste Audit Manual, Ben Gordon and Peter Montague, Greenpeace USA, 1436 U St. NW, Washington, DC 20009, 202-462-1177.

Community Right-to-Know: A New Tool for Pollution Prevention, OMB Watch, 2001 O St. NW, Washington, DC 20036, 202-659-1711.

Community Right-to-Know Handbook: A Guide to Compliance with the Emergency Planning and Community Right-to-Know Act, Neil Orloff and Susan Sakai, Environmental Practice Group of Irell & Manella, attn. the authors, 1800 Avenue of the Stars #900, Los Angeles, CA 90067, 213-277-1010.

Hazardous Materials Emergency Planning Guide, National Response Team, Hazmat Planning Guide WH-562A, 401 M St. SW, Washington, DC 20460.

"How to Create a Toxic Plume Map," Citizens' Environmental Coalition, Fact Sheet #2, 33 Central Ave., Albany, N.Y. 12210, 518-462-5527.

Layperson's Guide to Reading MSDSs, Massachusetts Department of Environmental Quality, 1 Winter St., Boston, MA 02108, 617-292-5993.

Making the Difference: Using the Right-to-Know in the Fight Against Toxics, Jeffrey Tryens and Richard Schrader, Center for Policy Alternatives, 1875 Connecticut Ave. NW, Washington, DC 20009, 202-387-6030.

New York State 1989 Toxic Release Inventory Review, New York State Department of Environmental Conservation, Division of Water, 50 Wolf Rd., Albany, New York 12233-3510.

Phantom Reductions: Tracking Toxic Trends, Gerald V. Poje and Daniel M. Horowitz, National Wildlife Federation, 1400 16th St. NW, Washington, DC 20036.

Reducing the Risk of Chemical Disaster: A Citizen's Guide, Gerald Poje and Joel Szkrybalo, National Wildlife Federation, 1400 16th St. NW, Washington, DC 20036.

Solving the Hazardous Waste Problem: EPA's RCRA Program, Environmental Protection Agency, Office of Solid Waste, 401 M St. SW, Washington, DC 20460.

SPDES: How You Can Affect the Process, Atlantic States Legal Foundation, 658 West Onondaga St., Syracuse, NY 13204, 315-475-1170.

Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances, U.S. Environmental Protection Agency and U.S. Department of Transportation.

The Toxic 500: The 500 Largest Releases of Toxic Chemicals in the United States, 1987, Norman L. Dean, Jerry Poje, and Randall J. Burke, National Wildlife Federation, 1400 16th St., NW, Washington, DC 20036.

The Right to Know More, Deborah A. Sheiman, Natural Resources Defense Council, 1350 New York Ave. NW, Washington, DC 20005.

The Right to Know—Making It Work: A Resource Manual, Scott Tobey and Margaret Seminario. George Meany Center for Labor Studies, AFL-CIO, 815 Sixteenth St., NW, Washington, DC 20006.

The Dynamic Duo: RCRA and SARA Title III: A Handbook, Carol Dansereau, Environmental Action Foundation, 1525 New Hampshire Ave. NW, Washington, DC 20036, 202-745-4870.

Toxic Chemical Release Inventory Questions and Answers, U.S. Environmental Protection Agency, Emergency Planning and Community Right-to-Know Information Hotline, OS-120, 401 M St. SW, Washington, DC 20460, 800-535-0202.

Toxic Chemical Release Inventory Reporting Form R and Instructions, U.S. Environmental Protection Agency, Section 313 Document Distribution Center, P.O. Box 12505, Cincinnati, OH 45212, 800-535-0202.

Toxic Chemicals: Toxic Release Inventory Is Useful but Can Be Improved, June 1991, U.S. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20877.

Tracking Toxic Substances at Industrial Facilities: Engineering Mass Balance Versus Materials Accounting, Board on Environmental Studies and Toxicology, 2101 Constitution Ave. NW, Washington, DC 20418.

Tracking Toxic Wastes in Ohio: A Guide to Federal and State Information Sources on Chemical Wastes from Industrial Plants, Catherine Miller and Lawrence Naviasky, INFORM Inc., 381 Park Ave. S., New York, NY 10016, 212-689-4040.

User Manual, RTK NET, 1731 Connecticut Ave. NW, Washington, DC 20009-1146, fax: 202-234-8584.

Using Community Right to Know: A Guide to a New Federal Law, OMB Watch, 2001 O St. NW, Washington, DC 20036, 202-659-1711.

Using Your Right to Know: A Guide to the Community Right-to-Know Act. Citizens' Clearinghouse for Hazardous Wastes, P.O. Box 926, Arlington, VA 22216, 703-926-7076.

3 Getting Organized, Deciding What to Do

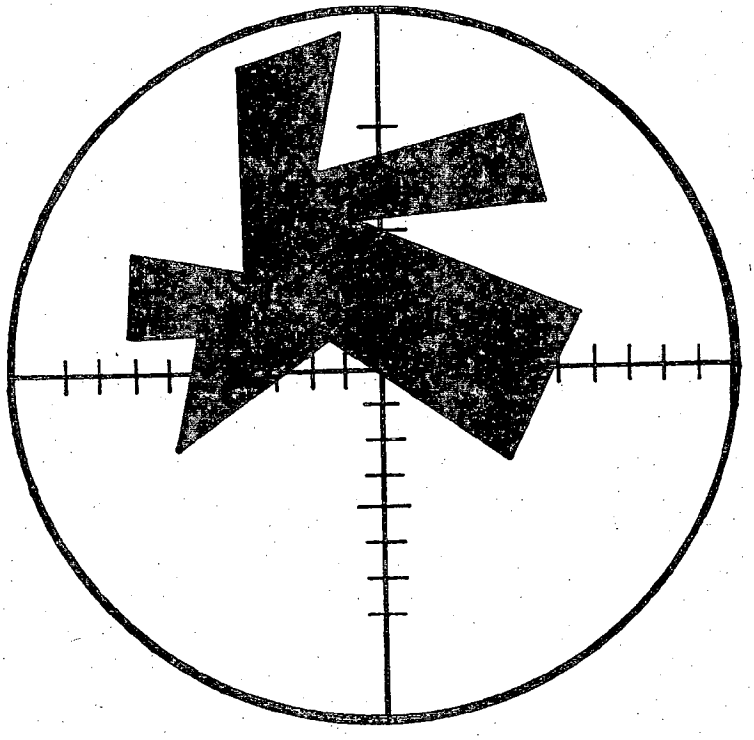
One person acting alone is not likely to succeed in persuading decisionmakers in government and industry to develop and implement effective pollution prevention/zero discharge programs. Only a strong grassroots campaign or movement bringing together significant numbers of people from all walks of life is likely to win the comprehensive programs capable of achieving zero discharge of persistent toxic chemicals and dramatic decreases in the use of other toxic substances.

A small citizens committee may be able to get governments and local polluters to take the first small steps towards zero discharge through pollution prevention, stopping short of a comprehensive program. This could set the stage for the broader effort that one day must be implemented.

Building a grassroots pollution prevention campaign bringing together enough people to really get something done involves a variety of different steps and activities. The most important include developing community leadership, educating community residents on the nature of the toxics threats and involving them in actions to deal with those threats, and carrying out a well-planned strategy for achieving specific campaign goals.

This chapter of the guide is designed to provide guidance for environmental and community leaders who want to create a local grassroots campaign to organize a community to address environmental and other problems.

Most activists will not have the time to use all of the advice offered in this chapter, and everything is not applicable to every local environmental or pollution prevention effort. Some of the organizing methods described here may not work in your community. But many of the measures detailed here will work, and one thing is certain: nothing is more sure to achieve a community aim than community organizing.



Getting Started

The key to winning comprehensive pollution prevention programs is building an effective grassroots campaign organization based in the neighbourhoods or areas most affected by the toxic threats you want to deal with. The first steps in building this organization are *research* (determining the nature and extent of the toxic hazards in order to target them for action) and *building a local organizing committee* (to carry out the grassroots campaign to reduce or eliminate that hazard).

These two steps are closely intertwined. For one or two concerned neighbours with jobs and family commitments, the task of thoroughly researching a polluting facility and its owners is going to be difficult and time consuming. If they take on this research burden alone, it could be months before they have developed a clear picture of a facility's use and release of toxic chemicals. The way around this problem is to gather just enough information to get half a dozen or a dozen other neighbours concerned enough to join together and form a local organizing committee. This committee will be able to carry out the required research much more quickly than one or two people.

The organizing committee is the core of the campaign organization, the foundation upon which a grassroots pollution prevention campaign is built. The committee plans, organizes, and carries out the entire grassroots effort. Without an organizing committee of some kind, a well-planned, systematic citizens pollution prevention campaign with the persistence needed to achieve real results cannot be built. There may be a natural outpouring of public dissatisfaction and concern in response to revelations about toxic pollution coming from a local facility. But an organizing committee mounting an organized effort is needed to channel this dissatisfaction and concern into action that will yield pollution prevention results, rather than mere rhetoric.

Regional Leadership

In areas with established environmental, labor, and community-based organizations, it makes sense for these organizations to promote, support, and help organize local grassroots pollution prevention campaigns. Incorporated and funded organizations can provide some limited resources and, more importantly, guidance to grassroots activists in their efforts to build pollution prevention campaigns.

This support and guidance can be more consistently provided by setting up a regional steering committee made up of staff and leaders from the area's environmental, labor, community, and religious organizations. The steering committee would guide and help organize the local pollution prevention campaigns. Organizations represented on the steering committee can also obtain grant money or other funding to pay for community organizers to build local or neighbourhood pollution prevention campaigns.

Once the regional steering committee is organized, it can then choose local pollution prevention campaigns to initiate or help along. Such a choice or targeting decision should be based on research that investigates:

- **The overall extent** of toxic pollution in various neighbourhoods or areas
- **The threat** posed by individual facilities
- **Pollution prevention efforts** already planned or being carried out by individual facilities. It makes no sense to target an industrial facility that already has a comprehensive pollution prevention program in place
- **Winnability of campaigns** aimed at obtaining actions at those facilities or at gaining adoption of pollution prevention programs by local government

It is very important to look at the level of concern and leadership among residents living near various polluting facilities or within various local government jurisdictions. Are there now activists in a neighbourhood or area who are working to mobilize the community around toxics problems? Are they in need of assistance? If there are grassroots leaders struggling to build a local citizens campaign with little time and money at their disposal, it makes sense for the steering committee to help them in their effort. If there is already a strong neighbourhood organization near a polluter, the steering committee should avoid "stepping on toes" by proceeding cautiously, perhaps providing support at higher levels of government.

Local Action

Regardless of whether or not there is assistance available from a regional steering committee or coalition, building an organizing committee is a critical early step in any grassroots pollution prevention campaign. There are a number of things that can be done to recruit people for the committee:

1. **Talk to people you already know** in the neigh-

bourhood and ask them to come to an organizing committee meeting.

2. **Meet with existing leaders** in the neighbourhood or community such as block club leaders, progressive clergy, and small business people, and ask them to be part of the organizing committee. Use the limited information on the toxics threat already gathered to convince them to attend the first (or the next) organizing committee meeting. If they are hesitant, tell them they can decide whether or not to join the committee after the meeting. See appendix 12 for some tips on how to hold a successful meeting.

   While it is a good idea to recruit some existing community leaders to the organizing committee, you may not want the committee to be dominated by them. These leaders can bring needed experience to the committee, but they may also bring their own agendas and other baggage. An organizing committee dominated by existing community leaders may not be able to further organize the community around the toxic threats facing it. Such a committee may be no more than a representation of a status quo—that, for whatever reasons, has allowed toxic contamination of the community to continue for years or decades. Besides, a vibrant grassroots campaign recruits residents who in many cases have never been part of an organization other than their church. Indeed, it might be a good idea to build a solid organizing committee of new leaders first, and then reach out to the old movers and shakers.

3. **Make contacts at supermarkets** or shopping centers and then work to involve these contacts in the organizing committee. After getting permission from store management, go to the store or shopping center at a time when a lot of people do their weekly shopping (say, Saturday). Bring a basic flyer or fact sheet on the toxic hazard being targeted by your effort, and a legal pad and clipboard to record names, addresses, and phone numbers of interested people. Try to have short conversations with about fifteen people per hour.

   Here is a sample introduction to use: "Hello (a smile always helps). Can I give you one of these? My name's Rachel Commoner, and I'm working with some people in the area to get an organization started to do something about the pollution coming from the Toxics-R-Us factory on Slough Death Drive. We're hoping that if we get enough people together we'll have the strength in numbers needed to get some action on this problem.

   "I don't want to take up much of your time this morning, but if you're interested and would like us to get in touch with you in the next week or so when we're setting up a meeting, I'll be glad to take down your name and phone number."

   Over a five- or six-hour period you should be able to talk to seventy-five people.

   Immediately after finishing, organize the list into index cards or a computer database with the name, address, and phone number of each person who gave you that information. Include any relevant notes from your conversation with each person. Visit all of the people who signed your legal pad at their homes as soon as possible, preferably within a few days. Having spent several hours talking to people at the shopping area puts you in the position to tell each person you visit that you have already talked to however many people interested in starting an organization to deal with the local toxics threat. Be positive and use whatever good information you obtained in conversations with others to build momentum. It's probably useful to talk about people either locally or in other areas of the country who have successfully organized to deal with a toxic hazard in their community. Invite each person you visit to the next organizing committee meeting. If they don't want to be part of the organizing committee, ask them to do something that takes less time, such as making phone calls or distributing flyers.

   By talking to seventy-five people at the shopping center, you will be doing well if you get forty names. Out of forty follow-up visits you may get twenty-five people who commit to attend the next organizing committee meeting. Out of those twenty-five, expect about eight to actually show up at the meeting.

4. **Do some doorknocking.** Develop a simple petition on the toxic hazard facing the area and knock on doors asking people to sign it. When you meet people who are particularly concerned, talk to them about the neighbourhood getting organized and invite them to an organizing committee meeting.

5. **"Pyramid" your contacts.** When talking to people, ask them to give you the names of anyone else they know who might be interested in joining the effort. At that point it may even be appropriate to ask them if they have the time to contact those people themselves.

Once again, when people you ask to join the organizing committee say "no," ask them to help the campaign by doing something that requires less commitment. Try to build an organizing committee made up of people

living throughout the neighbourhood or area being organized. Such a committee will be more representative of the community than one filled with people from just two or three blocks.

Invite people to the first meeting in person *and* in writing (flyer or note) *and* with a reminder phone call. Also do this when inviting new people to subsequent meetings. Remember, if one person out of every three of those invited actually shows up at the organizing committee meeting you are doing very well. There are many things in our society and in people's lives that discourage involvement in grassroots citizen action campaigns. So don't be disappointed if turnout is low at first.

The First Meeting

The first organizing committee meeting is important because it can set the tone for the entire campaign. While the meeting must include a discussion of the toxics problems facing the area, the chair of the meeting cannot allow the discussion to degenerate into depression and fatalism. The overall tone of the meeting must be upbeat and positive, building peoples' confidence in their ability to mobilize the community and win results. An upbeat meeting will be the first step in empowering the community and building the momentum needed for the campaign ahead.

An agenda for the first organizing committee meeting should have three components:

- **Presentation and discussion** of information on the toxics threat(s) facing the community
- **Development** of the first campaign strategy
- **Division of the work** that must be done.

All of these are important, but the development of campaign strategy merits special attention because the life experiences of most people do not prepare them to do this in a systematic way.

Grassroots Campaign Strategy

Just as professional football teams go into a game with a game plan or strategy and candidates for political office develop strategies to guide their campaigns, so pollution prevention organizers should systematically develop strategies for their grassroots efforts. Community organizing efforts do not have to be unplanned and unsophisticated. Considering the corporations or other powerful institutions often lined up against citizen campaigns, it is foolhardy to attempt them without going through a thorough planning process.

About an hour of the first organizing committee meeting should be devoted to campaign strategy. The strategy that comes out of the first meeting will be only an initial one. It will need to be revised frequently by the campaign's leadership as the campaign unfolds and new situations emerge.

A Step-by-Step Approach

The process described below is adapted from an approach developed by the Midwest Academy, an organization that specializes in training community organizers and leaders. It can be applied to planning a grassroots effort around almost any issue or problem in almost any community.

In summary, the step-by-step approach is this:

1. Define long-range goals.
2. Set specific goals and objectives.
3. Determine campaign targets.
4. Identify nontarget opponents.
5. Identify potential campaign allies.
6. Develop an overall campaign strategy.
7. Determine campaign tactics and tasks.
8. Plan campaign outreach efforts.
9. Plan campaign organizing drive.
10. Recruit volunteers and develop leadership.
11. Get resources.
12. Develop a campaign timetable.
13. Develop a campaign work structure.

Step One: Define Long-Range Goals

Generally speaking, what is the overall purpose of organizing a grassroots campaign around toxic pollution? Answers to this question will be things like: ending toxic pollution of our community while preserving good-paying jobs, or, protecting our children's health from the

threat of toxic contamination. The answer to a particular community situation may seem obvious at first, but potential differences in concern or emphasis among community members can emerge unexpectedly during an open discussion about community environmental problems. It is important that these differences, if they exist, be raised and resolved early on, before campaign organizing swings into high gear.

Step Two: Set Specific Goals and Objectives

What specific changes, policies, programs, or measures do people want to see adopted? These questions will help the organizing committee to set specific goals. These goals will change (and in many cases become more specific) as the campaign unfolds and new information comes to light. For example, at first the campaign may press for a toxics use reduction program at a facility. Then, after touring the plant and interviewing management, the organizing committee may be able to call on the company to implement very specific toxics use reduction measures at the facility.

Goals must be clear and specific during each phase of the campaign. Know what you want and know how to measure material victories. Always press for written and binding agreements, for timetables and due dates; these are "power" clauses.

Step Three: Determine Campaign Targets

Who has the power to adopt the changes, policies, programs, or measures desired? There are usually many answers to this question and they are often more complicated than one would expect. That is because most private and public organizations or institutions are governed by multiple, and sometimes overlapping, levels of decision-making power. The organizing committee must break through this web of power and narrow the campaign's targets down to specific people. Where possible identify the names of the decision-makers the campaign is targeting.

For private corporations first identify the name of the lowest level person you think has the power to implement your goals or demands. Then figure out who that person is responsible to, and so on, until a picture of the entire formal chain of command has been developed.

Now look at who owns the corporation. Is it a subsidiary of another company? Who owns that company? What other corporations or institutions is the polluter interconnected with? Next find out who sits on the corporation's board of directors and what other companies, organizations, or institutions those board members are involved with (as, say, stockholders, board members, officers, or managers). Now look at the company's operations. What are its subsidiaries and where do they operate? What products do the company and its subsidiaries make, or what services do they provide? Which banks or financial institutions have loaned money to the company and its subsidiaries? Now answer the same questions for other corporations that the company is interconnected with through ownership or through common directors or CEOs.

For government executive branch agencies in the United States or ministries in Canada, it is also possible to identify a formal chain of command right to the top of the agency (for example EPA Administrator Carol Browning or Ontario Minister of the Environment Ruth Grier). From there, look at the elected officials the agency or ministry is accountable to. It also useful to get information on the careers of high level agency bureaucrats. Have current or past agency officials spent part of their careers working in the industries their agency regulates?

Assessing decisionmaking power in legislative bodies is often more complex. Clearly, the legislator representing your neighbourhood, district, or riding in the legislative body should be a key target of any campaign seeking changes in government policies or programs. But in most legislative bodies there are other powerful lawmakers in key positions who also need to be targeted. Chairs of powerful committees, majority leaders, or lawmakers who have been in office a long time fit in this category.

The best way to figure out the power relationships within a particular legislative body is to ask someone who knows like a public interest lobbyist. Some organizations that primarily focus on lobbying offer training workshops for grassroots leaders and groups. These workshops offer critical preparation for pollution prevention activists who want to carry their fight to the legislative arena. See appendix 13 for a listing of organizations in the Great Lakes Basin that offer guidance on lobbying.

During the campaign planning part of the first organizing committee meeting, the committee will only be able to take a first shot at determining the campaign's targets. Power structure research and analysis will be needed to "nail down" or zero in on specific targets. Once power structure research and analysis provides a list of various potential campaign targets, the organizing committee can decide specifically which individuals to target during different parts of the campaign. For example, at one point the campaign may pressure a lawmaker to push an environmental agency to investigate

illegal releases of toxic chemicals from a facility the campaign is pressing to adopt a toxics use reduction program. At another point, the campaign may focus directly on facility managers with a strategy combining delegation meetings, letterwriting, large community meetings, and picketing.

At any rate, power structure research and analysis will give the committee a complete picture of power relationships within the corporations, or governmental bodies being targeted so that decisions about specific targets will be informed decisions.

One other important point needs to be raised about campaign targets. Targets are not always opponents. They are not always opposed to the goals of the campaign. Sometimes the decision-makers with the power to make some of the changes sought by the campaign actually support those changes from the beginning. If that is the case, accept the good fortune and move on to other campaign goals. Also, be sure to give positive public recognition to the enlightened target.

Step Four: Identify Nontarget Opponents

Which individuals, corporations, organizations, or institutions, besides the targets, have reasons to oppose the campaign? As grassroots campaigns against toxic hazards unfold, individuals, corporations, and organizations, other than the campaign's targets, will often emerge as opponents of the grassroots effort. They cannot be dealt with as targets because they lack the decision-making power to implement the goals of the campaign. Nonetheless, they devote time, money or other resources to prevent the campaign from achieving its goals. Campaign opponents can work privately as well as publicly.

During a grassroots campaign to enact government policies sunsetting persistent toxic substances in the Great Lakes Basin, for example, the Chemical Manufacturers Association or the Council of Great Lakes Industries might emerge as strong opponents. These organizations do not have the power to enact or turn down sunset program proposals. Only decision-makers in the Great Lakes governments have that power. But as opponents with significant resources, the two organizations can very much influence the outcome of the campaign. Like targets, campaign opponents can be identified through power structure research.

Step Five: Identify Potential Campaign Allies

Which groups, organizations, associations, businesses, etc. have reasons to support the campaign? What kinds of support and/or resources can each one of them bring to the campaign? What weaknesses or liabilities can each one bring to the campaign? What steps must be taken to make them part of a campaign coalition?

When working on this aspect of the campaign plan, start by talking generally about the constituencies or types of organizations that can be recruited into the effort. Then get as specific as possible, developing a list of specific organizations including (where possible) names of the leaders of each one. It should be easy to develop a fairly good list during the first organizing committee meeting, and then expand and refine it by gathering additional information after the meeting. This information can be obtained through the community research described in the last section of this chapter.

Workers and labor unions can be approached as potential allies by grassroots pollution prevention campaigns. Campaigns targeting specific facilities should reach out and establish contact with the union at the facility, or if there is no union, with workers themselves. For campaigns targeting governmental entities, the unions operating within the particular jurisdiction could be approached.

Unions and workers should be included in grassroots environmental campaigns, and their concerns—workplace health and safety and the threat of job loss—incorporated into campaign plans. The best way to incorporate worker concerns is to meet with the workers or union members early in the campaign so that these concerns can be identified and common ground between workers and the community can be established.

Other potential campaign allies include: block clubs, community-based organizations, PTAs, churches, small business associations, civic organizations, among others. Steps that could be taken to bring organizations into the campaign coalition as allies include:

- **Meet with the leaders** or members of organizations whose support would be most helpful to the campaign to describe the campaign and ask for support. During your presentation at this meeting, describe the specific ways the organization can help out the campaign.
- **Send a letter** to less-influential organizations describing the campaign and the ways in which they can support the effort. Include fact sheets, and a form the organization can use to join the coalition.
- **Follow up the letters** with phone calls to ask if the organization has made a decision on its participation in the campaign and the kinds of support it can provide. If they want a personal meeting or presen-

tation with a campaign leader, schedule it.

- **Maintain regular communication** even with little involved or uninvolved organizations, keeping them aware of reasons to become engaged with the campaign and of the many tasks and events their support would be useful for.

An organization can give many different types of support to a campaign including:

- **Signing on to the campaign** by adding its name to the list of organizations in the campaign coalition.
- **Publicizing campaign activities** in the organization newsletter.
- **Providing the campaign** with its membership lists and allowing direct outreach to get the members involved in the effort.
- **Directly involving members** in the campaign through direct appeals in the organization newsletter and mailings, and by phone calls.
- **Providing the campaign with money,** office supplies and equipment, and other resources.
- **Participating in the campaign organizing** activities and organizing committee.

When reaching out to potential allies it is important to be clear about the various types and levels of support they can offer the campaign. Before contacting them the organizing committee should have a good idea of what they are capable of bringing to the campaign. Many organizations will provide only low-key support. They do not have to be included in the organizing committee or the campaign's decision-making process. But all organizations that contribute significant resources or involvement to a campaign should be encouraged to participate in campaign planning and decision-making.

Step Six: Develop an Overall Campaign Strategy

What is the overall plan of attack the campaign should employ? The development of an overall strategy should be guided by:

- **The results** of the campaign planning process up to this point, including the power structure and community research done as part of the process
- **Assessment of how much pressure** it will take to get the targets to make the desired changes. If the campaign's leadership thinks a polluting company is community-minded and will therefore be cooperative, the strategy adopted would be relatively non-confrontational. But if a company has historically been a "bad actor," a more confrontational strategy would be planned for.
- **Assessment of the "pressure points,"** or where and to what kind of strategy the campaign's targets are likely to be most vulnerable
- **Assessment of what kind of strategy** would draw the most community support.

No strategy should be set in stone. The strategy arrived at during the first campaign planning exercise at the first organizing committee meeting will be a tentative one in most cases. Over the course of subsequent meetings, the strategy will be adjusted or changed. Flexibility, or being able to change with changing situations as the campaign unfolds, is very important. One type of strategy and set of tactics might be called for early in a campaign, while a completely different strategy might be needed late in a campaign, to finalize an agreement with a target, for example.

The type of strategy employed by the campaign will also depend very much on the behavior or reaction of the campaign's targets. If a company adopts a comprehensive toxics use reduction program after the first small group meeting with management, there will be no need for an escalating, confrontational strategy. But if a company refuses to even meet with campaign leaders, a strategy of confrontation that will turn up the heat on company officials is called for.

In general, strategies developed by the organizing committee should be escalating, beginning with low-key activities such as letterwriting and small group meetings with targets, leading to confrontational actions such as rallies and pickets only if no results are achieved. Every campaign strategy should include small group meetings with targets early in the campaign, aimed at convincing them to adopt the changes desired without resorting to more confrontational tactics. During campaign planning sessions, it is a good idea for the organizing committee to look at various campaign scenarios so that the leadership is prepared to respond to the target's level of cooperation.

Here are some community action strategies that grassroots campaigns can employ:

- **Seek a good neighbor agreement** with a polluting facility. The campaign presents a company with an agreement to reduce the use of toxic chemicals or take other action to protect and clean up the com-

munity. This strategy attempts to put citizens at the bargaining table with corporations to negotiate pollution prevention or toxics use reductions and encourage "neighbourly" decisions by companies.

- **Release a report** to kick-off a pollution prevention campaign. Using the sources of information described in chapter 2 of this guide, prepare a report on a specific targeted facility or on the extent of toxic pollution in the community. Include recommendations for actions to deal with the toxic hazards revealed. These recommendations could become the demands or goals of the campaign.
- **Prepare "plume maps"** and release them to kick-off an accident/pollution prevention campaign. SARA Title III information can be used to develop plume maps showing vulnerable areas where routine emissions threaten people's health, and where a massive accidental release of toxic chemicals would kill or maim people. These maps could then be publicly released at a media event along with accident prevention and pollution prevention recommendations that would become the demands or goals of the campaign.
- **Conduct petition** and letterwriting drives.
- **Deploy an "arsenal of agencies"** against a polluter. Pressure government agencies at the local, state/provincial, and federal levels to scrutinize or investigate company behavior, and to penalize wrongdoing such as permit violations. Environmental agencies are not the only agencies that can be employed. For example, local zoning agencies can enforce zoning requirements related to the use of hazardous materials, or state labor departments can be asked to investigate unfair labor practices.
- **Mount a corporate campaign.** Target chief executive officers, facility management, major shareholders, etc. for scrutiny or action.
- **Develop joint strategies with workers** at targeted facilities. Before launching the campaign, meet with workers or union representatives to discuss commonalities, and if possible, map out a joint strategy. Joint strategies can include community support for worker actions to deal with toxic health and safety hazards inside the facility, or incorporation of pollution prevention provisions in negotiated contracts by the union.
- **Challenge local government** economic assistance for corporate polluters such as government contracts, funding from tax-exempt municipal bonds, or tax breaks.
- **Run your own candidates** for elected offices.
- **Mount escalating,** media-generating, large turnout actions such as rallies, motorcades, or mock funerals.
- **Boycott.** This tactic can be effective but it is very tricky. First, do not conduct a boycott in the face of opposition by a plant's workers. Whether or not it is unionized, a plant's workforce has as much at stake in the fight for a cleaner facility as any community group, and no strategy potentially harmful to worker interests should be conducted without worker participation.

  Secondly, what are the practical difficulties in conducting a boycott? Where are most of the products produced at the plant sold? In many cases it is impossible for a local coalition to mount an effective boycott effort without help from national organizations and networks.

  If a boycott makes sense given these two caveats, it should be thorough-going. Boycott as many company-related things as possible, including company lenders (banks), company executives, company-sponsored events, and company public appearances in addition to company products and non-company products that have company products as major components.
- **Pursue a "three rights" strategy.** This approach seeks to win three rights for citizens living near toxic polluters:
  - *The right to know* the types, amounts, and effects of all the toxic materials handled by a firm and just how the operation is run. There is no right to know in Canada. In the United States, citizens can work for the right to know more than what is available under SARA Title III.
  - *The right to inspect.* Any factory or facility that is chemically trespassing into our lives must be made to open their records and gates to allow our campaign organizations, along with independent experts of our choosing, to inspect each operation and to interview management to find out what toxic chemicals are used, stored, manufactured, and released to the environment, by the facility.
  - *The right to negotiate* to gain measures that will remedy the problems identified during inspections of the facility and its records, and during the interviews with managers. These measures could

include the development and implementation of comprehensive toxics use reduction plans.

- **Citizen suits.** In the United States, citizens have the right to file lawsuits against corporations that fail to meet their reporting obligations under the SARA Title III Community Right To Know law, and against companies in violation of their RCRA, Clean Water Act, or Clean Air Act permits. A citizens' suit strategy can be very effective as long as it is used as part of a larger grassroots effort. Citizen suits can be used to negotiate pollution prevention good neighbor agreements. And the threat of a citizens' suit can be as effective as the suit itself. A grassroots campaign can use the threat of a citizens suit to get a corporation to negotiate a good neighbor agreement.

Step Seven: Determine Campaign Tactics and Tasks

What tactics should be employed and what tasks must be completed to carry out our strategy and achieve the goals of the campaign? Tactics are to strategy as the waves of the ocean are to the tides. Tactics are the steps through which the strategy is implemented.

Deciding on effective tactics for a particular campaign situation requires imagination. Tactics for a grassroots citizens campaign flow from the principle that the campaign's main strengths are its numbers. Some general rules to guide a campaign organization's tactical decisions have been developed by the Midwest Academy:

- **Never use a tactic** that people involved in the campaign do not understand, are hostile to, or are afraid of. Keep tactics within the life experiences of most people in the campaign, otherwise you build fear and confusion into the movement.
- **Tactics should be reasonably enjoyable** to the people involved in the campaign.
- **Tactics should be dramatic,** clever, and headline-catching whenever possible.
- **Power is perceived**—it is both what you have and what the campaign's targets and opponents think you have. Use the news media to inflate the latter.
- **The threat of using a tactic** is sometimes more persuasive to a target than the tactic itself.
- **Go outside the experience** of the targets and opponents whenever possible. Try to catch them off guard. Vary tactics. Do the unexpected, or even the opposite of what is expected. Apply pressure where it is least expected. If a target is used to dealing with pickets, try something else. If a target is not used to pickets, picket.
- **Ridicule (and flattery)** are important tools. Label the targets and opponents.
- **A tactic used too often,** for too long, becomes stale and therefore ineffective.
- **Use tactics to keep pressure on** in a campaign. There should be a new action every week. Pick new fights; keep on top of the issues. The risk of cooptation grows more from losing the initiative than it does from overtly compromising your values.
- **Tactics should get opponents to react**—and the campaign should be ready to react to that reaction.
- **Have a constructive alternative to offer.** Know what you want and know how to measure material victories. Always press for written and binding agreements, for timetables and due dates. These are "power" clauses.
- **Identify targets clearly.** Do not let them diffuse responsibility.
- **Know the interests** of your targets and opponents. Play them off against each other. Play on their competition for power.
- **Make sure your tactics are appropriate** to your current aims and the current stage of your campaign. Campaigns pass through stages, and different tactics are appropriate for different stages and different levels of escalation in the campaign. Early in a campaign, a low-key public education tactic such as literature distribution might be needed. Faced with an intransigent target as time passes, the campaign may later appropriately adopt mass picketing as a tactic.
- **A campaign should employ a mix of tactics.** A strong grassroots campaign organization ought to be able to focus on small group meetings with policymakers one month, and then switch to direct action the next.
- **Choose tactics that increase** the number of people involved in the campaign.

Some questions the organizing committee should discuss when deciding on tactics, actions, and overall strategies are:

1. **Is the timetable** for the tactic or strategy internal or

external? The timetable for organizing a big turnout at a public hearing is external. It is set by the agency holding the hearing, not by your campaign organization. The timetable for a boycott is internal. The campaign can start it or stop it any time it wants to.

2. **What are the legal constraints** on a tactic or strategy? For example, pickets must be carried out within certain legal bounds. Large rallies often require permits. The organizing committee needs to explore potential legal constraints before deciding to do anything. Nonviolent civil disobedience, which is by definition illegal (benignly), may be chosen under certain circumstances, but the consequences of this type of action must be thoroughly explored.

3. **What relationship does the tactic** or strategy establish between the campaign's leadership and its supporters or base of support? Between the organization and the campaign's targets and opponents? A law suit directly involves attorneys, expert witnesses and a few of the campaign's leaders. A strategy of direct actions such as pickets, rallies and other high-profile actions directly and fully involves large numbers of campaign supporters.

   The direct action strategy is better for empowering people and building both broad participation and democratic decision-making into the campaign. In the long run, such a strategy will also ensure greater respect for the campaign by targets and opponents, increasing the likelihood that concessions will eventually be made.

4. **Will the tactic or strategy** affect the interest and level of support of various campaign allies? Will it bring in more organizations into the campaign?

5. **What is the inherent power** of the tactic or strategy? What kind of power does it gather together and exert on the campaign targets? A media-generating picket only exerts the power of public embarrassment, while an effective consumer boycott or a strike of vital employees exerts enormous direct economic power on the target.

6. **What resources** does the tactic or strategy require that the campaign have?

7. **What reaction** does tactic or strategy elicit from the campaign's targets or opponents? What forces are put in motion by the use of the tactic or strategy?

Some examples of tactics used in grassroots toxics campaigns are:

- **Rallies,** demonstrations, and pickets.
- **Large community meetings.** These can be organized around one toxic polluter, or, to increase turnout and build citizen unity, around several toxic threats.
- **A mock wedding** to show that corporate or polluter interests are married to government agencies or officials in your community.
- **Creative actions at local government meetings** such as presenting the mayor or common council with play money to symbolize selling out to corporate polluters.
- **A candlelight vigil** outside City Hall, the polluting facility, or even the home of a campaign target. The group could sing songs and pray for the target to "see the light."
- **"Walk of Concern"** or other kind of thematic march.
- **Toxic motorcade.** In this imaginative tactic, each car in the motorcade has a sign that says something like "I am not a Ford Escort, I am 1600 pounds of vinyl chloride emissions coming from the Chemkill Plant and I cause cancer." This tactic is designed to help people understand technical information by showing how much toxic chemicals are being released from a facility in terms that are easily visualized. By moving slowly through the community with signs like this, a motorcade will graphically demonstrate the amount of toxic emissions being sent into the community by the local polluter.
- **Symbolic report cards** grading a facility's toxics use reduction and emergency preparedness efforts. You can also throw in other aspects of company behavior such as the firm's treatment of its workers and its efforts to influence elected officials through campaign contributions.

All grassroots campaigns require a large number of fairly low-key mundane activities and tasks. When developing the campaign plan, list these activities and tasks in as detailed a manner as possible. By doing this the organizing committee will have a very specific list of tasks that need to be performed by (and assigned to) someone in order for the campaign to be successful. Have this "to-do list" handy while recruiting new people to the campaign so that you can tell them exactly what needs to be done at any given time. Then they can choose precisely the ways in which they want to help out the campaign. This is important because it is easier to recruit

and keep new volunteers or activists if there are specific things for them to do.

Step Eight: Plan Campaign Outreach Efforts

What things should we do to get people involved in the campaign? If a grassroots pollution prevention campaign does not succeed in moving a significant number of people into action or support, it is probably doomed to failure (or only very limited success). An intensive, well-planned community education, outreach, and mobilization effort is needed to involve as many citizens as possible in the campaign. Without such an effort, the campaign's message will only reach the already converted.

The following types of activities can be used to educate people about the toxics problem(s) and involve them in the campaign:

- **Generate as much free media coverage** for the campaign as possible. The organizing committee should develop a media plan as part of the overall campaign planning process. This media plan needs to be integrated with the campaign's choices of strategy and tactics, and, of course, media events need to be designed so that they are "newsworthy." The media do not cover events to help organizations publicize themselves. Turnout at a key campaign event can be increased through free news media coverage created by smaller media events held a day or two before the campaign event.

  Appendix 14 contains some "how to" materials to guide you in your efforts to successfully get the campaign's message out through the media.

- **Direct mail efforts** to publicize the purpose of the campaign and campaign events.

- **Letters** to the editor.

- **Public service** announcements.

- **Outreach** through allies.

- **Door-to-door flyering** or literature drops.

- **Go doorknocking** to talk to people in person at their homes. This is by far the most effective way to personally contact people in the community. There is no substitute for personal contact in convincing people to become active in a campaign, and doorknocking does it best. Hitting the doors is the crucial element of any grassroots community organizing drive that wants to identify and develop new leadership made up of people who have never been active before by going deeper than the easy-to-attract level of activists and joiners. See appendix 15 for more details on how to conduct effective doorknocking. Knocking on doors is unfortunately one of the more difficult things to get volunteers to do. Most people don't like the idea, but once they actually spend an hour or so hitting the doors they realize that most of their fears were unfounded. Many find the face-to-face contact with other people invigorating, others simply nerve-wracking—but it is rare that anyone really knows how they will feel until they try doorknocking. The trick is to get them to try. A few ways to help volunteers start doorknocking include:

  - *Ask people to doorknock* in their own immediate neighborhoods.
  - *Organize group doorknocking days,* where a large number of people doorknock the same area.
  - *Have experienced doorknockers* go out with volunteers their first couple of times.

- **Contact people by phone** using *Polk's City Directory* or other directories listing people by address instead of alphabetically.

- **Poster neighborhoods** (nondestructively—no wheat paste or other nonremovable glues) to publicize campaign meetings or events. Get supportive businesses to display the posters.

- **Hand out flyers** at shopping centers and other places where many people go, such as bingo games, concerts, events, and church services.

- **Conduct tabling.** There are two kinds of tabling—low-key tabling that most of us think of, and a more proactive variety called "assertive" tabling, in which two or three volunteers position themselves in the crowd and actively urge people to go to the table, which is usually off to the side out of the main flow of people traffic. A brief one- or two-line "mini-rap" can get people to the table, such as, "Join the fight to stop pollution from the Toxics-R-Us plant . . . sign the petition at the table over there." You can also work the crowd with petitions on clipboards to get signatures directly.

- **Generate church announcements,** either from the pulpit during services, or in the church bulletin.

- **Conduct volunteer recruitment** and fundraising. During each personal contact with someone ask him or her to volunteer for a campaign task or activity, help out the campaign with a donation of money or other resources, or both. Volunteer sign-up forms should be passed out at all campaign actions, meetings, or events to recruit new volunteers.

- **Use sound trucks** to get out a message.

An ongoing, fairly low-key "toxics education program," perhaps consisting of fact sheet distribution or letters to the editor, will help build community concern about local toxic hazards. But the bulk of the grassroots education, outreach, and mobilization efforts should be aimed at involving people in the campaign's meetings, actions, and other events. This type of action-oriented approach will succeed in educating many more citizens than a low key approach. And people educated in this way will be much more likely to turn their newly found awareness into involvement in an organized effort to deal with local toxic pollution.

An outreach, organizing, or mobilization drive should be carried out before any campaign event that requires a large turnout for success. Just as in an election campaign, the intensity of this drive should be escalated until it reaches a fever pitch during the last 48 hours before the event. Each drive should try to get the campaign's message through to every citizen in the target area several times through a combination of the contact or outreach activities described above. As many direct individual personal contacts (doorknocking and phoning) as possible should be included in each drive. Record the level of support of everyone the campaign contacts in person and be sure to contact people who are supportive again as part of a massive final outreach effort during the last two or three days before the event.

During that couple days leading up to a key campaign "happening," a massive final outreach effort needs to be mounted. The goal of this effort should be to get the message out to the entire community one more time. Personal contacts with all of the people identified as campaign supporters earlier in the drive should be included as part of this final effort.

Step Nine: Plan Campaign Organizing Drive

In addition to an outreach drive building up to each major campaign event, one effective way to launch grassroots pollution prevention campaigns is with an intensive "organizing drive" culminating in a big community-wide meeting. If successful, this initial organizing drive will build a solid base of community support for the campaign, and will launch the effort with the momentum it needs for the tough battles ahead. If the area to be organized is too large for one drive, it could be divided into sections, and an organizing drive can be carried out in one section at a time. We have already detailed the first steps in the organizing drive: researching the toxics problems, building the organizing committee, and developing the campaign plan. The rest of the organizing drive is made up of these steps:

1. **Set the size** and geographic boundaries of the drive. In general, the organizing committee should target an area containing the number of households that can be doorknocked in about a four to eight week period. Eight weeks is the absolute maximum. If the drive takes too long momentum will be lost. Calculate the number of households by assuming that one person can hit about 10 doors in an hour. So if six organizing committee members can doorknock an average of six hours per week:

   6 members x 6 hrs/wk x 10 doors/hr. x
   6 weeks = 2,160 doors in 6 weeks

2. **Set date,** time and place of the big community meeting.

3. **Hold organizing committee meetings** about every ten days during the drive and continue to build the organizing committee.

4. **Send a letter** or flyer to every household in the targeted area shortly after the first organizing committee. If the organizing committee can raise the postage money (use an existing organization's bulk permit where possible—it's bulk mail rate is the lowest available), then sending them through the mail is the best way to go. If not, they can be distributed by volunteers door to door, but be sure to address the flyers. That personalization goes a very long way in getting people involved. Use the Polk's City Directory or another directory that lists people by address to get the names and addresses. You can send a flyer, a letter signed by the organizing committee, or a double-sided combination flyer/letter.

5. **Doorknock every household** in the target area over a four-to-eight-week period after the letter or flyer reaches residents. Record the level of interest of each person you talk to.

6. **Hold house meetings** on blocks where interest is very high to further explain the toxic pollution problems and the grassroots campaign. Recruit people to the organizing committee.

7. **Put up posters** publicizing the big meeting.

8. **Send out requests** for the media to make public service announcements on the big meeting; then make follow-up calls to get them printed or aired.

9. **Start to recruit organizations** into the campaign coalition.

10. **Flyer the entire target area** door-to-door within one week of the big meeting.

11. **Get churches/synagogues** to announce big meeting during services or print meeting announcement in their bulletins. This will require phoning, and in some cases meeting with, clergy before hand. So start reaching out to clergy one or two weeks before you want announcements to be made.

12. **Phone every household** doorknocked during the seventy-two hours leading up to the big meeting.

13. **Hold a news conference** or media event the day before or the day of the big meeting to generate additional free media publicity. One possibility is to release a key piece of information. If you hold a media event at 10:30 a.m. or 1:30 p.m. during the day of an evening meeting, you might be able to get the time and place of the meeting broadcast on local television and radio news programs during the several hours before meeting time. This kind of publicity can be equal to a few thousand flyers.

14. **Flyer** shopping centers, churches, and other places during the forty-eight hours leading up to the meeting time.

15. **Organize sound trucks** to broadcast the time and place of the meeting throughout the area during the twenty-four hours leading up to meeting time.

16. **Provide rides** to the meeting for people without cars or friends with cars. Unfortunately public transportation is unreliable after 6 p.m. in many communities. Provide rides for people who need them. You want to make it as easy as possible for people to attend the meeting.

17. **Carefully plan and organize the big meeting.** Be sure all leaders taking on the various meeting roles are well-prepared. Generally speaking, the meeting should consist of:

    - *An information component* describing the toxic hazards being targeted by the campaign
    - *A citizen speak-out component* to give residents the chance to speak their hearts and minds about the pollution problems of concern to them
    - *An action and organizing component,* where specific actions are presented to people and voted on, and people are recruited for various tasks.

    You can also invite public officials to speak as a way to draw more people. But make sure they do not take over the meeting.

Step Ten: Recruit Volunteers and Develop Leadership

How can people be encouraged to become new volunteers or leaders of the campaign? How can we help new volunteers/leaders and existing leaders to develop the skills they need to be effective as grassroots leaders? What can we do to help campaign leaders prepare for important meetings, actions, and events?

A campaign's existing leaders and volunteers must constantly work to recruit new volunteers and leaders. Every time the campaign reaches out to people it must ask them to help out by volunteering or by contributing money or other resources. Volunteer recruitment must be part of every outreach activity, and every campaign meeting, action, or other event. At every event, volunteer sign-up forms should be passed out describing specific activities that people can check off. Volunteers are part of the lifeblood of the campaign, and new blood must be constantly brought in.

Leadership recruitment and development is often overlooked by grassroots campaigns. As a result, many campaigns rely too heavily on one leader, or a small handful of leaders. These leaders actually become too important to the campaign. Most of the work and emotional stress that goes with leadership falls on their shoulders, frequently leading to burnout. And if an irreplaceable leader becomes ill, moves, gets a more demanding job, or burns out, the campaign could be dealt a severe blow. The greater the depth and skill level of a campaign's leadership, the stronger the campaign.

While it is a difficult thing to accomplish in the heat of an intense grassroots campaign, the organizing committee should carry out a planned, ongoing leadership recruitment and development effort. In cases where the campaign is blessed with a paid professional community organizer, leadership development work should be a central part the organizer's job. But because there is usually a serious lack of resources for community organizing, most grassroots campaigns will not have an organizer with enough time to give leadership development the attention it needs. So for most campaigns, someone on the organizing committee should be chosen as a leadership development coordinator.

This process can be helped with the writing of a leadership development scale, basically a list of increasingly time-consuming and/or skill-requiring tasks carried out at one time or another by the campaign.

Every citizen who is recruited by the campaign's education, outreach, and mobilization efforts to do anything to support the campaign can be evaluated for skills, interest, and energy level, and then placed somewhere on

the scale. The organizing committee or leadership development coordinator can then identify tasks that are at higher levels of difficulty.

Leadership development efforts work consciously to move each individual involved in the campaign to higher levels on the involvement/leadership development scale, recognizing that each person is different, and will advance in different ways. Some people, most comfortable with one-on-one communication, may move from flyering their street to doorknocking to becoming an area coordinator, but will never take on a speaking role at a large event. Others may be more inclined to speak before large groups than to talk to people at their homes, and will become leaders at meetings, but remain reluctant to go door-to-door.

To encourage campaign participants to move higher on the leadership/development scale by taking on increasingly challenging tasks, the coordinator and the Organizing Committee will have to provide leadership training and preparation. Campaign volunteers/leaders must be prepared for each new task they undertake or each new role they fill. For tasks that are done by large numbers of people such as petitioning, doorknocking, or phoning, group training sessions make the most sense. For key leadership roles at major actions, meetings, or other events, each individual must be prepared. After the individualized preparation, all of the key leaders for the event could be brought together for a run through or "dress rehearsal" so that they get a good feel for how each of their roles fit together.

It is also a good idea to conduct leadership training activities that are not connected to specific campaign events or activities. Periodic training workshops can be held to help community residents develop skills in a range of areas including researching an issue, doing community outreach activities, planning and running a meeting, working with the news media, and so on.

If at all possible, the leadership development coordinator should get outside training for campaign leaders. One or two leaders can be sent away for a training conference, or a trainer can be brought in for a day-long workshop. Either way, it will be well worth the time and money. In most cases, it will be more valuable to the campaign than legal representation. Appendix 13 lists organizations that offer training for community leaders.

Step Eleven: Get Resources

What funding and other resources are needed to effectively carry out the campaign? What things can be done to raise the necessary resources? Do we have the ability to do the things necessary to obtain these resources? If we are unable to get the resources needed to fully carry out this campaign plan, which elements of the plan are least important and can be cut without weakening the campaign too much?

It is important for the organizing committee to do a resource check by specifically answering these questions during the campaign planning process. Remember that money is only one kind of resource. Office space, office supplies and equipment, donated services such as printing, and volunteer time are all equally valuable, sometimes more valuable in the long term. The organizing committee should try hard to identify ways to obtain the needed resources and avoid cutting parts of the campaign. A plan for raising the resources can be developed and incorporated into the overall campaign plan.

Fundraising is of course a crucial part of the resource development plan. Since it takes a long and involved process for grassroots groups to secure foundation support, it is probably a good idea for the campaign to concentrate on community fundraising, at least at first. Two excellent guides to grassroots fundraising are *The Grassroots Fundraising Book* by Joan Flanagan, available from the Youth Project, 1555 Connecticut Ave. NW, Washington, DC 20036, and *Fundraising for Social Change*, by Kim Klein. Another source of helpful advice is Klein's periodical, the *Grassroots Fundraising Journal.* But in case the campaign leaders do not have the time to read these publications, here are a few basic pointers:

- **Fully incorporate fundraising** into all campaign activities and events. When petitioning or doorknocking, ask people for a few dollars. Include a fundraising component in every major large turnout event (such as a raffle, 50/50 split, or just passing the hat). People need to know that without some money the campaign will not succeed.
- **Start small** with simple activities that do not require the investment of much money up front (such as raffles). Then invest some of the funds raised through these low-risk efforts into larger, riskier, and more profitable events (such as dinners, dances, Las Vegas nights and bingos).
- **Institute** a campaign membership dues system.
- **Choose a fundraising coordinator** to organize the fundraising activities. Find someone who has organized fundraising activities before as a volunteer in a community organization or social club. There are people with this kind of informal fundraising experience in most neighbourhoods.

If the campaign organization eventually incorporates

as a formal not-for-profit corporation, it can submit grant proposals to foundations. Incorporation takes six months to a year. The campaign can also secure foundation support through an (incorporated) organization that is a member of the campaign coalition. There are two ways this can be done. The organization can submit a grant proposal to specifically fund campaign staff and activities. The campaign can also submit a proposal with the organization acting as its fiscal agent, that is, the organizational vehicle through which the grant money flows to the campaign.

Step Twelve: Develop a Campaign Timetable

When is the best time for us to carry out different parts of the campaign?

The timetable for the campaign should be as detailed as possible. A good approach is to write a weekly timetable for the upcoming two months, and a monthly one for planning farther into the future. List the specific meetings, actions, and tasks that will be carried during each week or month in the timetable. Once again, remember that the timetable is not set in stone. It will need to be adjusted frequently, and the organizing committee should review it at each meeting.

Step Thirteen: Develop a Campaign Work Structure

How should campaign work be divided up? What parts of the campaign, if any, need committees for their effective implementation? What campaign tasks or activities can be assigned by coordinators without full committees?

Some grassroots campaigns fall into the trap of forming committees for everything. A cumbersome committee structure could become a virtual "grassroots bureaucracy," taking up so much time, energy, flexibility, and efficiency that it actually weakens the campaign, making it less organized instead of better organized. Set up committees only for those parts of the campaign that cannot be fully planned and coordinated during the full organizing committee meetings or by one or two coordinators between meetings. Committees that are set up should be disbanded once they have completed their work and outlived their usefulness. Consciously work to combine flexibility and efficiency with democratic decision-making in deciding whether various kinds of campaign work should be done by a committee or by individual coordinators.

To take a few examples, power structure research and analysis is probably best done by a committee. It is difficult to plan a research effort like this during the organizing committee meeting. On the other hand, the task of making follow-up phone calls to people interested in volunteering can probably be done by a few coordinators who divide up lists of volunteer.

One effective way to organize a campaign's outreach efforts is geographically, through a system of block leaders and area coordinators. The area coordinators organize outreach activities in a neighbourhood, say, fifteen square blocks. They coordinate the efforts of the block leaders, who are responsible for anywhere from one to three blocks. The area coordinators train them and provide them with the flyers, phone lists and other materials they need). Area coordinators also do the outreach work themselves on blocks without leaders. There could also be two block leaders for the same block, with one doing outside outreach and the other doing phone work. This approach accommodates people who do not want to do a lot of outside work going door-to-door.

Campaign Research

Power Structure

Grassroots campaigns can tap several sources of information to research the power structure that controls the decisions that shape the life of the community These information sources can be used to break through the web of decision-making power that governs the polluting facilities or governmental bodies being specifically targeted by the campaign, as well as the community in general.

- **Records in the local recorder of deeds** or assessor's office will give you information on who owns the deed to the land upon which a polluting facility is built.
- **Securities and Exchange Commission** 10-K reports. Corporations that sell stock publicly are required to file these and other SEC reports, which are available to the public and contain information such as a company's revenue, expenditures and profits, major holdings and connections to other companies, either through their financial dealings or their board of directors and chief executives officers; the major shareholders of the company, and whether or not the company is a subsidiary of another company. These reports can often be obtained by writing the company itself. If not, contact the SEC at ??—to come.
- **Standard and Poor's** *Directory of Corporations, Directors, and Executives.* This multivolume reference can be found in most good libraries. One volume lists major corporations, their boards of directors and chief executive officers. The other volumes alphabetically list the (75,000) directors and executives of these corporations, and indicates the other corporations, banks, financial institutions, foundations, hospitals, and organizations that each one serves as a director or executive. This information makes it possible to map out the connections among various corporations and other powerful institutions.
- **Moody's manuals** contain information on the operations of major corporations, including their directors, executives and subsidiaries. Moody's manuals can be found in the reference section of most central libraries.
- ***Who Owns Whom?*** details corporate ownership trees from two directions. It lists corporate subsidiaries and indicates which corporations own them, and also lists major corporations and their subsidiaries. This reference book can be found in most libraries.
- ***Martindale-Hubble Directory of Law*** lists the major law firms in the United States and their large corporate clients. This reference book can be found in most law libraries, and in some other libraries.
- ***Who's Who in America?*** provides information on many key decision-makers in corporations and government. This reference book can be found in most libraries.
- ***National Cyclopedia of American Biography.*** This reference book contains information about the lives of many powerful Americans.
- **Corporate annual reports.** These contain a fair amount of information. You can obtain them by writing to a company and indicating that you are considering a purchase of company stock.

Demographic Information

Most of the following can be answered by reviewing census data:

- How many people live in the area?
- What is the income breakdown for area families?
- What is the ratio of homeowners to renters?
- What is the racial breakdown of the area?
- What is the ethnic breakdown?
- What is the age breakdown of your area?
- What are the occupations of residents in the area?
- What is the average family size? How many single-person households are there?
- What is the area's religious breakdown?
- How long have people resided in the area? What is the average length of residency?
- What have been the area's immigration patterns? Who came first and what occupations did they assume? For this kind of information, look in local history sections of area libraries, or interview local historians.
- What percentage of the area speaks a language other than English? Which languages?

- Where in the community do various racial and ethnic groups live?
- What types of housing exist in the area—what percentage are single-, double- or multiple-family dwellings, what percentage are apartment buildings, and so on.

Political Information

Much of the following information can be obtained from your county elections board.

- How many registered voters live in the area? What percentage are registered with which parties?
- How many people vote in the primaries and in the general elections?
- What were the results in the last two local elections? Who won? Who lost? What were the totals? Did these results show any trend towards or away from either party? What leading individuals and institutions supported which candidates?
- Are there any elected officials currently residing in the area?
- Are there any appointed public officials currently residing in the area?
- Who are the party committee members residing in the area?

Social Information

- What are the major institutions in the area?
  - Churches and church organizations
  - Civic organizations
  - Fraternal organizations
  - Senior citizen organizations
  - Unions
  - Professional organizations
  - Social service agencies
  - Block clubs
  - Influential families
- What are the major interests of these groups?
- In what geographic sections of the community are these organizations strong?
- Which political leaders do these organizations provide a base of support for?

School Information

- What schools are in your area?
- How many students attend these schools?
- Who are the principals of these schools?
- Are there parent groups? How active are they and what issues do they work on?
- Who sits on the Board of Education?
- What unions represent teachers and school staff?

Economic Information

- What are the occupations of people in the area?
- Where are their places of work?
- What toxic chemicals do these workplaces use and release into the environment?
- Are these workers organized into unions or not? Which ones?
- Which banks lend in the neighbourhood?
- Who are the major realtors in the neighborhood?

Resources 3

Dynamics of Organizing, Shel Trapp, New England Training for Community Organizers, 1985, 235 Promenade St, Providence, RI 02908.

Fundraising for Social Change, Kim Klein, Chardon Press, P.O. Box 101, Inverness, CA 94937.

The Grassroots Fundraising Journal, P.O. Box 11607, Berkeley, CA 94701.

The Grassroots Fundraising Book, Joan Flanagan, Contemporary Books Inc., 180 North Michigan Avenue, Chicago, Illinois 60601.

How to Deal with a Proposed Facility; Leadership Handbook on Hazardous Waste, Citizen's Clearinghouse For Hazardous Wastes, P.O. Box 926, Arlington, VA 22216, 703-926-7076.

Organizer's Manual, Midwest Academy, 225 Ohio St. #250, Chicago. IL 60610, 312-645-6010.

Organizing: A Guidebook for Grassroots Leaders, Si Kahn, 1982, McGraw-Hill.

Roots to Power: A Manual for Grassroots Organizing, Lee Staples, Praeger.

Toxics, Jobs, and the Environment: A Workbook on California's Toxic Economy, Toxics Coordinating Project, 942 Market St. #502, San Francisco, CA.

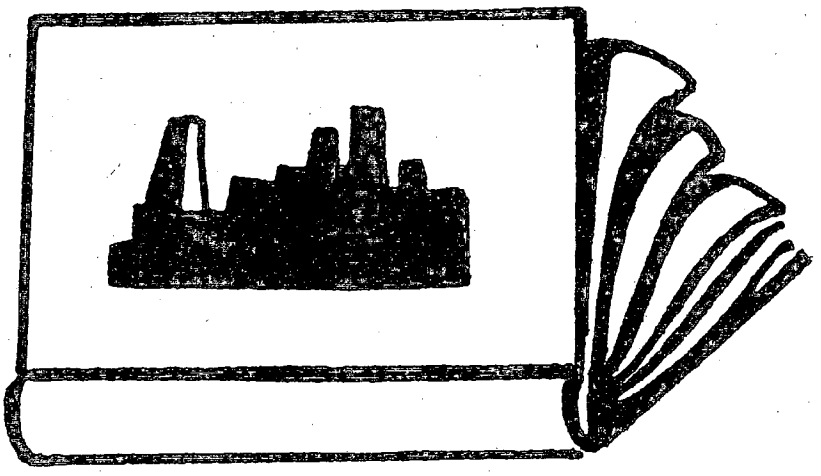
4 Overview and Examples

Planning

As a strategy for dealing with North America's environmental problems, pollution prevention remains in its infancy. Entire industrial sectors and types of toxics users lack pollution prevention models. Where models do exist, in only a few cases is it possible to take those developed for a particular industrial facility and apply them to other plants in the same industry without adjustments. Therefore one of the most important things industrial facilities and other users of toxic chemicals can do to move towards reducing their use of toxic chemicals is to embark on a comprehensive pollution prevention planning process. Such a plan would contain:

- **An analysis of each production process** in which any targeted chemical is manufactured or used. This analysis would describe the specific use, movement and fate of each chemical within each production process.
- **A facility-wide analysis** of the use, movement, and fate of targeted chemicals.
- **Current and projected toxics use** in the facility.
- **Economic impacts** of each chemical used, including purchase, pollution control, regulatory compliance, disposal and liability costs.
- **An assessment** of toxics use reduction technologies and their projected net costs, including training.
- **A plan or program** for implementing a toxics use reduction effort, with a very specific timetable.
- **Quantitative two- and five-year reduction goals** expressed as a byproduct reduction index (percent reduction in waste byproducts per unit of product) for each chemical, each production process, and the facility as a whole.
- **Statements** of why particular toxics use reduction options were or were not implemented.

Nonindustrial users of toxic chemicals, including businesses not engaged in manufacturing, governmental bodies, and institutional organizations such as schools and hospitals can develop similar plans with certain modifications. For example, the unit of activity in the factory, the production process, in a school would become the various school departments or operations, such as heating, maintenance, and groundskeeping.



Examples by Type

Input Substitution

Input substitution is the replacement of a toxic substance or raw material used in a production process with a nontoxic or less toxic substance.

Cleo Wrap, a manufacturer of wrapping paper, substituted water-based inks for organic-solvent-based inks in its printing process. This measure:

- **Eliminated the need for solvent storage** and its associated fire hazard. The firm was able to dig up its underground solvent storage tanks and is no longer subject to government regulations concerning them.
- **Reduced volatile organic solvent emissions** that exceeded pollution standards by virtual elimination of hazardous waste.
- **Saved the company $35,000 annually.**

Production Process Redesign

Production process redesign is the development of different production processes to reduce or eliminate the use of toxic substances and thereby the generation and release of hazardous wastes.

Vulcan Automotive Equipment in Vancouver, British Columbia, replaced a caustic soda cleaning process with an abrasive aluminum shot system for cleaning metal parts. The new process involves baking the metal parts to remove volatile oils and greases and then spraying the parts with a high-velocity stream of aluminum shot to thoroughly cleanse them of grime and rust. The aluminum dust byproduct from the process is recycled. Although there may be lead content problems in the baking process, the new method has:

- Dramatically increased productivity
- Eliminated the need for water
- Eliminated the need for hazardous waste disposal
- Improved product quality
- Decreased operation and labour costs

Production Process Modernization

Production process modernization is the replacement (or upgrading) of existing production equipment or methods with less-polluting or nonpolluting equipment or methods, but using essentially the same production process.

Modern Plating of Los Angeles, California, plates steel automotive rims and other auto parts. When the company installed a nickel-chromium rack line, it also instituted a water and materials recovery program that has resulted in the saving of plating chemicals and obviating the need to use some 400,000 gallons of rinsewater per month.

Somerville Metalcraft of Crawfordsville, Indiana, used to consume 150 to 200 pounds of chromium each *shift* in its custom plating operation. After installing a closed-loop evaporator to allow the recovery of chromium from its rinse tanks, the company uses less than 200 pounds of the metal each *month*. The company uses about 8,000 pounds less chromium per month, saving over $100,000 per year.

Improved Operation and Maintenance

One way to reduce toxic emissions is to improve the methods used to operate and maintain production equipment. This can drastically reduce the amount of toxic chemicals needed by a production process. One paint manufacturing company studied by the U.S. Environmental Protection Agency (its name was not disclosed) reduced its waste generation from 0.34 pounds of waste per gallon of paint produced in 1982 all the way down to zero in 1985. The company accomplished this by implementing a comprehensive pollution prevention program:

- **Dedication of "let-down" tanks** for white paint alone, which eliminates intermediate washing of these tanks. The deposits are allowed to build up and are then scraped off manually, resulting in a 5 to 10 percent reduction in the volume of cleanup waste.
- **Proper scheduling** of batches of paint so they are produced in order of light to dark paint, eliminating the need for intermediate cleanups.
- **Preventing obsolescence of raw materials** to avoid their degradation. Raw material are accepted from the supplier only when it meets stringent quality control standards. When a raw material becomes obsolete it is returned to the supplier.
- **Preventing obsolescence of finished stock** by using good production planning and inventory control. A computerized inventory system provides more accurate, more detailed information on obso-

lescence in a shorter time than conventional hard-copy systems.

- **Reducing off-specification production** through the use of raw material quality control, ongoing worker training programs, employment of new, well-functioning machine tools, and effective cleanup procedures.

In-Process Recycling/ Extended Use of Toxic Chemicals

In-process recycling and reuse or extended use of toxic chemicals involves using add-on equipment such as filtration and other closed loop systems that become an integral part of the production process.

Thru Blu, a leather-making facility in St. Paul, Minnesota, instituted a very successful chromium recycling process. Like 90 percent of the industry Thru Blu uses a chrome sulphate solution to preserve its leather. The batch chromium solutions are 60 to 70 percent absorbed by the leather, leaving 30 to 40 percent in a process water waste effluent. Under its old production system, Thru Blu drained as much as $1,200 worth of chrome tanning solution into the sewer daily.

Then Thru Blu invested $1.2 million in an installation to recover the chrome from the effluent. Annual savings came out to $510,000, paying back the investment in only two years, and generated wastes were reduced by 99 percent. There was no change in productivity or product quality.

Product Reformulation

Product reformulation is the alteration of an end product to eliminate the toxic substances used to make it, or to at least reduce their amount and toxicity. A good example of product reformulation would be the use of unbleached, recycled paper to issue a report or publish a book, rather than the typical bleached paper made from trees. Such a product reformulation allows pulp and paper companies to reduce their use of chlorine compounds in their bleaching processes as well as the number of trees they must cut down to make the paper in the first place.

Examples by Industry

Automobiles

The following alternative technologies and solvents are described in "Chlorinated Solvents and the Great Lakes Auto Industry," produced by Greenpeace.

- **Terpene solvents,** made of natural terpene and other biodegradable ingredients, are effective replacements for chlorinated solvents used in cleaning and degreasing auto parts. Terpenes can be used with little or no modification of existing equipment or industrial processes, can actually be more effective cleaners than chlorinated solvents, and are cost competitive. For more information, contact Envirosolv Inc., 1840 Southside Blvd., Jacksonville, FL 32216, 904-724-1990, fax 904-724-2508.

- **Water-based alkaline cleaners** are another replacement for chlorinated solvents in the auto and metalworking industries. For information contact JoAnn A. Quitmeyer, W.R. Grace and Co., Connecticut, Dewey and Almy Chemical Division, 55 Hayden Avenue, Lexington, MA 02173.

- **Cleaning steel machine components** without using chlorinated solvents and other environmentally unacceptable chemicals. A process developed by a Swedish company relies on a mixture of water and a small quantity of detergent used at a temperature of 120 to 140 degrees Centigrade. For more information contact SKF Norden, Machines and Equipment, S-415-50 Gothenburg, Sweden, 031-37-1000.

- **An automatic parts washer** that, using heat, power sprays, and biodegradable detergent, cleans (and applies a phosphoric paint pretreatment to) large fabricated metal structures up to 6 cubic feet in size and weighing 6,000 pounds, all automatically. Contact Steven M. Nourie, Product Manager, American Metal Wash Inc., P.O. Box 265-N, Canonsburg, PA 15317, 412-746-4203.

Some auto plants are starting to adopt pollution prevention measures. General Motors, Chrysler, and Ford plants in Windsor, Ontario, are replacing chlorinated solvents used for degreasing processes with biodegradable, phosphate-free cleaners containing high-grade penetrants (orange peel) activated by water. Water-based auto paints produced at a BASF facility in Windsor are now also being used at the General Motors plant in Windsor.

Pulp and Paper

If the zero discharge effort is ever to make serious inroads in the Great Lakes Basin, it will probably start in the region's pulp and paper mills. Papermaking is the largest source of persistent toxic chemicals directly discharged to the Great Lakes. These chemicals are almost entirely organochlorines, which are created by the use of chlorine compounds to bleach processed wood to make paper.

There has been no progress in getting Basin mills to move toward zero discharge (by replacing chlorine with other bleaching agents and processes), but there has been progress in lowering levels of discharges. Great Lakes mills have reduced their collective release of persistent toxic substances by almost half from an estimated high of 600 million pounds a year in 1986. However, this progress can obscure the crucial issue in pulp and paper toxic pollution: there is no need for any organochlorine discharges because there is no economic or technical need for chlorine in bleaching.

Much of the improvement in the industry's discharge levels is due to investment in oxygen and other "prebleaching" technology. This investment will be useful for eventual zero-discharge production. But the industry is also making large investments in end-of-pipe technologies such as "aerated lagoons." The lagoons substantially improve the quality of effluent for a number of elements of pulp and papermaking discharge, but estimates of total effectiveness range from a mere 20 percent to a still-insufficient 50 percent. In any case, only one third of that reduction is truly elimination of toxic pollution, in the form of conversion to relatively neutral salts. The other two-thirds is merely transferred to air, via evaporation, and to land, via absorption into lagoon sludge, which is eventually landfilled, land "spread" or incinerated. The investment in lagoons is wasteful in the long term because lagoons can play no role in any future zero discharge effort.

Greenpeace hired an economist to analyze the economic impacts of implementing chlorine-free processes in Great Lakes pulp and paper mills. The study, completed in late 1991, concludes that there would be no net economic harm to the industry. Some mills would be shut, but this would be the result of ongoing concentration in the industry, the trend toward integrated mills, and the current marginal status of many mills. On the plus side, the industry would be in a good position to compete in the rapidly growing European market for chlorine-free paper products.

The total discharge of organochlorines into the Great Lakes from pulp and paper plants is estimated by Greenpeace researchers at about 350 million pounds per year as of late 1990. No official figures are available because only Canada has ever compiled statistics on pulp and paper discharges of organochlorines as a whole. In the United States paper makers need only report the discharge of the more notorious organochlorines, such as dioxin.

In the pulping process chlorine combines with unwanted organic material in pulp to form more than a thousand compounds, most of them foreign to nature. Only 300 of these chemicals have been studied; several hundred components of papermaking effluent therefore remain of unknown composition and effects. This is particularly disturbing because many of the compounds studied so far have turned out to be both persistent in the environment and toxic in extremely small quantities. Dioxin is only one of many papermaking byproducts of this type. Most of the persistent toxic chemicals banned in the last few years are organochlorines, including DDT, PCBs, chlordane, and toxaphene.

It should not be forgotten that many if not most of the elements of papermaking effluent can be found in very small quantities in paper endproducts. When paper is used to contain food, as milk cartons are, this fact becomes a human health concern.

Nonchlorine Bleaching

Chlorine whitens pulp by removing or altering a substance called lignin and a few other things found in wood. Lignin has two negative qualities for papermakers: it makes paper yellow, and it gets darker when exposed to light. Chlorine and its compounds make paper white by attacking the lignin and other substances, and they do so while leaving untouched the cellulose fibres that make up paper. Unfortunately, all nonchlorine bleaching chemicals—generally oxygen, ozone, or hydrogen peroxide—attack the fibre as well as the lignin, weakening the pulp in the process of brightening it.

Nonchlorine pulp manufacturers thus must choose to use a lot of substitute chemicals, producing weaker, fully bright pulps, or less substitute chemicals, producing darker, full-strength pulps. Fortunately, the degree of tradeoff will likely lessen as nonchlorine bleaching technology is advanced and technical managers develop better methods to control the bleaching process. There are also advanced ways of brightening paper through the use of fillers mixed with the pulp and coatings applied after it is made into paper. These technologies are currently in a state of rapid development. Coatings and fillers already make up a third (by weight) of some papers, like magazine stock, and this percentage is expected to grow substantially in coming years.

All nonchlorine chemicals reduce the strength of pulp, which can only be weakened to a limited degree if it is to be used in operations like high-speed magazine printing, which requires tremendous strength. Designers of nonchlorine kraft bleaching processes therefore focus their efforts in three areas:

- Cooking the pulp so that it requires less bleaching. An advance called "extended cooking," for example, has recently been improved on with a method called "modified continuous cooking."
- Using less bleach during the bleaching stages (principally by improving "extraction," the method of removal of free-floating lignin and other waste between bleaching stages).
- Modifying methods of using nonchlorine chemicals, for example, manipulating the pressure and concentration of the chemicals in the pulping mixture, so that they do less damage to the cellulose.

Industry Response

The papermaking industry claims that chlorine is essential to the pulp-making process, and that in any case there is no need to stop using chlorine because its toxic byproducts can be limited to "acceptable" levels in effluent. To sugarcoat the idea of acceptable levels of persistent toxic substances, the industry commonly refers to it as "virtual elimination in effluent."

The European example belies this claim. The major European magazine publishers have committed to using paper bleached without chlorine as soon as industry can retool, and there is already a booming market in such paper in Europe. In the long term, Europe will use chlorine for only the most specialized of papers, those for which chlorine-free methods have yet to be developed.

The idea of acceptable levels of discharge can be dismissed almost as easily. The concept is the underpinning of objections to discharge regulation by all industry, but it has no application in the context of pulp- and papermaking: bleaching effluent contains a very large number of compounds that are 1) harmful in quantities almost below measuring and 2) likely to remain in the environment for decades.

Furthermore, two-thirds of the organochlorine compounds in bleaching effluent not yet studied—it is only reasonable to expect that eventually many of them will also prove to be very dangerous. Applied to bleaching effluent, "acceptable levels of discharge" is just another way of saying "no news is good news."

In any case, environmental history has generally been one of finding out that chemicals are substantially more dangerous than originally thought after they have already been permitted into the environment in large quantities. Lead is a good example—its level of generally recognized toxicity in the environment has been reduced to less than a thousandth of that considered problematic only fifteen years ago.

To base regulation on proving which organochlorines are toxic and at what levels is really to argue against a comprehensive effort to protect human or wildlife health from these chemicals. Organochlorines are already well-known to be very dangerous.

Zero Discharge

Zero discharge is the only comprehensive way to protect the ecosystem on which Great Lakes humanity depends. The most important pollution prevention techniques pertinent to papermaking are:

- Chemical substitution, which replaces persistent toxic chemicals in production processes with chemicals that are nonpersistent and nontoxic.
- Process change, which alters production processes to eliminate the need for persistent toxic chemicals.
- Product reformulation, which redesigns products to eliminate the need for persistent toxic chemicals.

Zero-discharge-oriented pulping uses all these techniques. Oxygen, ozone, and hydrogen peroxide (and someday, perhaps, such substances as nitrogen oxide and sodium hydrosulphite) are used as chemical substitutes for chlorine. Cooking and extraction modifications, as well as advances in the use of fillers and coatings, are process changes that make the use of those substitute chemicals practical. And market segmentation (increased demand for very specific kinds of paper) and mill integration (unification of the previously separate process of pulp and paper making) are forcing product reformulation: pulp strength and brightness is increasingly being tailored to the needs of the paper it will be made into; often this paper does not require the use of chlorine.

It is important to note that pollution prevention changes can result in cost savings that repay pollution prevention investment within a couple of years, sometimes more quickly. Expensive chemicals can be recycled, or eliminated in favour of cheaper chemicals, and the costs of waste disposal can be reduced or eliminated entirely. Just as important, goods produced without the use of toxic chemicals can often be marketed at higher prices. on that basis. This is particularly true in the paper industry. Even as pulp prices are falling worldwide,

chlorine-free pulps are commanding a premium of between $50 and $80 per tonne.

Printing, Publishing and Allied Industries

The commercial printing industry's primary raw materials are paper and ink. Paper is the industry's largest, most expensive supply item. It is frequently the waste generated in greatest volume and this waste is usually nonhazardous.

The amount of waste paper a printer generates usually indicates the amount of waste ink it generates. Printers use many different inks, which may contain flammable and toxic solvents and toxic heavy metals. Ink generally consists of a pigment, a binder and a vehicle. The pigment (the color) frequently comprises heavy metals that would cause the inks to be considered toxic. The binder holds the pigment to the paper or other stock and is normally nontoxic. The vehicle has traditionally been a flammable or toxic solvent that allows the pigment and binder to be applied to the stock. Significant quantities of solvent are also consumed in the cleaning of printing machinery.

Three waste streams, trash, wastewater, and equipment cleaning waste, are generated and disposed of in the production of print. Reduced use of inks and solvents and the associated costs of disposal can lower operating costs. This can be achieved by:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Good operating practices and quality control
- Loss prevention and housekeeping
- Input substitutions
- Product substitutions
- Waste segregation and separation
- Recovery and reuse of chemicals
- Recycling

Checklist of Waste Minimization Alternatives for Printers

Trash

- Recycle empty containers or return them to supplier for refilling.
- Use proper storage procedures for photosensitive materials.
- Recycle spoiled photographic film and paper.
- Monitor press performance carefully.
- Install web break detectors.
- Use electronic imaging and laser platemaking.

Wastewater

- Use silver-free films.
- Use water-developed lithographic plates.
- Recycle spent solutions.
- Recover silver from spent solutions.
- Employ countercurrent washing.
- Use squeegees to wipe off excess liquid in nonautomated processing systems.
- Substitute iron-EDTA for ferracyanide bleaches.
- Implement better operating practices
- Remove heavy metals from wastewater.
- Use electronic imaging and laser platemaking.
- Use washless processing systems.

Equipment-cleaning wastes

- Substitute less toxic/nonhazardous solvents.
- Schedule jobs to reduce number of cleanups.
- Recycle waste ink and cleanup solvent.
- Use automatic cleaning equipment.
- Use automatic ink leveler to reduce ink waste and spillage.

Although much of the printing industry is subject to Resource Conservation and Recovery Act (RCRA) requirements, not all printing and allied industry operations produce hazardous waste. A good overview of the possible chemical compositions of specific hazardous wastes generated by the printing and allied industries is provided in the EPA booklet, "Printing and Allied Industries," EPA/530-SW-90-027g.

Cleaning solvents and heavy metals and solvents present in inks are good targets for toxic use reduction. And due to consumer demand, substitutes for metal- and solvent-containing inks are available and growing in popularity.

The cost of ink-contaminated solvent disposal can be reduced by using distillation to recover the solvent and produce a far smaller volume of sludge for disposal. Complete distillation process units are readily available in a variety of sizes. The cost of such a unit, already proven cost-effective, provides the following benefits:

- Less waste (therefore lower disposal costs)
- Reduced liability (due to reduced disposal)
- Lower cost of reclaimed solvent (available for the

cost of running the equipment, compared to new solvent)

- Owner control of reclaimed solvent purity
- Reduction in reporting (filling our federally and sometimes state- mandated manifests)

Water- and vegetable-oil-based inks can be used, eliminating the need for cleaning solvents. Soy ink is the most common vegetable-oil-based ink and it provides superior print quality. Using squeegees whenever possible to remove ink from trays makes ink go farther and reduces the need for solvent. Machines can be dedicated to individual colors or colors can be sequenced from light to dark to reduce cleaning. Waste ink can be saved and blended into black for reuse.

A number of devices automate press adjustments. Most are promoted by manufacturers as speeding up the "makeready" step (in which the first copies are run and ink flow and press speed are adjusted), thus saving paper and ink, but the direct benefit of the devices is to improve quality control. Available devices include: automated plate benders, automated plate scanners, automatic ink key setting systems, computerized registration adjustors, and ink/water ratio sensors. The cost effectiveness of the devices cannot be asserted sweepingly. Each printer must weigh the cost of the devices against the increases in quality and reduction in paper and ink waste that will result.

Photoprocessing is common in the printing industry and produces wastewater containing significant quantities of silver. Various methods of recovering silver from wastewater using metallic replacement, chemical precipitation, and electrolytic recovery are available. The trend in photographic materials towards reduced or eliminated silver content and materials substitutions has helped reduce the problem of silver-bearing wastewater.

A comprehensive overview of the pollution prevention process in the commercial printing industry is available from the U.S. EPA. See "Guides to Pollution Prevention: The Commercial Printing Industry." U.S. EPA, Office of Research and Development, August 1990 (EPA/625/7-90/008).

Also of interest might be: "Pollution Prevention in Printing," draft, by L. Epstein, November 1991, available from the Environmental Defense Fund, 202-387-3500; *Pollution Solutions for Printing and Photography*, newsletter, #2, summer/fall 1991, available from the Erie County Department of Environment and Planning, Environmental Compliance Services, Erie County, New York; and "Hazardous Waste Management for Printers" (supplement to "Are You a Small Quantity Generator," draft). New York State Department of Environmental Conservation, Division of Hazardous Substance Regulation, Bureau of Pollution Prevention, September 1991. See also *Hazardous Waste Minimization*, Freeman, H. M., McGraw Hill, 1990.

Specific technical information can also be obtained from product manufacturers and from the Graphic Arts Technical Foundation in Pittsburgh, 4615 Forbes Ave., Pittsburgh, PA 15213, 412-621-6941.

Agriculture

Postwar U.S. and Canadian agriculture has become dominated by the development of large, mechanized farms that use chemical fertilizers and pesticides to grow huge amounts of single crops with a minimum of labor. Only a small percentage of the millions of pounds of pesticides applied to crops each year actually reaches pests. The rest remains in the soil, air, and groundwater, eventually migrating to streams, rivers, and lakes. As a result, these chemicals pollute drinking water, particularly the untreated water drawn from private wells, but also both rural and urban public water supplies. In addition, mechanized agriculture causes increased soil erosion. Sediment from this erosion combines with chemical fertilizers and pesticides in agricultural runoff to produce a double pollution problem.

The most effective pollution prevention approach for the agricultural sector is to shift from the current farming system to one that employs "sustainable" farming practices—practices that enrich the soil and minimize pests without needing regular replenishments of fertilizer and pesticides from outside the farming ecosystem. These practices include:

- **Organic farming** or integrated pest management (IPM). An increasing number of farmers are moving away from chemical pesticides. Some are able to control pests without any chemicals through an organic approach that includes diversity of crops and animals, healthy soil, careful water management, and a variety of methods that break up weed, disease and insect cycles.

  Integrated pest management is one approach being used by farmers to reduce use of synthetic chemical pesticides. IPM encourages naturally occurring pest controls such as predators and parasites, disease agents, and diversified farming practices. Synthetic chemicals are only used as a last resort, after careful study of the entire ecological and economic situation at a particular farm. Field scouting is done to schedule pesticide applications only when they are necessary. IPM requires an understanding of the interaction of soil, climate, plants, animals, insects,

and microorganisms in the area where it is applied. Monitoring of pests and their natural enemies determines what strategy will be used.

- **Crop rotation.** This time-tested technique involves rotating crops that deplete the soil of nutrients, such as corn and soybeans, with crops which nourish the soil, such as clover, as well as with grasses that hold the soil together and provide humus when plowed under. Rotation helps reduce the proliferation of weeds and insects, reducing the need for chemical pesticides.
- **Contour plowing.** This technique dramatically reduces soil erosion by plowing in patterns that follow the natural contours of the land.
- **Plant structures.** Planting windbreaks, "shelterbelts," and buffer zones helps hold the soil, reduce wind erosion, promote moisture retention in the soil, and protect crops.

Dramatic reductions in the use of pesticides in agriculture are achievable. A recent study by Cornell University found that food prices would rise by less than 1 percent if alternative pest control practices replaced half of the chemical pesticides used in U.S. agriculture. The economic and environmental analysis combined data on crop yields and pesticide use from hundreds of researchers at university laboratories and government agencies. Covering forty crops, from vegetables and citrus fruits to cotton, wheat, and tobacco, the study is probably the most comprehensive ever done to examine the feasibility of using alternatives to widely used chemical pesticides. In the case of tomatoes, the study found that they would thrive on a biological approach to pest control; synthetic pesticide use could be reduced by 80 percent through the use of *Bacillus thuringiensis* or Bt, an insect-killing bacterium, by releasing parasitic wasps that prey on aphids, and by scouting before applying pesticides.

Resources 4

Bulletin of Pollution Prevention, Great Lakes United, Summer 1991.

A Citizen's Guide to Promoting Toxic Waste Reduction, Lauren Kenworthy and Eric Schaeffer, INFORM Inc., 381 Park Ave. S., New York, NY 10016, 212-689-4040. The guide will be updated, expanded and published under the title *Preventing Industrial Toxic Hazards* in spring 1993.

Cutting Chemical Wastes: What 29 Organic Chemical Plants Are Doing to Reduce Hazardous Wastes, INFORM, Inc., 381 Park Ave. S., New York, NY 10016, 212-689-4040.

"Environmental and Economic Impacts of Reducing U.S. Agricultural Pesticide Use" (Cornell University study), found in *Handbook On Pest Management in Agriculture*, CFR Press Inc., Boca Raton, Florida.

Farmland: A Community Issue, Concern Inc., 1794 Columbia Rd. NW, Washington, DC 20009, 202-328-8160.

Hazardous Waste Minimization, Harry Freeman, available from McGraw Hill, Inc. at 800-262-4729.

Industrial Waste Audit and Reduction Manual, Waste Reduction Program, Ontario Waste Management Corporation, 2 Bloor St. W., 11th Floor, Toronto, Ontario M4W 3E2, 416-923-2918.

New York State Waste Reduction Guidance Manual, New York State Department of Environmental Conservation, Division of Hazardous Substances Regulation, Bureau of Pollution Prevention, 50 Wolf Road, Albany, NY 12233-7253.

Pesticides: A Community Action Guide, Concern Inc., 1794 Columbia Rd. NW, Washington, DC 20009, 202-328-8160.

Pollution Prevention 1991: Progress on Reducing Industrial Pollutants, U.S. Environmental Protection Agency, Office of Pollution Prevention, 401 M St. SW, Washington, DC 20460.

"Pollution Prevention as Corporate Policy: A Look at the 3M Experience," David Benforado, in *The Environmental Professional*, vol. 11, 1989, pp. 117-26. Available from Benforado at 3M, Environmental Engineering and Pollution Control, Building 21-2W-06, 900 Bush St., St. Paul, MN 55106, 612-778-4791.

Pollution Source Reduction: A Training Manual, T.R. Lakshmanan, Lee Dane, and Rick Reibstein, Massachusetts Office of Technical Assistance.

The Product Is the Poison—Part I: The Case for a Chlorine Phase-out, Joe Thornton, Greenpeace Great Lakes Project, 1017 W. Jackson Blvd., Chicago, IL 60607,

312-666-3305.

The Product Is the Poison—Part II: Chlorinated Solvents and the Great Lakes Auto Industry, Robert Ginsburg, Ph.D., Greenpeace Great Lakes Project, 1017 W. Jackson Blvd., Chicago, IL 60607, 312-666-3305.

Profit from Pollution Prevention: A Guide to Waste Reduction and Recycling in Canada, Pollution Probe Foundation, 12 Madison Ave., Toronto, Ontario M5R 2S1, 416-926-1907.

Profiting from Waste Reduction in Your Small Business: A Guide to Help You Identify, Implement and Evaluate an Industrial Waste Reduction Program, David Wigglesworth, Alaska Health Project, 431 W. 7th Avenue #101, Anchorage, Alaska 99501, 907-276-2864.

Proven Profits from Pollution Prevention: Case Studies, Institute for Local Self-Reliance, 2425 18th St. NW, Washington, DC 20009, 202-232-4108.

Still Going to B.A.T. for Water Quality?: A Four Year Review of the Ontario Ministry of Environment's Municipal/Industrial Strategy for Abatement (MISA), by the Canadian Institute for Environmental Law and Policy, Pollution Probe Foundation, and Great Lakes United, available from CIELAP at 517 College St. #400, Toronto, Ontario M6G 4A2, 416-923-3529, and Pollution Probe at 12 Madison Avenue, Toronto, Ontario M5R 2S1, 416-926-1907.

The Success Stories Bank Holdings, State of the Environment Reporting, Environment Canada, Hull, Quebec K1A 0H3, 819-953-1440.

Trust Us, Don't Track Us: An Investigation of the Chemical Industry's "Responsible Care" Program, Carolyn Hartmann, staff attorney, U.S. Public Interest Research Group, 215 Pennsylvania Ave. SE, Washington, DC 20003.

The U.S. EPA's Pollution Prevention Information Clearinghouse has a library of over 400 case studies of pollution prevention programs implemented in various industries, plus descriptions of more than 600 federal, state, and local government programs. The clearinghouse can be reached by phoning the RCRA Superfund Hotline at 800-424-9346 or the Small Business Ombudsman Hotline at 800-368-5888 or 703-821-4800.

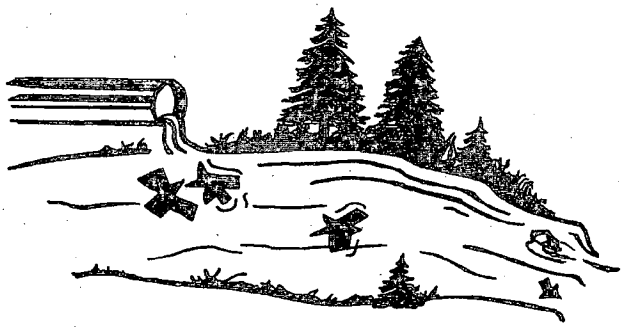
5 Sewage Treatment Plants

Publicly owned sewage treatment plants are in an excellent position to promote pollution prevention in industrial facilities. Compared with other government agencies engaged in environmental protection activities, STP operators have the most contact with the industries they regulate. Their offices, staff, and other resources are based in the same municipality or local area as the regulated industries. STP staff and field inspectors, as a group, have a fairly extensive understanding of industrial process operations, knowledge that is important in identifying pollution prevention opportunities available to specific industrial facilities. This existing level of expertise reduces the amount of staff training needed to implement an STP pollution prevention program. Indeed, thorough wastewater pretreatment inspections involve examination of the same industrial processes and procedures that need to be evaluated in order to identify pollution prevention opportunities.

There are several reasons why STPs should adopt policies and programs that promote pollution prevention. First, pollution prevention programs are essential if an STP is to effectively protect the environment from toxic pollutants. Sewage treatment facilities are designed to treat typical domestic wastes and biodegradable commercial and industrial wastes. When toxic industrial pollutants are discharged into the sewer system, a significant portion of them work their way into the environment by concentrating in STP wastewater sludge, volatilizing into the air, or passing through the treatment system into the receiving waters with the facility's effluent. As a result, sewage treatment facilities have become major sources of toxic contamination in the Great Lakes Basin. By implementing policies and programs aimed at encouraging industrial sewer users to prevent toxic pollution by reducing their use of toxic materials and their generation of hazardous waste byproducts, STPs can reduce their toxic contribution to the ecosystem.

Second, pollution prevention programs are one of the most effective ways to protect the STP operation itself from toxic pollutants. Toxic contaminants discharged into the sewer system can interfere with the normal cleansing operation of the sewage treatment facility. Highly acidic or caustic industrial wastes can corrode piping and equipment. The most proactive way to protect the STP from toxic pollutants is to prevent their discharge with wastewater from industrial sewer users by encouraging industries to reduce their use of toxic chemicals and their generation of toxic waste byproducts.

Third, pollution prevention programs are an effective way to protect STP workers from the hazards posed



by toxic substances. The discharge of toxic industrial wastes into the sewers can result in the release of poisonous gases that pose a hazard to treatment plant workers and the STP collection system. The most effective way to address these hazards is to prevent their creation in the first place through programs designed to encourage industrial sewer users to adopt pollution prevention measures at their facilities.

Fourth, STPs can use pollution prevention programs to avoid getting caught in a "regulatory squeeze play." As discharge limits imposed on direct dischargers, including STPs, become increasingly stringent, more and more industrial facilities may become indirect dischargers, sending their wastewater effluent into sewer systems. As a result, STPs may be saddled with increasing toxic loadings from industrial sewer users just as they are expected to meet lower and lower discharge limits—despite the fact that their treatment systems are not designed to remove synthetic toxic pollutants. The best way for an STP to avoid such a dilemma is through the adoption of a comprehensive pollution prevention programme designed to help industrial users avoid generating hazardous byproducts and releasing them into the sewers with their wastewater.

Sewage treatment systems can help industrial sewer users reduce their use of toxic raw materials, their generation of toxic waste byproducts, and their discharge of toxic substances to the sewer system—all without transferring those same pollutants to other environmental media—by developing and implementing:

- **Educational programs** that provide pollution prevention information to companies.
- **Technical assistance programs** that help companies identify and evaluate site-specific opportunities for toxics use reduction, source reduction, and other pollution prevention measures.
- **Regulatory programs** that establish indirect inducements or direct requirements designed to promote pollution prevention.

STP Education and Outreach Programs

Education and outreach efforts encourage industrial and commercial sewer users to voluntarily reduce toxic pollutant loads to the sewer system by implementing pollution prevention practices and technologies at their facilities. Effective educational programs offer users access to technical and financial information, as well as information on how to plan comprehensively for pollution prevention. Educational programs are the lowest-cost pollution prevention effort that can be adopted by a sewage treatment plant.

STP operators have numerous contacts with their industrial sewer users, through on-site inspections and the like. All of these contacts are good opportunities for disseminating pollution prevention information and promoting pollution prevention concepts.

Four key considerations can be helpful to treatment plant staff in designing a pollution prevention educational program that is both inexpensive and successful:

- **Clear priorities** should be established for channelling limited resources and targeting the most significant polluters with the most effective methods of education. Once an STP makes a decision to implement pollution prevention education, a lot of time and effort should be spent planning before any actions are taken.
- **Outside entities,** particularly business organizations, should be encouraged to sponsor as many of the education activities as possible, for example, having the Chamber of Commerce host workshops.
- **Education activities** should be planned in such a way that they can be incorporated into the STP's normal, day-to-day routines, for example, made a standard component of post-inspection reviews. These activities need to encourage users to:
  - *Create a formal company policy* establishing a pollution prevention program.
  - *Conduct a pollution prevention assessment* to identify pollution prevention opportunities.
  - *Implement the results* of the pollution prevention assessment and measure progress.
  - *Revise accounting methods* to include the costs of both the generation and management of hazardous wastes in each department.
  - *Motivate, train, and involve employees* in pollu-

tion prevention activities.

- *Integrate pollution prevention* into long-term business planning.

California's Local Government Commission has developed twenty-eight low-cost activities that can be used by STPs and local governments to promote pollution prevention and hazardous waste minimization through education and outreach. Many of these activities are described in the local government section of this guide.

Technical Assistance Programs

STPs can provide technical assistance to help industrial sewer users identify and analyze pollution prevention opportunities at their facilities. Such programs differ from educational efforts in that they are more machinery-, process-, and facility-specific.

Site-specific pollution prevention technical assistance seeks to reduce each industrial sewer user's use of toxic materials, generation of hazardous waste byproducts, and discharge of hazardous pollutants to the sewers *without* transferring pollutants to other environmental media through increased air emissions, creation of hazardous sludge, or generation of liquid hazardous wastes for off-site disposal.

An STP can design an on-site pollution prevention technical assistance program by:

- **Incorporating technical assistance** into routine industrial pretreatment inspections. In this approach, wastewater inspectors would over time consciously gain expertise in the industrial processes they oversee. At first they might offer general pollution prevention advice after they had completed routine inspection or monitoring activities. This would probably involve basics about practices and technologies.

  A higher level of advice could be provided as inspectors became more experienced in formulating pollution prevention techniques for specific process combinations in specific industrial facilities.

- **Training one or more staff** as pollution prevention specialists. These people would provide the on-site technical assistance in sessions conducted separately from compliance or monitoring inspections. Such sessions would be much more in-depth, and could include a comprehensive pollution prevention/waste minimization assessment—a systematic review of a facility's processes, technologies, and procedures to determine what can be done to reduce toxic materials use and waste output.

An STP's program can provide pollution prevention technical assistance in a small workshop setting with several similar companies in attendance; as part of other meetings or conferences normally held with company management in connection with the STP's efforts to regulate a facility's discharges to the sewer system; or onsite at the company's facility, plant, or shop.

An STP pollution prevention technical assistance program is more costly than an educational effort be-

cause staff time and training requirements are substantially greater. These costs should be viewed as investments made to achieve reductions in the hazardous waste byproducts discharged into the sewer system, and into the environment. Over time, expenditures for pollution prevention staff time and training are likely to pay for themselves by helping STPs control the costs of fulfilling their environmental protection mission.

STP Pollution Prevention Regulatory Programs

STPs can promote pollution prevention efforts among commercial and industrial sewer users either indirectly, by better use of pollution *control* measures (promulgating stringent discharge limits and strongly enforcing them), or directly, by requiring measures oriented toward pollution *prevention.*

Stronger Pollution Control

Stronger pollution control regulations can lead to pollution prevention because they make pollution prevention cost-effective. Discharge limits have traditionally been based on the *concentration* of pollutants in the wastewater, the amount of a pollutant that present in a specified volume of wastewater. This system makes mere dilution of emissions an attractive way to meet pollution regulations—without, of course, reducing at all the amount of pollutants released into the environment.

A way to prevent this skirting of the law is to abandon concentration guidelines in favor of *mass discharge rates*—the total quantities of given pollutants that may be released to the sewer system over a specified period of time. Mass discharge rates provide no incentive for firms to dilute their emissions; a ton of waste in a thousand gallons of water is the same as a ton of waste in ten thousand gallons of water. Mass-based limits redefine how industrial sewer users view compliance, by focusing their attention on the total quantities of hazardous waste byproducts they are generating.

Aggressive STP monitoring and enforcement of discharge limits is necessary for pollution prevention efforts to make economic sense for sewer users—pollution *prevention* measures are financially attractive only for those firms complying with pollution *control* measures in the first place. Noncompliance or illegal hazardous waste disposal, if undetected, is unfortunately the most cost-effective way a company can appear to comply with environmental regulations. Coordination with other government agencies that regulate industries online to the STP is a good way to improve current enforcement.

Direct Inducements

Pollution Prevention Plans

No company can start a pollution prevention effort without an overall plan. The first step in requiring

pollution prevention efforts is to require a plan. A written pollution prevention/hazardous waste minimization plan identifies the technically feasible and economically practical toxics use reduction, source reduction, and recycling measures that a sewer user can implement, along with a timetable for implementation. The plan is based on a comprehensive pollution prevention assessment, that is, a systematic review of the company's processes, operations, and procedures.

Specifically, pollution prevention plans should include:

- **An analysis of each *production process*** in which any targeted chemical is manufactured or used. This analysis would describe the specific use, movement and fate of each chemical within each production process.
- **A facility-wide analysis** of the use, movement, and fate of targeted chemicals.
- **Current and projected toxics use** in the facility.
- **Economic impacts** of each chemical used, including purchase, pollution control, regulatory compliance, disposal and liability costs.
- **An assessment** of toxics use reduction technologies and methods, and their projected net costs, including training.
- **A plan or program** for implementing a toxics use reduction effort, with a very specific timetable.
- **Quantitative two- and five-year reduction goals** expressed as a byproduct reduction index (percent reduction in waste byproducts per unit of product) for each chemical, each production process, and for the facility as a whole.
- **Statements** of why particular toxics use reduction options were or were not implemented.

Incorporate Pollution Prevention into Existing Plans

Pollution prevention programs should be incorporated into existing pollution-fighting plans such as the Best Management Practices plans to be required under Ontario's MISA Sewer Use Control Program.

Deferred Regulatory Requirements

Companies are often more comfortable meeting increasingly stringent discharge limits by employing familiar end-of-the-pipe pollution control technology. When faced with rigid compliance deadlines, management may be reluctant to "experiment" with pollution prevention measures, even if they are likely to ultimately be more effective, or even outright cost-saving, compared to the traditional end-of-the-pipe approach.

In order to overcome this barrier to pollution prevention, an STP can do things like extend compliance deadlines in exchange for implementation of a facility pollution prevention plan.

Pollution Prevention in Permits

There are some standard pollution prevention and waste reduction technologies and practices that are widely accepted in particular industrial sectors. These appropriate, time-tested measures can be identified and written into wastewater discharge permits on a case-by-case basis.

Discharge Prohibition

This prohibition can be written into sewer use bylaws and could be applied to persistent toxic substances and any other waste byproducts that could be eliminated through toxics use reduction, source reduction, and recycling practices. Discharge of flammable, corrosive, high-temperature pollutants, or pollutants liable to obstruct the sewer system can also be prohibited, as is already being proposed under Ontario's MISA sewer use program.

Starting an STP Pollution Prevention Program

A comprehensive STP pollution prevention program would combine features from all of the types of programs described above. However, faced with limited resources for new initiatives, an STP may choose to begin with a pilot educational program, or another low-key, low-cost effort, and gradually expand into a comprehensive program.

Even if an STP starts small with a low-key effort and the intention to expand it into a comprehensive pollution prevention program, the chances of success will be enhanced if there is formal policy support for the pollution prevention program from the decision-making body that governs the STP, as well as technical support from the STP's staff. A local STP pollution prevention bylaw can be the first step in achieving this.

Examples of STP Pollution Prevention Programs

Milwaukee Metropolitan Sewer District System

The Milwaukee Metropolitan Sewer District (MMSD) is responsible for maintaining a sewer system that serves almost 1 million people in a 420-square-mile area. It also operates two wastewater treatment plants that treat and discharge to Lake Michigan more than 200 million gallons of wastewater each day.

The Milwaukee Metropolitan Sewer District (MMSD) sponsored an independent advisory body called the Greater Milwaukee Toxics Minimization Task Force (TMTF) to develop a toxics reduction strategy for the greater Milwaukee area. TMTF's formation was part of the MMSD's Comprehensive Toxics Management Strategy, which seeks to "minimize toxic waste discharged to the MMSD system and to the environment with consideration of financial, social, and public health impacts." This toxics management strategy consists of seven elements:

- **Participation in local and nationwide research** to determine the impacts of toxic substances on the environment and public health, with a primary focus on risk assessment.
- **Development of an inventory** of toxic substances found in Milwaukee-area rivers and Lake Michigan.
- **Monitoring and analysis of discharges** from industry, wastewater treatment plants, combined sewer overflows, and nonpoint sources.
- **Application of control measures** to reduce toxic substances to acceptable levels. It is more economical to remove a concentrated pollutant from a small volume of wastewater.
- **Reduction or minimization** of the amount of toxic chemicals generated in the first place. This may require changes in the way goods are manufactured. Industry must consider the type and quantity of waste generated as an important factor in their decision process.
- **Cooperative efforts** among industry, government, and educational institutions to achieve compliance with state and federal toxic control regulations.
- **Information and education** for homeowners, com-

mercial establishments and industries. If people understand the problem and their contribution to it, they will be more likely to participate in solving it.

MMSD is already actively engaged in the first four elements of the toxics management strategy: research, inventory, monitoring, and control measures. The toxics reduction strategy developed by the TMTF addresses the last three elements.

In order to help focus its work, the task force developed three lists of Toxic Pollutants of Concern (TPOC):

Priority 1

Toxic pollutants of immediate concern—those for which MMSD is subject to state or federal regulations, or for which regulations are proposed. These regulations include water-quality-based effluent limits in the Wisconsin Pollutant Discharge Elimination System (WPDES) permits issued to MMSD's wastewater treatment plants, the state hazardous air pollution regulations, or the proposed federal sludge regulation.

Priority 2

Toxic pollutants of potential concern in the near future —those for which effluent limits are included in the WPDES permits for the MMSD's treatment plants.

Priority 3

Generic lists of pollutants of future concern—those generally considered of concern in the environment but not yet identified as being of specific concern in the MMSD system or the Milwaukee area.

Appendix 16 lists the Priority 1 and 2 TPOC.

The toxics reduction strategy developed by the task force contains the following elements:

Goal 1

Improve the MMSD toxic chemicals database in order to maximize the effectiveness of an ongoing toxics reduction program and to measure progress in achieving toxics reduction goals.

- **Contact other sewerage districts,** conduct literature reviews and evaluate ongoing research and programs relating to:
  - Toxic Pollutants of Concern
  - Toxic chemicals in stormwater inflow
  - Toxic chemicals from residential sources
  - Toxic chemicals from commercial sources
- **Develop and implement** a comprehensive monitoring strategy for Priority 1 and Priority 2 TPOCs for all significant sources of pollution to and from the MMSD system.
- **Develop an integrated,** comprehensive database management system to support the toxics reduction program.

Goal 2

Evaluate and achieve reductions from sources of toxic chemicals to the MMSD system that are not currently regulated.

- **Develop a technical assistance unit** that will help industry and commercial businesses reduce the generation of problem wastes. The unit will include specialized teams for problem wastes or particular industries. The teams would be made up of task force members, outside education and consulting groups, and retired engineers. The teams will compile and distribute detailed information on technical topics for specific businesses and types of pollutants. This specialized information will be shared with individual businesses and industries through facility evaluations, waste audits, and technology transfer tailored to meet the specific needs of each business. Pollution prevention information will be provided by technical specialists who are not regulatory, adversarial or competitors.
- **Work with chemical suppliers,** trade associations, academic institutions, and other groups to identify and promote waste minimization techniques and alternative (nontoxic or less toxic) chemicals to industrial and commercial users of the MMSD system.
- **Develop and/or change permits,** as needed, to control significant sources of Priority 1 and Priority 2 toxic pollutants of concern.
- **Collect and distribute information** on toxic chemicals and waste minimization to all formal and informal education audiences. This idea is to reach beyond major industrial users to commercial, residential, and other small sewer users. The following types of information should be distributed:
  - *General information* to build an awareness of what hazardous waste is.
  - *Waste reduction techniques* such as using alterna-

tive products and methods (say, for house cleaning), and proper use, storage, and application of hazardous materials.

- *The proper methods of disposal* for the different kinds of hazardous waste.

Components of this effort will include a systematic public information/public education campaign around the theme "Every Home a Pollution-Free Zone," a formal curriculum for the Milwaukee schools, and personal contact with community-based organizations such as neighborhood block clubs.

- **Improve Clean Sweep,** MMSD's household hazardous waste management program (called Clean Sweep) by:
  - Making the program regional in scope
  - Creating permanent drop-off sites
  - Educating citizens on alternatives
  - Improving coordination with recycling programs
- **Advocate product labeling** for proper disposal of household wastes. The task force plans to lobby the Wisconsin legislature to use petitions, resolutions, and letters to encourage the state's congressional delegation to undertake an effort to require the necessary labeling.
- **Create a package of disincentives** so that consumers will not buy and companies will not make products that should not be disposed of in the sewers (or elsewhere) due to toxic concerns. If these disincentives fail to curtail disposal of these toxic products in the sewers, then institute a ban on their sale. The disincentives may include certain forms of product taxation.
- **Investigate the contribution** of toxic pollutants from construction operations and materials. Develop a reduction program aimed at minimizing leaching and runoff of contaminants.
- **Provide waste minimization** and source reduction educational activities for significant dischargers of toxic pollutants of concern.

Goal 3

Achieve further reductions, as necessary, of regulated sources of toxic chemicals to the MMSD system.

- **Provide workshops** on pollution prevention for specific types of dischargers, a major technical conference each year, a "Mayor's Award for Outstanding Achievement in Pollution Prevention," a newsletter, and an information clearinghouse.
- **Require waste minimization assessment** and planning for all significant dischargers to the MMSD system. Create an ad hoc committee to develop waste minimization assessment and planning requirements to be incorporated into permits.
- **Set effluent limits** and change permits based on monitoring and waste minimization audits.
- **Work to improve** the transfer of toxics-related information between MMSD and industrial dischargers to the MMSD system.
- **Continue to evaluate** the economic viability of a regional waste facility and/or a regional facility that recovers salable products from wastes containing heavy metals.
- **Develop and formally adopt** a MMSD toxics reduction policy.

Since the task force released its toxics reduction strategy, concrete steps have been taken to carry out two of the recommendations. The MMSD has obtained a grant to survey other sewerage districts, the first recommendation of goal 1. MMSD has also given a grant to the Lake Michigan Federation, a coalition of citizens and citizen organizations in four states around Lake Michigan, to carry out the recommendation under goal 2 to collect and distribute information on toxics and waste minimization to "all formal and nonformal education audiences."

MMSD's board of commissioners has approved the rest of the task force recommendations in principle, but has asked staff to prepare detailed plans for implementing them before it gives final approval.

The toxics use reduction strategy developed for MMSD by the task force is comprehensive. It includes all three types of pollution prevention programs that can be adopted by sewer systems and other local governmental entities: educational, technical assistance, and regulatory. If it is implemented, this strategy will be a model for other sewer systems in the Great Lakes Basin. Citizens in Great Lakes communities should accept nothing less from their sewer districts and local governments.

Seattle Water Treatment Department

A fairly comprehensive pollution prevention effort has been implemented in the Seattle metropolitan area for

nearly twenty years. The program started in the early 1970s with an industrial waste minimization program targeted primarily on industrial users of the sewer system. Beginning in the late 1980s, a program targeting small quantity hazardous waste generators and residential households was developed and launched.

The industrial pollution prevention program centered around a team of investigators who worked with management of industrial facilities to help them move towards waste minimization as the best approach for achieving compliance with discharge limits. These investigator/consultants work with managers to identify pollution prevention opportunities and then to develop and implement pollution prevention plans. A staff industrial process engineer assists in the pollution prevention planning.

Industries were targeted for the pollution prevention program through a process of identifying specific problem chemicals in sewage treatment plant sludge and effluents, tracing those contaminants to specific waste streams, and then tracing the waste streams to their specific industrial sources.

As a result of this ambitious pollution prevention effort, industrial discharges to the Metropolitan Seattle sewer system have been reduced by approximately 80 percent. In addition, heavy metals and other contaminants have been completely removed from treatment plant sludge, making the sludge suitable for use as organic fertilizer and for the composting of organic solid waste.

Metro Seattle's small-user plan consists of two major components:

- **Technical assistance and education efforts** to promote practices that reduce or avoid generation of hazardous wastes. These include a household hazardous waste telephone information line, onsite consulting services, a resource library, and general public information and outreach, including school system education programs.
- **Development and promotion** of convenient and accessible collection options for wastes that cannot be reduced. These include permanent and mobile household hazardous waste collection facilities, including pickup service for the homebound.

Metro Seattle's program is funded to the tune of $6 million to $7 million a year. The money comes from sewer use fees and commercial and residential solid waste collection charges. Program implementation has been going pretty much according to plan. The primary obstacle so far has been the difficulty in getting people to change the consumer products they buy to reduce the amount of household hazardous waste they generate.

Other STP Waste Reduction Efforts

Several other local municipalities are also undertaking waste reduction schemes:

- **In Boston,** Ray Crystal (617-242-7310) is piloting a study to determine the relative sources of heavy metals and organic compounds.
- **In San Francisco,** Dan Rourke (415-550-2750) is attempting to identify nonindustrial sources of hazardous wastes by mass-balancing.
- **In Oakland,** at the East Bay Municipal Utility District, Joe Damas (415-465-3700) is implementing a source control program.
- **At the Orange County** (near Los Angeles) Sanitation District, Jim Wybenga (714-962-6957 x3813) is implementing a source control program for waste water from small businesses.

Changing Wastewater Treatment to Prevent Pollution

The standard STP wastewater treatment processes results in the generation of toxic byproducts discharged into receiving waters with STP effluent. Specifically, when chlorine is added to wastewater to destroy bacteria and other pathogenic organisms, trihalomethanes, a family of chlorinated compounds including many toxic chemicals, are formed.

In Canada, new clean technologies developed by the National Water Research Institute (NWRI) and Trojan Technologies provide a way around this problem. NWRI scientists found that ultraviolet light of the appropriate wavelength and intensity kills bacteria in sewage effluent as effectively as traditional methods and inactivates some viruses more effectively, without changing water chemistry.

Trojan Technologies has undertaken development of commercial products that range from municipal systems that can treat 212 million gallons/day (a new facility in Quebec City) to household systems that sterilize only tens of gallons of drinking water each day. The use of this technology at Quebec City will eliminate the use of over 700 tons of chlorine per year from effluent being discharged into the St. Lawrence River.

The benefits of this new technology have been:

- A reduction in the loading to receiving waters of persistent chlorinated compounds
- A reduction in the release of chemicals that may contribute to the destruction of the ozone layer
- A reduction of the threat of chlorine spills
- Costs comparable to those of traditional methods
- Reduced worker exposure to chlorine gas.

Resources 5

Citizens Guide to Combined Sewer Overflows in the City of Detroit, Great Lakes United, December 1990.

Control at Source: Regulating Industrial Sewer Use in Ontario, Canadian Institute for Environmental Law and Policy, 517 College St. #400, Toronto, Ontario M6G 4A2, 416-923-3529.

Controlling Toxic Pollution in Urban Stormwater Runoff: Options for Local Governments, Local Government Commission, 909 12th St. #205, Sacramento, CA 95814, 916-448-1198.

Household Hazardous Wastes in Municipal Wastewaters and Storm Drains, Dave Galvin, Municipality of Metropolitan Seattle, Office of Water Quality, 821 Second Ave., Seattle WA 98104.

Local Hazardous Waste Management Plan for Seattle—King County, Dave Galvin, Municipality of Metropolitan Seattle, Office of Water Quality, 821 Second Ave., Seattle WA 98104.

Low Cost Ways to Promote Hazardous Waste Minimization: A Resource Guide for Local Governments, Local Government Commission, 909 12th St. #205, Sacramento, CA 95814, 916-448-1198.

MISA: Controlling Industrial Discharges to the Sewers, Ontario Ministry of the Environment, September 1988.

The National Waste Reduction Handbook: An Introduction to Source Reduction and Recycling for Municipal Decision-Makers, National Round Table on the Environment and the Economy.

Reducing Industrial Toxic Wastes and Discharges: The Role of POTWs, Local Government Commission, 909 12th St. #205, Sacramento, CA 95814, 916-448-1198.

Still Going to B.A.T. for Water Quality?: A Four-Year Review of the Ontario Ministry of Environment's Municipal/Industrial Strategy for Abatement (MISA), Canadian Institute for Environmental Law and Policy, Pollution Probe Foundation, and Great Lakes United, available from CIELAP at 517 College St. #400, Toronto, Ontario M6G 4A2, 416-923-3529, and Pollution Probe at 12 Madison Ave., Toronto, Ontario M5R 2S1, 416-926-1907.

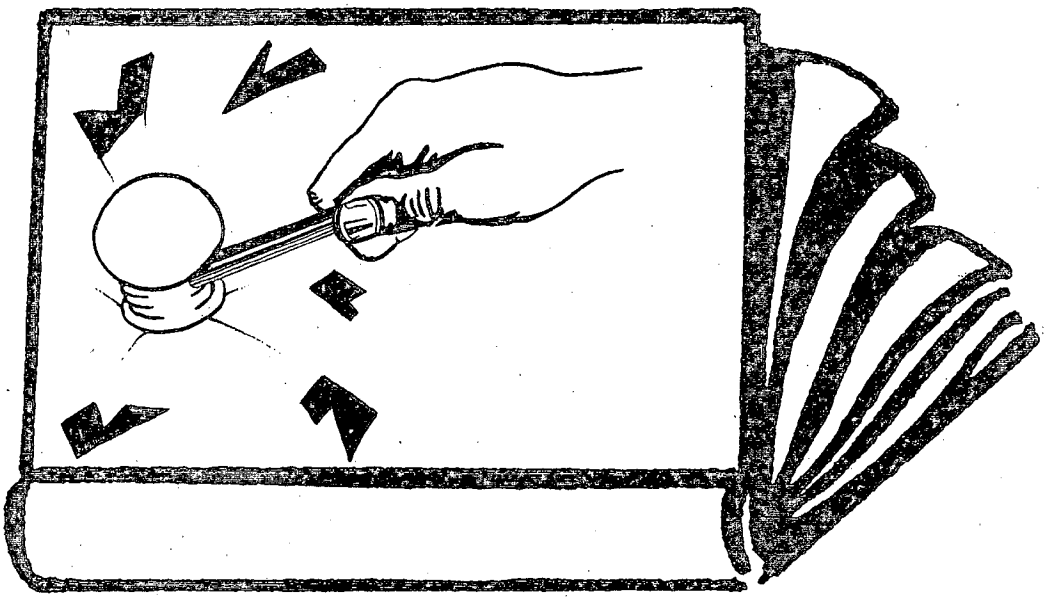
The U.S. EPA's Pollution Prevention Information Clearinghouse has a library of over 400 case studies of pollution prevention programs implemented in various industries, plus descriptions of more than 600 federal, state, and local government programs. The clearinghouse can be reached by phoning the RCRA Superfund Hotline at 800-424-9346 or the Small Business Ombudsman Hotline at 800-368-5888 or 703-821-4800.

6 Local Government

Local government authority to adopt and enforce environmental protection and pollution prevention programs is different in the United States and Canada. It also varies according to state and province. Before launching any effort to win adoption of a local government pollution prevention program, activists should meet with sympathetic legal experts to find out precisely what kind of environmental protection authority is enjoyed by the local government being targeted.

Here are some of the key questions that need to be answered:

- What environmental protection authority has the local government traditionally exercised?
- Does local government have any additional authority it can employ if it so chooses?
- Does local government have the power to implement desired pollution prevention policies and programs?
- Do county, state, or provincial levels of government have the power to enact policies that supersede those of local government?
- Does local government have the power to adopt and enforce mechanisms to raise revenues to fund pollution prevention programs?
- If higher levels of government impose such revenue-raising mechanisms, would this prevent the local government from doing so?



Improving Coordination

Effective implementation of local government pollution prevention efforts is helped by better coordination among the various governmental agencies responsible for chemicals-related programs. These usually include at least the pollution control, hazardous materials, emergency response, and sewer discharge units of government. Sometimes fire, parks, and health units of government have chemicals-related responsibilities as well. And any of these units may belong to different levels of government. Pollution control agencies often exist simultaneously at more than one level of local government, for example, at both the county and municipal levels in the United States.

However extensive the diversity of government involvement in regulating chemicals, efforts within a region should be coordinated if at all possible. For all issues or efforts that cross jurisdictional boundaries, coordinating committees should be established to maximize regulatory effectiveness and rationalize any effects on business.

Such committees also make sense within jurisdictions. They should be made up of representatives from all the departments involved in environmental or hazardous materials programs, regulations, or emergency response efforts. Representatives from major users of hazardous materials, such as the parks department (pest control) or highway department (vegetation management) should also be included. Finally, representatives from local environmental organizations could be added to provide a larger and external perspective.

The effectiveness of an internal coordinating committee will be enhanced if it is chaired by a high-level policymaker such as the chief administrative officer or a prominent legislator.

Both interjurisdictional and internal coordinating committees can improve the effectiveness of pollution prevention efforts by providing a mechanism through which various government departments and jurisdictions can share critical information. For example, comprehensive pollution prevention programs need information from local emergency response committees in order to assess area toxics use and waste generation. A coordinating committee can prevent turf battles, resources questions such as the cost of staff time, and personality disputes from inhibiting this flow of information.

Interjurisdictional coordinating committees can help avoid duplication of efforts by two or more pollution prevention programs operating in the same area.

Help Efforts

The kinds of programs local governments can employ to help users of toxic chemicals in their areas move towards pollution prevention are very similar to the program options available to sewage treatment plants described elsewhere in this guide. This approach includes enactment of a pollution prevention bylaw, initial program planning (including assessment of how the three types of pollution prevention programs—educational, technical, and regulatory—could be applied locally), and the collection of data on toxics use and waste generation and release.

Local governments should start small, with low-cost educational efforts, then gradually expand to the more resource-intensive technical assistance and regulatory programs. Throughout this process, staff implementing the program can learn from the experience and use the success of low-cost activities to generate the political support needed to secure the resources required by more sophisticated efforts.

Low-Cost Efforts

The Local Government Commission of California has developed a number of low-cost pollution prevention activities and programs that can be implemented by local government entities. These include:

- **Encourage local business leaders** to set up educational and technical assistance programs for area businesses. Through their companies, business leaders could easily implement most of the low-cost options discussed below. One approach would be for staff to ask area business leaders to look at this list of options and sign up for what they think they can take on. Business leaders could also be asked to use their influence to develop more resource-intensive technical and financial assistance programs. Large companies with engineering staff may very well have the ability to offer pollution prevention technical advice to smaller firms that lack such resources.

  When approaching the leaders of local business, civic, or trade organizations, or large area corporations, it is a good idea for the local government to have:

  - *A clear statement* of its pollution prevention program objectives.
  - *A description of cost savings* businesses can achieve through pollution prevention.
  - *A good sense of the role* business leaders can play

in the government's pollution prevention program.

One way to build commitment from the business community is to suggest that business leaders form pollution prevention committees within their organizations.

- **Encourage other outside organizations** to participate. In addition to a community's business leadership, other institutions and organizations can be encouraged to sponsor pollution prevention program activities for area companies. Universities, local economic and community development entities, community colleges, civic organizations, and environmental organizations often have the resources to implement educational as well as more technical pollution prevention programs. A local economic revitalization program could help small businesses obtain loans to finance pollution prevention improvements and equipment. A university engineering department could set up a program to provide student interns for small businesses to help them conduct pollution prevention assessments.

- **Make specific, written requests** of individual companies. Local governments can directly ask individual companies to institute one or more of the significant pollution prevention actions described in this guide. Requests can be made in the form of letters, and, as part of the request, industries can be encouraged to sign a voluntary "participation" form acknowledging the types of actions the company intends to take.

- **Recruit volunteers** to staff the pollution prevention educational program. Volunteers can be recruited from local universities, civic groups, environmental organizations, local industries, or from among retired professionals in the area. Most of the tasks connected with low-cost pollution prevention education do not require people with scientific or technical backgrounds. Responsibility, dedication, and sometimes public relations and communications abilities are qualities needed.

- **Compile and promote** industry pollution prevention success stories. Short descriptions of how specific companies or industries have developed and implemented pollution prevention programs, and details of the changes made and how much money was saved can be invaluable aids in encouraging local industries to adopt pollution prevention programs. There are numerous sources of success story information. Some success stories are included in this guide, and more can be found in the publications mentioned in end-of-chapter resource lists. Local case studies, if any are available, will have a greater impact on local firms than examples from other areas. Finding such examples would be an excellent project for a local government to take on. Small- and medium-sized businesses might be more inclined to voluntarily implement pollution prevention efforts of their own if their business colleagues were seen as pollution prevention leaders. Highlighting local pollution prevention progress can also help a local government agency generate the political support needed to secure resources for a more comprehensive pollution prevention program.

- **Publicly recognize** pollution prevention achievements. Local government entities implementing a pollution prevention educational effort can publicly recognize companies that have adopted successful pollution prevention efforts at their facilities. "Pollution Prevention Achievement Awards" can be presented to successful firms at meetings of the local government legislative body, at news conferences, or at special awards luncheons or dinners. However such awards are granted, it is important to generate news media coverage publicizing the company's achievement.

- **Work with engineering firms.** Many engineering companies have the technical expertise needed to conduct pollution prevention assessments for area firms that use toxic chemicals and generate hazardous waste byproducts. Local governments can approach these engineering firms and ask them to donate some of their technical expertise by conducting a technical pollution prevention workshop for an area industry. The engineering firm can benefit by advertising its pollution prevention assessment services, and some workshop participants may actually decide to hire the company to conduct an assessment at their facility. Another approach is to ask the engineering firm to conduct pro bono assessments for a few local companies. The local government could then advertise the results of the assessments, as well as the money saved by the companies through implementation of pollution prevention measures identified by the assessments. This could attract new clients to the firm.

- **Organize an in-plant tour** of a facility that has successfully reduced its wastes through a pollution prevention effort. The tour can be conducted by local industry, elected officials, community leaders, and environmental organizations. Newspaper, tele-

vision, and radio reporters can be invited to take the tour.

- **Work with the local media.** Local governments should make sure that their educational and outreach programs receive appropriate media coverage. This coverage should be seen as extensions of the programs themselves—good coverage will generate information requests and wider understanding of program purposes. It is a good idea to develop ongoing relationships with the media, periodically letting them know what programs are planned, sending them educational materials, and inviting them to meetings and events. Items of particular interest to the media might be pollution prevention achievement awards, industry workshops, in-plant tours, pollution prevention exhibits, and meetings with key business leaders on pollution prevention.

  Particular media aims might include getting on local radio and television talk shows about pollution prevention and securing local newspaper editorials or opinion pieces promoting pollution prevention efforts. Opinion pieces will be most effective if written by elected officials or business leaders (even if the actual writing is done by pollution prevention staff). Talk shows will be most effective if they feature local elected officials, business leaders, or a representative of a company that has implemented a successful pollution prevention program.

  Public service announcements can also be used to promote a pollution prevention educational program. However, since many PSAs are normally aired later at night, it could be useful to organize a meeting between station managers and elected and business leaders in an attempt to encourage the media to air the PSAs at times when audiences are larger.

- **Formally declare a pollution prevention week.** This device can be used to focus a great deal of public attention on pollution prevention. Many of the low-cost educational and outreach activities described here can be brought together into a series of events carried out in one specially publicized week. Creative slogans or themes can be used to promote the week, such as "An Ounce of Pollution Prevention . . ."

- **Organize a pollution prevention exhibition fair.** The fair would be a full- or half-day-long event offering various types of useful pollution prevention information. Vendors can display their pollution prevention technologies and services. Pollution prevention workshops for various industries can be held. Brochures and educational materials from the sewage treatment plant or local government pollution prevention program can be made available.

- **Establish a blue-ribbon task force** on pollution prevention charged with developing pollution prevention or waste minimization strategies for both the public and private sectors. The task force could consist of eight to twenty members, including business leaders, industrial technical staff, university representatives, public members, representatives from environmental organizations, and other people deemed appropriate for the local area. Some amount of government-provided staffing would be needed to allow the task force to operate effectively.

- **Provide public education** on consumer waste reduction. The use and disposal of consumer products containing hazardous materials are important sources of contamination problems for sewage treatment plants and solid waste landfills. Consumer use and abuse of these products can also lead to exposure to toxic substances in peoples' own homes.

  STPs and local governments can educate consumers to reduce environmental and health risks by using less toxic or nontoxic products, recycling household wastes where possible, taking proper precautions when using toxic products, and safely disposing of product waste containing hazardous materials. This kind of pollution prevention message can be communicated to citizens through television, radio and newspaper stories, utility bill inserts, materials regularly mailed to residents and public posters.

  Consumer waste reduction and pollution prevention education can also be incorporated into household hazardous waste drop-off days or collection programs. These programs could provide educational materials on safer alternatives to household toxic product use.

- **Develop a pollution prevention library** that brings together the best resources on pollution prevention. Such a library would provide a service for industry, build the pollution prevention expertise of sewage treatment plant or local government staff, and provide ready-made references for the various low-cost pollution prevention educational activities being organized as part of the program. Some types of materials that can be carried by a local pollution prevention library include:

  - *General pollution prevention* educational materials.
  - *Technical information* providing data on specific pollution prevention technologies and methods,

organized by industrial categories, industrial waste streams, and industrial processes. Included would be resource lists of technical consultants, engineering firms, and pollution prevention vendors.

- *Financial information* describing opportunities for obtaining low-interest loans and grants to finance initial implementation of industrial pollution prevention measures.

When developing a pollution prevention library it is probably wise to first collect the types of informational resources that are most useful for the targeted industries in the local area, and then gradually expand as staff time and space allows.

- **Conduct pollution prevention workshops.** These should be designed to offer three types of information:
  - Introductory information and case studies
  - More technical, applied information
  - Financial assistance information

  All three topics can be fit into one day-long workshop, or separate workshops can be organized for each type of information. It would be helpful to bring in workshop presenters from local companies that are practicing pollution prevention. Workshops can be cosponsored with local organizations or companies or delegated entirely to nongovernmental organizations such as university or trade association.

  Technical workshops providing detailed information on pollution prevention practices and technologies are best organized by specific industrial categories, industrial waste streams, or industrial processes. Focusing the topic of technical workshops in this manner allows immediately applicable information to be given to the industries that need it the most, and gives similar industries an opportunity to become part of an identifiable pollution prevention network.

  One approach that can be employed is to design a year-long workshop program consisting of one workshop for each industrial category.

- **Compile and distribute** pollution prevention information packets. Once companies are introduced to the general concept of pollution prevention, the information should be as industry-specific as possible. Some of the useful items that can be included in an initial packet are: a pollution prevention audit checklist, a list of pollution prevention assessment consultants, a technical bibliography, a sample corporate policy statement, and some success stories.

- **Organize a speakers bureau.** Establish a network of volunteers, students, elected officials, and staff who would occasionally be available to speak to business groups, trade associations, companies, labour unions, civic organizations, environmental groups, and government agencies about pollution prevention. Once the network of pollution prevention speakers is created, the sewage treatment plant or local government can draw up a list of groups that would benefit from a pollution prevention presentation, and contact them to host a speaker at one of their regularly scheduled meetings.

- **Publish pollution prevention newsletter.** Each issue could focus on specific industrial categories but have items of general interest as well. If a sewage treatment plant or local government does not have the resources to produce a newsletter devoted entirely to pollution prevention, it can 1) include pollution prevention articles in an existing newsletter; 2) dedicate one or more issues of an existing newsletter to pollution prevention; or 3) place pollution prevention articles in the newsletters of other governmental bodies or nongovernmental organizations, such as the Chamber of Commerce, or trade associations.

- **Develop a local slide show** or video with pollution prevention success stories drawn from area companies. The slide show or video can be used for many of the activities undertaken as part of the sewage treatment plant or local government's pollution prevention educational program.

- **Encourage financial assistance** for pollution prevention. Raising the front-end capital needed to develop and implement pollution prevention programs is a serious obstacle for many corporations. A typical pollution prevention or waste minimization assessment costs between $5,000 and $10,000. Implementing the prevention methods identified by the assessment is, of course, almost always vastly more expensive. While pollution prevention practices frequently save companies considerable amounts of money over the long run, many companies, especially small and medium-sized firms, do not have the financial resources to make the initial investment. Many companies need low-interest, long-term loans to be able to invest in pollution prevention.

  A sewage treatment plant or local government educational effort can help address this problem by:

  - *Providing information* to toxics users and hazard-

ous waste generators on the increasing costs of waste management, the profitability of pollution prevention, and how to obtain pollution prevention loans and grants from government and private sources.

- *Acting as a catalyst* by organizing meetings among local government representatives, business leaders, local banks, economic development corporations, larger corporations, and other financial institutions to explore ways of providing low-interest, long-term loans for pollution prevention. During these meetings, pollution prevention should be presented as a strategy for making local industries more viable. The goal should be to develop a specific plan for improving the availability of pollution prevention financing.

- **Create economic incentives** to encourage pollution prevention. This strategy would include reducing local permit fees, certain taxes, enforcement (penalty) fees, or regulatory requirements in exchange for concrete pollution prevention actions. Since an ir centive strategy of this kind may result in disruptions in existing programs (the amount of revenues collected by governments will almost certainly be affected), it needs to be fully examined and carefully planned before it is implemented.

- **Stimulate development** of cooperative pollution prevention ventures among area businesses. Meetings could be organized by industrial categories or waste streams, and should be held in cooperation with trade associations.

- **Include pollution prevention education** as part of local inspections. Local governmental entities such as sewage treatment agencies, fire departments and environmental health departments regularly conduct inspections of businesses. Introductory pollution prevention educational work can be incorporated into these inspections by distributing written pollution prevention information and holding brief in-person meetings with the owners or managers to introduce the concept of pollution prevention and its potential economic advantages.

Technical Assistance Programs

Pollution prevention technical assistance programs that can be instituted by local governments are the same in content as those discussed in the sewage treatment plant section. However, the opportunities and mechanisms for delivering assistance to toxics users are different for local governments, and vary from jurisdiction to jurisdiction, depending in part on already existing government activities. The same monitoring and enforcement inspections carried out by STPs are not traditionally the function of other local governmental entities. However, many governments conduct other hazardous materials control inspections that could be used in the early stages of a pollution prevention assistance program. As resources are made available for a staffed pollution prevention program, program staff would work with departments that have ongoing contacts with toxics users through enforcement of existing city bylaws.

Regulatory Approaches

The starting point for regulatory approaches by local government to bring about pollution prevention should probably be local bylaws or ordinances requiring new businesses locating within a jurisdiction to develop pollution prevention plans as part of the permit or license application process. Over time this pollution prevention planning requirement could be applied to existing businesses seeking permit renewals. Eventually, actual implementation of a pollution prevention plan, rather than its mere writing, could be required as a precondition of permit renewals.

A municipal government can use its control over the delivery of essential infrastructure services such as water and sewer use to encourage development and implementation of pollution prevention plans by businesses. If a business does not formulate and implement a plan in a timely fashion, a local government can discontinue water or sewer use services. It would be especially appropriate to use this type of lever in cases where a business is violating other environmental or hazardous material bylaws.

It is important to remember that regulatory mechanisms are one component of a comprehensive pollution prevention program, and should be used in conjunction with technical assistance and educational efforts. Indeed, the adoption of a regulatory pollution prevention approach without corresponding educational and technical assistance efforts could threaten the very survival of many small and medium-sized toxics users. This can be as injurious to community health (as well as harmful to the public's support for environmental protection) as the lack of any pollution prevention program at all.

Fee System

While EPA and other grants are a good way to fund the start-up of local pollution prevention programs, these grants will not last forever. Eventually a permanent source of funding will have to be found. One source of funding that can be used by local government pollution prevention programs is a toxics use or hazardous waste fee system. This approach would charge users of toxic chemicals or waste generators a fee based either on the quantities of toxic chemicals they use, the amounts of hazardous wastes they generate, or the amounts of toxic chemicals released to the environment. Revenues raised through the fee system would be dedicated to funding the pollution prevention program. Naturally the fee system itself encourages reductions in the use of toxic materials or in the generation of hazardous waste by-products. The less toxic materials used or waste generated by a facility, the lower the fees it must pay.

Land Use Planning

Prevention of toxic pollution has not traditionally been part of local government land-use planning processes, but certain land use planning mechanisms, such as zoning bylaws and changing the official land use plan, are important tools available to local governments to promote pollution prevention.

Updating the Official Plan

A municipality's official plan contains its overall land use policies. In order to address toxic chemicals as a land use issue, it is necessary to ensure that proper authority is written into the official plan. Existing elements of the official plan, such as safety and transportation elements, can be changed to address hazardous waste management and even pollution prevention planning. Language incorporated into the official plan needs to be broad enough to support the various kinds of possible future efforts to control, manage, and regulate toxic substances and hazardous wastes within the jurisdiction. The following statements would accomplish this end:

- "It is the goal of the jurisdiction to prevent toxic contamination of the air, water and land and to reduce human exposure to these materials."
- "It is the intent of the jurisdiction to develop and implement a comprehensive hazardous materials management program that will expand, strengthen, and fill the gaps in current environmental laws and regulations."

Another way to update the official plan is to add a separate hazardous materials section to the plan.

Zoning Bylaws

Policies established in the official plan are enforced through local zoning bylaws, which generally divide the jurisdiction into districts and detail activities that are prohibited, permitted, or permitted only with special conditions. Zoning bylaws can be used to restrict the location of chemical-handling industries to areas of the community where human and environmental risks are minimized.

Some communities have revised their zoning bylaws to protect groundwater by restricting the use and storage

of hazardous materials in areas with critical groundwater vulnerabilities. Other communities have enacted revisions designed to protect residential areas by restricting the types and/or densities of chemical industrial development to protect population centres or other sensitive uses. A few jurisdictions have passed zoning bylaw revisions establishing buffer zones between residential neighbourhoods and the sites of facilities using hazardous materials.

Even in areas zoned for industrial uses, local jurisdictions can permit the use of hazardous materials only if companies institute practices and technologies—such as pollution prevention—that maximize community protection. For example, local governments can reserve the right to require new facilities, existing facilities that are expanding, or existing facilities handling some minimum quantity of hazardous materials to develop toxic use reduction and waste reduction strategies.

Urban Stormwater Runoff

Evidence accumulated in recent years indicates that in most urban areas stormwater runoff is one of the most significant sources of pollution. Pollution carried by urban stormwater runoff includes oil and grease, diesel emissions and leakage, car exhaust, pesticides and fertilizers, bird and pet waste, street litter accumulation, vehicle tire and brake pad wear, sedimentation from construction, and toxic wastes released through illegal disposal by businesses, industry, households, and individuals.

Efforts to control pollution in stormwater runoff include intervention at the point of pollution generation and intervention at the point of pollution transport.

Intervention at the Point of Pollution Generation

Intervention at the point of pollution generation attempts to stop the introduction of pollutants into the storm drain system. All of the pollution prevention and waste minimization programs that local governments and STPs can implement are methods to stop the introduction of pollutants into the stormwater drainage system.

Intervention at the Point of Pollution Transport

Intervention at the point of transport attempts to preemptively contain or minimize runoff effluent after it has been introduced into the environment. This kind of intervention includes several methods that, employed in combination, comprise a comprehensive program and can significantly reduce the amount of treatment required of stormwater runoff. Some of these methods are similar to measures that can be taken to deal with the impacts of combined sewer overflows.

- **Regular street sweeping** to pick up dust and dirt particles that are otherwise carried into receiving waters by runoff.
- **Oil-water separaters=boxes** or tanks that collect runoff, reduce the turbulence it, and allow the lighter oil in the runoff to rise to the surface. Then it can easily be skimmed off. Since runoff from commercial properties and parking lots contains much more oil and grease than runoff from residential areas, it makes sense to locate the separators near the lots and commercial sites.

- **Reduction in the amount** of an area's impervious surfaces. Planning greenbelts and replacing impervious surfaces with more porous alternatives, such as bricks or lattice concrete, allows some runoff to percolate into the underlying soil, reducing runoff volume.
- **Catch basins** in storm drain openings—these catch solids and allow liquids to flow over the edge. Catch basins could act as the first point of sediment settling for urban runoff. However, they are effective only if cleaned on a regular basis.
- **Grassy swales.** Vegetation along the sides of storm drain channels significantly reduces the pollutants in stormwater by slowing the water's velocity and allowing sedimentation. Accumulated sediments must be removed periodically to prevent the release of contaminants into the runoff during storms.
- **Gravel and small stones** in storm drains tend to attract some chlorinated hydrocarbons and heavy metals suspended in the flow. For this to work, however, channels must be regularly cleaned of contaminants.
- **Natural and artificial wetlands** improve the quality of urban runoff by forcing sedimentation. Heavy metals are absorbed by peat and suspended in the wetlands. Hydrocarbons are digested by bacteria. Unfortunately, the long-term effects of the concentration of contaminants in and on wetland vegetation and in wetland wildlife are not known.

Pollution Prevention in Local Government Itself

Local governments can directly contribute to reductions in the use of toxic materials and generation of hazardous wastes in their jurisdiction by developing pollution prevention programs for incorporation into government operations. Indeed, if a local government expects other users of toxic chemicals to prevent pollution, it is reasonable to expect it to serve as a role model by preventing pollution from being created by its own activities.

To start the process of developing its own pollution prevention program, a local government should direct each of its departments to conduct a pollution prevention assessment to identify opportunities for reducing toxics use and waste generation. See appendix 17 for a reprint of one county's pesticides procurement and hazardous waste management policies. The results of these departmental assessments could then be woven together into a comprehensive pollution prevention plan. The next and more difficult step, of course, is implementation of the plan.

One type of pollution prevention effort that can be adopted by local government is the reduced use of pesticides and fertilizers through integrated pest management programs applied to public parks, streets, and facilities. See appendix 18 for the story of one county's effort to eliminate its use of pesticides.

Also useful are educational activities targeted at the individual citizen. These programs can inform residents of the availability and effectiveness of less toxic or nontoxic alternatives to pesticides and chemical fertilizers.

Examples

Erie County, New York

Erie County includes the Buffalo metropolitan area. It is carrying out a three-year, $1 million demonstration effort to help small- and medium-sized businesses reduce the amount and toxicity of the wastes they generate. The program is being implemented with EPA grant money by the Office of Pollution Prevention, which operates out of the Division of Environmental Compliance in the county's Department of Environment and Planning.

Consisting of both educational and technical assistance activities, the county's program is targeting several industries including printing, photography, metal manufacturing, electroplating, dry cleaning, and auto body repair. Specific elements of the Erie County effort include:

- S A project advisory group with representation from industry, labor, academia, environmental organizations, and area economic development agencies.
- S Workshops on pollution prevention approaches for particular industries.
- S A newsletter, each issue focusing on pollution prevention methods for a particular industry.
- S Onsite environmental audits performed for companies to help managers identify specific pollution prevention opportunities and methods that are applicable to their particular businesses.

Toronto, Ontario

Toronto's Environmental Protection Office is just beginning a program to help the city's waste-generating establishments reduce or recycle their hazardous wastes. The goal is for 80 percent of Toronto's hazardous waste producers to be involved in the program within three years.

Key elements of the Toronto program include:

- **Initial development** of a profile of the city's hazardous waste producers that will list them according to types and quantities of waste created or hauled offsite. The waste-minimization potential for each establishment will also be assessed where possible.
- **Targeting waste producers** with the greatest pollution prevention potential.
- **Providing onsite consultation** to help businesses with site-specific pollution prevention programs.
- **Researching waste minimization approaches** for various types of waste.
- **Establishing a pollution prevention** information clearinghouse to offer companies general introductory pollution prevention information, technical information on specific hazardous waste minimization techniques, and financial information such as how to obtain low-interest and long-term loans and grants to finance pollution prevention programs.

Hamilton, Ontario

Cave and Associates, an environmental consulting firm, is working with the area's sewage treatment system to encourage and assist small-quantity waste generators to adopt pollution prevention programs. This effort, which began during the spring of 1992, will:

- **Survey targeted businesses** to identify the types and quantities of wastes being generated, as well as pollution prevention approaches that can be applied to those wastes.
- **Inaugurate educational efforts** to encourage businesses to adopt appropriate pollution prevention measures.
- **Connect small businesses** with Hamilton's household hazardous waste management program.

Hayward, California

The Hayward City Council initiated the city's waste minimization program in 1988 by establishing a five-member task force made up of representatives from the City Council, Chamber of Commerce, the League of Women Voters, large area companies, and a homeowners' association. A three-phase program of education, technical assistance, and regulation is being carried out. Specific elements of this program include:

- **Introductory presentations** on pollution prevention to local industry associations.
- **General workshops** on pollution prevention.
- **Pollution prevention workshops** for specific industries.
- **Brochures** on pollution prevention methods for specific industries.
- **A local law** requiring companies to develop waste minimization plans.

Los Angeles, California

The Los Angeles pollution prevention program began with the 1987 formation of the Mayor's Advisory Committee on Hazardous Waste Reduction. Elements of the city's program include:

- **Establishment** of the Hazardous and Toxic Materials Project in the Office of the Board of Public Works to coordinate hazardous waste management activities among city departments generating hazardous wastes and to promote pollution prevention policies and practices by local industries.
- **Development** of waste management and minimization programs for city departments.
- **Technical assistance** to industries through education and outreach.
- **Inspections and audits** of every city facility to assess waste generation and identify pollution prevention options.
- **Use of water pollution control inspectors** to encourage industries to adopt pollution prevention programs.

Ventura County, California

Ventura County's Environmental Health Department is carrying out a pollution prevention program that provides various kinds of support for local industry:

- **Free evaluation** of waste minimization opportunities.
- **Reviews of waste minimization plans** to ensure that changes in waste management practices do not violate state laws.
- **Workshops and seminars** to provide forums for government and industry to share information and ideas.
- **In-depth waste audits** that include recommendations on pollution prevention methods.

Resources 6

Controlling Toxic Pollution in Urban Stormwater Runoff: Options For Local Governments, Local Government Commission, 909 12th St. #205, Sacramento, CA 95814, 916-448-1198.

Environmental Choice Program, 107 Sparks St., 2nd Floor, Ottawa, Ontario K1A 0H3. Information on environmentally friendly products.

Household Hazardous Wastes in Municipal Wastewaters and Storm Drains, Dave Galvin, Municipality of Metropolitan Seattle, Office of Water Quality, 821 2nd Ave., Seattle WA 98104.

Household Hazardous Waste Management News, 16 Haverhill St., Andover, MA 01810, 508-470-3044.

Land Use Planning for Prevention: Getting Started, Local Government Commission, 909 12th St. #205, Sacramento, CA 95814, 916-448-1198.

Local Hazardous Waste Management Plan for Seattle—King County, Dave Galvin, Municipality of Metropolitan Seattle, Office of Water Quality, 821 Second Ave., Seattle WA 98104.

Low-Cost Ways to Promote Hazardous Waste Minimization: A Resource Guide For Local Governments, Local Government Commission, 909 12th St. #205, Sacramento, CA 95814, 916-448-1198.

The National Waste Reduction Handbook: An Introduction to Source Reduction and Recycling for Municipal Decision-Makers, National Round Table on the Environment and the Economy.

Pesticides: A Community Action Guide, Concern Inc., 1794 Columbia Rd. NW, Washington, DC 20009, 202-328-8160.

Regulating the Urban Cosmetic Use of Synthetic Pesticides: An Action Plan for the Province of Ontario, Urban Pesticide Caucus, Toronto Environmental Alliance, 401 Richmond St. W. #104, Toronto, Ontario M5V 3A8, 416-348-0660.

Ten Model Local Government Programs for Reducing Hazardous Waste, Local Government Commission, 909 12th St. #205, Sacramento, CA 95814, 916-448-1198.

The U.S. EPA's Pollution Prevention Information Clearinghouse has a library of over 400 case studies of pollution prevention programs implemented in various industries, plus descriptions of more than 600 federal, state, and local government programs. The clearinghouse can be reached by phoning the RCRA Superfund Hotline at 800-424-9346 or the Small Business Ombudsman Hotline at 800-368-5888 or 703-821-4800.

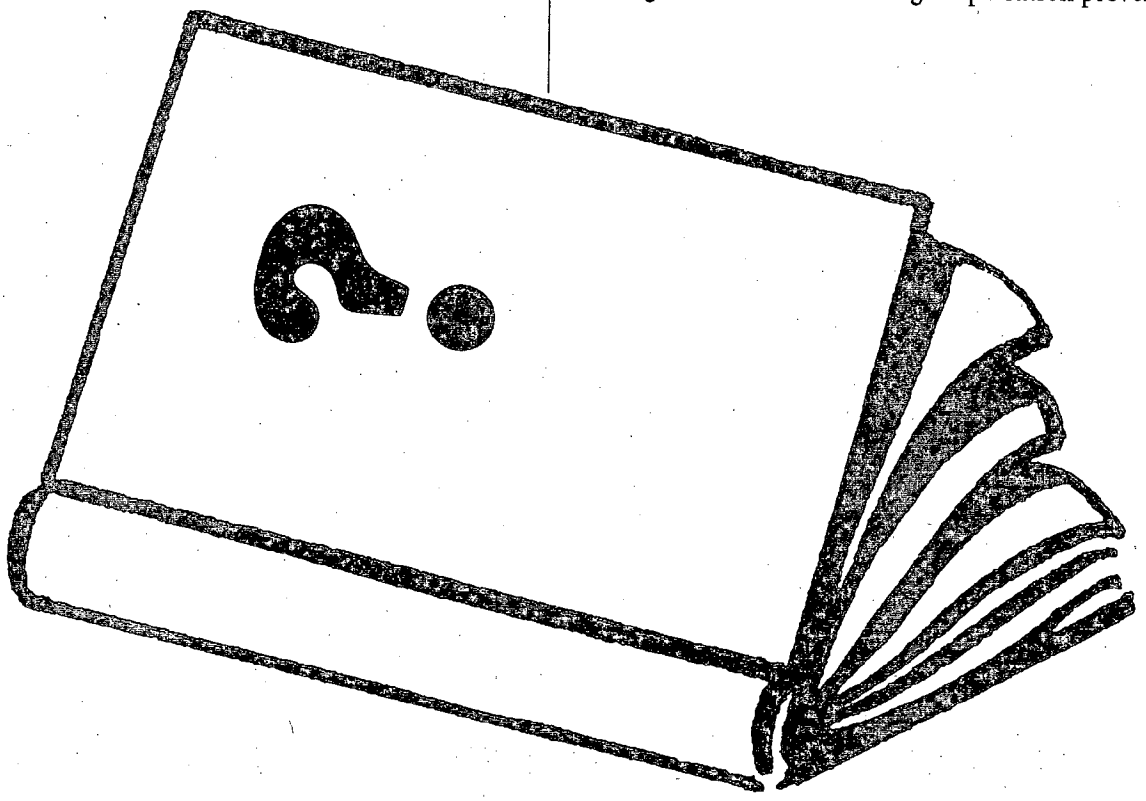
7 Direct Citizen Action

Good Neighbour Campaigns

Releasing toxic pollutants into the neighbourhood environment is not a very neighbourly thing to do. Ordinary citizens are beginning to organize local campaigns aimed at turning polluters into good neighbours through negotiating and signing "good neighbour agreements." In this new approach to addressing toxic hazards, citizens living in the neighbourhood of a polluting facility, sometimes guided by staff or leaders from environmental organizations, work to negotiate an agreement with the polluter in which the facility agrees to implement specific changes designed to remedy the toxic hazards it poses to the neighbourhood. If the workers at the facility are represented by a union, neighbourhood residents can join forces with it to win changes at the plant that prevent both pollution and worker exposure to toxic substances.

The "good neighbour" approach is needed because an exclusive reliance on the bureaucratic regulatory approach to environmental protection has failed to truly clean up the environment. This failure has been clearly underscored by the Toxic Release Inventory data that has been released to the public under SARA Title III since the mid-1980s. Billions of pounds of toxic pollutants are released into the environment in the United States every year.

With limited staff and resources and many polluting facilities within their jurisdictions, it is almost impossible for government environmental agencies to deal effectively with all of the toxic pollution entering the ecosystems they are charged with protecting. An active citizenry organizing local efforts to sign good neighbour agreements with polluting facilities can supplement the environmental protection efforts being undertaken by government. Local neighbourhood organizations have a strong self-interest in working for pollution prevention



programs at nearby industrial facilities that will protect both the neighbourhood environment and jobs.

Agency personnel, working out of distant offices, cannot know everything that happens at a facility. A local neighbourhood organization, however, is in a good position to monitor the facility continuously, and if the organization is working with the union representing the facility's workers, this monitoring could be done from both inside and outside the plant.

Good neighbour agreements can be negotiated over a number of issues and can include provisions to:

- **Study and reduce toxic chemical use** and waste generation, and work toward a goal of zero discharge of toxic pollutants.
- **Provide funds** for residents to hire their own technical experts to review the firm's activities.
- **Establish a comprehensive chemical accident** prevention program using advanced techniques identified by citizens' own technical experts.
- **Allow residents the right to periodically inspect** the facility.
- **Grant citizens and plant workers** the right to have ongoing participation in a company health and safety committee.

Examples

Good neighbour campaign efforts include instances where the polluting company readily enters into negotiations with local neighbourhood groups as well as cases where neighbourhood organization had to wage intensive grassroots pressure campaigns to coax companies to the negotiating table.

Floor City Architectural Metals Minneapolis, Minnesota

Based on TRI information, Citizens' for a Better Environment (CBE) began working in 1990 with the Seward Neighborhood Group (SNG) to negotiate a good neighbour agreement with the Floor City Architectural Metals company. The facility reported releasing more than 100,000 pounds of toxic chemicals into the sir during 1989. Neighbors had been complaining about the pollution for twenty years but had little basis for taking action because the facility was not breaking existing environmental laws. After a public hearing held by the Minnesota Pollution Control Agency on a Floor City air quality permit failed to get results, CBE suggested that SNG use a good neighbour approach.

Under the 1990 Minnesota Toxic Pollution Prevention Act (TPPA), any facility required to report releases under the TRI must develop a "Toxic Pollution Prevention Plan." While such plans are confidential, annual progress reports based on information in the plans are available for public review.

The grassroots good neighbour effort at Flour City, currently in progress, is being organized to complement the TPPA planning process. Floor City officials agreed to participate in a dialogue with SNG and CBE to discuss the chemicals used at the plant and how they could be reduced. SNG's goal is an agreement with clear pollution reduction goals that community leaders can track annually with the facility's progress reports.

Smith Foundry, Phillips, Minnesota

The Smith Foundry is another company that is polluting the surrounding area even though it is in compliance with environmental regulations. While the Foundry is complying with Minnesota Pollution Control Agency standards, neighbourhood residents complain about odors coming from the facility. White dust and black soot frequently blow from the operation. In 1988, the foundry was cited by the Occupational Safety and Health

Administration for several violations of employee safety standards, including the exposure of five employees to respirable (breathable) silica in excess of allowed exposure limits. Citizens for a Better Environment is helping the People of Phillips organization (POP) organize a good neighbour effort. First the group worked to organize and mobilize the community so that it would be able to negotiate from a position of strength. Negotiations with Smith began in July 1991, and have been going on since then in a cooperative, nonconfrontational manner.

POP and CBE have also prepared a workplan to guide the development of the good neighbour agreement. The plan includes:

- **Development of an upper management** support policy and confidentiality statement.
- **Assessment of areas** around the plant in terms of release of pollutants.
- **Understanding issues of concern** to the people of Phillips (these included employment policy, buffer zone between foundry and neighbourhood, and a neighbourhood revitalization program).
- **Evaluation of the effectiveness** of current and past practices to eliminate pollution.
- **Assessment of options** available to eliminate or reduce pollution.
- **Determining goals** and schedules for achieving various options.
- **Describing the rationale** for choosing options.
- **Listing options not considered** due to economic, technical, or practical reasons.

Lewcott Company Worcester, Massachusetts

The Quinsigamond Village Health Awareness Group in Worcester, Massachusetts, waged an extensive grassroots campaign to clean up the Lewcott Company. The firm had generated terrible odors, and posed substantial fire hazards due to the storage of large quantities of flammable chemicals in close proximity to people's homes. After pickets, bad publicity, and challenges to company licenses, the company agreed to negotiate. The result was an historic agreement in which the company agreed to move its dangerous operations to its other facility, a few miles away, by a specific date. The agreement also granted the community group, in the interim, the right to inspect the facility and to assess penalties for odors. In return, the group agreed to remove the anti-Lewcott signs that had been posted on the front lawns of citizens living along the busy street where Lewcott was located. The agreement was enforceable through binding arbitration, and was ratified by residents of the community in a neighbourhood-wide meeting.

Dynasil company Berlin, New Jersey

A group of citizens near Berlin, New Jersey, was concerned about possible pollution from the Dynasil Company, a high-technology glass maker. In May 1988, with the company's permission, the Coalition Against Toxics conducted a detailed inspection with an independent inspector provided by the National Toxics Campaign Fund, a national environmental organization. The group identified several ways to improve Dynasil's environmental safety. The coalition assumed they would have to prod Dynasil to adopt their proposals. Dynasil, however, found the coalition's ideas both sensible and cost-effective. The company implemented all of the recommendations within a month of receiving them.

Exxon Chemicals Baytown, Texas

Baytown Citizens Against Pollution and Texans United have been attempting to negotiate with Exxon Chemicals to end the massive air and water pollution generated by the company's Baytown plant. While the company has been largely uncooperative, the two groups have been making progress getting state agencies to require the company to pay the immense cost of cleaning up contaminated soils. The citizens' groups believe that continued and escalating citizen activism of this kind may ultimately bring the company around to bargaining directly with them.

Sheldahl Corporation Northfield, Minnesota

In 1989 methylene chloride pollution emitted by a Sheldahl Corporation plant in Northfield, Minnesota, sparked a grassroots effort to close the facility. But in time citizens concerned about toxic releases to the community joined with workers exposed to toxic chemicals inside the plant. Together they shifted the campaign goal from pollution control to toxics use reduction. The result was that the plant today is both less polluting and still providing good jobs in the community.

Sheldahl employs about 700 people at its Northfield

facility, which manufactures flexible circuitry, including that used behind the dashboard of almost every automobile. U.S. Toxics Release Inventory data published in June 1989 showed that Sheldahl was releasing over 400 *tons* of methylene chloride, a probable human carcinogen, into the air each year. This revelation shocked the community and led to a grassroots campaign to force the company and the government to deal with problem.

Shortly after the TRI data was made public, a community information meeting was held featuring heated exchanges and a proposed company plan. Realizing that the newly established TRI would soon let people know about their methylene chloride releases, Sheldahl planners had for months been trying to develop a means of dealing with the emissions. The resulting plan of action was released at the information meeting.

The plan called for five-year reduction of the plant's methylene chloride emissions, eventually reaching 40 tons per year, 10 percent of the existing level. The basis for the emission reductions was a corresponding schedule of methylene chloride use reductions. Thus, at the very first community meeting, the company proposed a toxics use reduction plan.

Citizens attending the meeting wanted much faster reductions, and before long they formed a group called Clean Air in Northfield, "CAN" for short. Sheldahl was in the process of applying for the renewal of its air pollution permit with the Minnesota Pollution Control Agency (MPCA), and CAN's strategy was to use the renewal process to push for installation of pollution control technology capable of reducing the methylene chloride emissions more quickly than the company's use reduction plan. Although approaches such as closed-loop recycling of the methylene chloride were considered, CAN's original plan for dealing with the pollution was pollution control.

The TRI information that triggered community concern dealt only with releases to the environment outside of the plant, and the exposure of citizens outside of the plant. Section 313 of SARA Title III, which created the TRI, is enforced by the Environmental Protection Agency, whose jurisdiction is limited to areas outside plant boundaries. MPCA, the state agency charged with protecting the community from plant emissions, has absolutely no jurisdiction over worker health and safety inside the plant. So the initial community discussion and CAN's organizing focused on one part of Sheldahl's methylene chloride problem, emissions to the surrounding community. Worker exposure was not on the agenda.

For Sheldahl's workers and their union, methylene chloride was a concern, but the most important issue was job security. They were frightened by the recent relocation of a small part of the Northfield operation to a South Dakota facility. The fear that an overly zealous citizens group fighting pollution might cost them their jobs was very real.

CAN did not include among its members any Sheldahl employees. The organization's founders were, for the most part, well-educated and affluent, while Sheldahl workers tended to be less well-educated and less well-off economically. Even in a small town like Northfield, there had been little previous social contact between CAN activists and Sheldahl workers.

These differences surfaced dramatically during a meeting between CAN leaders and the Amalgamated Clothing & Textile Workers Union (ACTWU), held to discuss working together. One CAN activist accused the union of knowing for a long time that Sheldahl was sending a carcinogenic chemical out of its stacks, and demanded to know why workers failed to alert the community. ACTWU leaders said they had heard that some people in the community wanted to shut down the plant. The meeting broke up with little accomplished.

Nonetheless, a number of CAN and union leaders remained committed to working together. A series of meetings between CAN, ACTWU, and the Air Toxics Study Group, based at a local college, were held. The most important of these meetings featured a presentation by Eric Frumin, the national director of ACTWU's Department of Occupational Safety & Health. Frumin's presentation effectively shifted the policy debate towards toxics use reduction.

ACTWU and its Sheldahl members had been concerned about worker exposure to methylene chloride for quite some time. In the collective bargaining agreement signed with Sheldahl in 1987, the union won inclusion of a clause requiring monitoring to determine how much each worker was exposed to toxic chemicals. This agreement was coming to an end just as the Northfield methylene chloride controversy began. With an October 31 deadline for a new contract approaching, Frumin and the leaders of ACTWU Local 1481 saw the community's concern as an opportunity to go beyond monitoring to actually reducing the toxic exposure risks imposed on workers. They saw the community activists as potential allies in their struggle.

During the meeting with community leaders, Frumin criticized the traditional pollution control response of companies faced with community concern about toxic emissions. He proposed toxics use reduction programs aimed at phasing out the use of methylene chloride. This would be the solution to both worker exposure inside the plant and community exposure outside the plant. CAN eventually agreed.

Emboldened by public attention, CAN's attitude, and Sheldahl's earlier toxics use reduction proposal, the workers of ACTWU Local 1481 did an unusual thing. They decided to go beyond job security issues to include employee health protection as an essential demand in their negotiations with the company. They decided to use collective bargaining to turn Sheldahl's proposed plan into a genuine commitment. Establishing a firm timetable for methylene chloride use reductions became a centerpiece of the union's demands.

After a period of tense negotiations held in a context of support from the grassroots campaign, an agreement containing a toxics use reduction clause was signed.

The greatest threat to environmental commitment by the public, a commitment that is crucial to serious progress on the state of the environment, is the charge that there is a conflict between environmental protection and economic well-being. As demonstrated by the Sheldahl experience, citizen-worker alliances both vitiate the power of that charge and move the traditional response to pollution problems away from pollution control and toward pollution prevention.

Johnson Controls Whitmore Lake, Michigan

Another way to clean up pollution problems in a community is to check up on likely polluters.

Johnson Controls, Inc., operates a foam cushion manufacturing plant in Whitmore Lake, Michigan. Nobody knew it, but for years the facility released between a *million and a million and a half pounds* of methylene chloride pollution to the air each year. The tremendous emissions were the sixteenth highest in the nation for that common solvent, but nobody knew about the pollution because Johnson Controls illegally failed to report it to the government. The company simply ignored the federal law known as SARA Title III, the Toxic Release Inventory, which went into effect in 1987.

The government was unaware that the company was breaking the law, but the violations were turned up after a 1991 investigation by the Ecology Center, an Ann Arbor environmental group. In September 1991, using the "citizen suit" provisions of SARA Title III, the Ecology Center filed a complaint in federal court alleging the company's pollution reporting violations.

The Ecology Center together with the union representing the plant's workers (United Auto Workers Local 408) and Clean Land, Air, and Water, a grassroots citizens' organization, mounted a cooperative effort to fix the Whitmore Lake plant's pollution problems. By combining the legal leverage of the TRI citizen suit with mobilization of the community and active union pressure, the three organizations are hoping to convince Johnson Controls to sign an agreement reducing its use and release of toxic chemicals and improving worker safety.

Negotiations for an overall pollution prevention and plant safety agreement continue as of the end of 1992, but Johnson Controls announced in May 1992 that it would eliminate its use of methylene chloride at the Whitmore Lake facility. The use of methylene chloride was completely phased out within one month, replaced by a water-based solvent.

A Hypothetical Campaign—Battling "Toxics R Us"

Toxics R Us Inc. is a multinational corporation primarily involved in the production of industrial chemical products. Their Garden City facility has operated in the York County municipality since 1942, when it began operations as a munitions manufacturer during WWII. The sprawling chemical complex sits on a 150-acre site in Garden City, straddling a working class and lower-middle-income area of about 50,000 people that is 50 percent white (mostly Polish-American), 40 percent African-American, and 10 percent Hispanic. The complex operates twenty-four hours a day.

Toxics R Us employs 2,100 workers. Sixty percent of its workforce is female, 65 percent is white, 30 percent is African-American, and 5 percent is Hispanic. Fifty percent of the total Toxics R Us workforce lives within four miles of the chemical complex, but most of those are the company's African-American and Hispanic workers. Less than a quarter of the white employees live within four miles of the facility.

Since 1957, the workers at Toxics R Us have been represented by an international chemical workers union. Relations between the union and the company had been good until the current contract negotiations. Toxics R Us hired a union-busting consultant to conduct the negotiations, and the company's last, best, and final offer included 25 percent wage cuts, reductions in benefits, and elimination of the profit-sharing plan established in 1977. The company claims that, due to intensifying competition and increasingly stringent environmental regulations facing the chemical industry, it will be forced to reduce its workforce by 1,800 workers over the next five years if the union does not agree to its offer.

Toxics R Us was recently cited by the U.S. Occupational Safety and Health Administration for failing to provide its workers with the protective equipment and training needed to effectively deal with the job's toxic hazards. Toxics R Us has disposed of or released hazardous waste byproducts to the land, water, and air of the surrounding area on a regular basis since WWII. There are twenty-three inactive hazardous waste sites on the 150-acre complex, with chemically contaminated leachate migrating from seventeen. Under a 1989 legal agreement with the government, Toxics R Us is conducting a study to develop cleanup options for the inactive sites.

In 1990, Toxics R Us released the twelfth highest amount of TRI-reported chemicals among all of the reporting facilities in the nation.

Five area residents formed a group that worked to get the site cleanup agreement and they are still monitoring the investigation/remediation process as it unfolds. The group recently became concerned about the company's ongoing releases to the air, and to the nearby Crystal River. Because the cleanup agreement was reached through the court system, the group never involved large numbers of area residents in its activities.

In December 1990 a study by a research team at Ivory Tower State University was released showing cancer rates in York County five to fifteen times the national average. Many of the chemicals used at Toxics R Us are known carcinogens. The study alarmed the leaders who had been working on pollution problems caused by the company, and they asked for a meeting with company officials.

During the January 14, 1991, meeting, company officials minimized the risk posed by the Toxics R Us complex, and claimed to be operating entirely within the regulations. While the meeting was cordial in tone, the company was unwilling to allow citizen leaders to tour the facility with their own technical experts, and was not inclined to work out any agreement with the community for pollution prevention. The meeting convinced the neighbourhood leaders that it was time to involve more people—time to organize and mobilize the community.

The leaders obtained several books and manuals on community organizing to guide their efforts. They also phoned various organizations involved in organizing communities around a wide range of issues. One of the leaders used some of her vacation time to attend a five-day training session in community organizing techniques held by the Midwest Academy, a school for community leaders and organizers.

By the time their effort to organize their community began in March 1991, the group had already researched Toxics R Us fairly thoroughly, and they concentrated on building a campaign organizing committee (OC). The leadership group met with key clergy members, and leaders of various civic and community-based organizations. Through these meetings they were able to recruit three organizing committee members, making a total of eight on the OC. Through the shopping center outreach approach described in the community organizing section of this guide, the committee was able to recruit ten more OC members, for a total of eighteen.

During the first OC meeting, held on the evening of Thursday, March 21, 1991, the committee developed a campaign strategy and plan using the step-by-step approach described in this guide. Here is what the OC developed over the course of a two-hour campaign planning session:

Long-Range Campaign Goals

"What is the overall or long-range purpose of the campaign?" To this question the committee answered, "To end toxic chemical pollution coming from the Toxics R Us complex, while preserving the jobs that the complex provides the community."

"What specific changes, policies, programs, or measures do we want to see adopted? Which polluter, toxics user, or governmental body should adopt them?" To these questions the committee answered that it wanted Toxics R Us to:

1. Allow campaign representatives to tour the Toxics R Us complex accompanied by their own industrial hygienist and other independent technical experts.
2. Negotiate in good faith with the campaign to develop and agree upon a specific good neighbour agreement.
3. Sign a good neighbour agreement that includes the following elements:
   a) Safer handling and management procedures for toxic materials at the complex, including a comprehensive chemical spill prevention program.
   b) Comprehensive emergency preparedness plan to prepare for potential emergency releases of toxics.
   c) Chemical emergency preparedness training for area police, fire, medical, and other appropriate personnel, funded by Toxics R Us.
   d) Comprehensive pollution prevention/toxics use reduction planning by Toxics R Us with full citizen and worker input and participation. An ideal form of this planning is detailed elsewhere in this guide, but whatever planning is carried out, it must be *specific*—it should contain specific reduction goals, targets, and timetables.
   e) Implementation of the pollution prevention/toxics use reduction plans developed through the comprehensive planning process.
   f) At least 120 days' advance notice to workers of any significant layoffs due to pollution prevention activities.
   g) Construction of a program to ease the impact on workers and the community of any pollution-prevention-related layoffs by funding worker retraining programs and community economic adjustment efforts.
4. Implement the good neighbour agreement.
5. Meet monthly with campaign leaders to review progress in implementing the good neighbour agreement.

Campaign Targets

"Who has the power to adopt the changes, policies, programs, or measures we want?" In answer, the committee listed:

1. Managers of the Garden City Toxics R Us complex.
2. Vice presidents in the Toxics R Us international headquarters in Houston, Texas.
3. The president and chief executive officer at the Houston headquarters.
4. The chair of the Toxics R Us board of directors.
5. Key Toxics R Us board members—those who own significant blocks of company stock (as little as 1 percent in a multinational company listed on the stock exchanges), and those who sit on the boards of financial institutions that own blocks of Toxics R Us stock or have loaned it money.
6. The Dontcaere family, owners of the largest single block of Toxics R Us stock (14 percent of common stock and 34 percent of preferred stock).

Nontarget Opponents

"Which individuals, corporations, organizations, or institutions, besides the targets, have reasons to oppose our campaign?" In answer, the committee listed:

1. The York County chapter of the state's Business Council
2. The Chemical Manufacturers Association
3. The local Chamber of Commerce
4. The York County Society of Chemical Engineers
5. Regional business customers of Toxics R Us Inc.
6. Pro-business members of the Garden City Common Council and the York County Legislature. Three out of thirteen councilmembers and eight out of seventeen county legislators fall into this category
7. The York Athletic Club, where many Toxics R Us managers are members

Potential Allies

"Which groups, organizations, businesses, or individu-

als, have reasons to support our campaign? What kinds of support and/or resources can each one bring to the campaign? What weaknesses or liabilities can each one bring to the campaign? What steps must be taken to make them part of the campaign coalition?" In answer to these questions, the committee listed:

1. The Oil Chemical and Atomic Workers Union local
   a) The local can bring their members, printing, postage, supplies, and money to the campaign. The union's members can bring information from inside Toxics R Us to the campaign, as well as a strong interest in protecting jobs at the complex. OCAW can sign onto, or formally endorse, the campaign. OCAW can use its clout with elected officials (obtained via support when they run for office) to get their support for the campaign.
   b) The only weakness the union might bring to the campaign would be a willingness to settle for a weaker pollution prevention program in order to protect jobs at Toxics R Us.
   c) The following must be done to bring OCAW into the campaign:
      - Meet with union leadership to discuss common goals and, if all goes well, the union's role in the campaign (schedule the meeting via letter and follow-up phone calls). Be clear from the beginning that the community leaders in the campaign fully embrace the union's goals of job protection, as well as specific goals in the union's current contract dispute with Toxics R Us. Ask the union to place representatives on the campaign OC, and ask for other specific types of help detailed in a) above.
      - Incorporate union members into the campaign's volunteer base.
2. Other area unions. This might best be done in conjunction with OCAW.
3. Block clubs and other community-based organizations.
   a) Community organization members can become campaign leaders and certainly be volunteers, and their organizational names can be lent to formal endorsements.
   b) We cannot identify any significant weaknesses or liabilities that community organizations might bring to the campaign.
   c) Bring them into the campaign by organizing a meeting with their members (via letter, with a follow-up phone call). Ask for specific types of support.
4. Clergy/churches/synagogues.
   a) Religious organizations can bring money, office space, supplies, services (i.e., printing), publicity via church bulletins and pulpit announcements, and credibility to the campaign. Their members can be volunteers and leaders.
   b) The only weakness they might bring to the campaign is potential opposition to certain tactics or strategies (i.e., picketing or mass demonstrations).
   c) Bring religious organizations into the campaign by asking them to help publicize a public meeting, and by meeting with clergy members and asking for their support, specific and otherwise.
5. Some local and state elected officials.
   a) Public officials can lend credibility and do a number of other things to help the campaign. The various elected officials should be examined individually in order to target them for appropriate forms of particular support.
   b) Too much such support, or the wrong kinds of it, or support by the wrong officials, can make the campaign seem too "political" to the public.
   c) The support of public officials can be obtained through letters and follow-up visits by campaign delegations to the officials at their offices.

Overall Strategy

"What is the overall plan of attack for our campaign?" In answer, the committee designed the following strategy to achieve the specific goals of the campaign.

1. Coalition-building, public education, community outreach/organization.

   This early phase of the campaign will include bringing potential allies into the campaign, public education through free media, mounting a campaign organizing drive, and carrying out the other parts of the campaign's outreach plan.
2. After the early organizing phase of the campaign, we will employ the following escalating strategy to achieve the listed goals:
   a) Campaign leaders or meet with Toxics R Us officials.
   b) Win passage of local government resolutions

calling for negotiation of good neighbour agreement.

c) Conduct a petition/letterwriting drive

d) Deploy an "arsenal of agencies" against Toxics R Us by pressuring a variety of government bodies to scrutinize the company's practices.

e) Organize large turnout actions such as public meetings, rallies, marches, motorcades, picketing, and so on.

f) Pressure the customers of Toxics R Us. The help of unions and environmental organizations (especially on the national level, reached through local contacts) would be particularly helpful here.

g) Pressure individual Toxics R Us managers and directors.

Specific Tactics, Tasks, and Activities

"What tactics do we want to employ, what activities must be carried out, and what tasks must be completed to move our strategy forward?" To these questions the committee answered:

1. Build the campaign coalition by bringing in potential allies, as described in the "Getting Organized" section.
2. Hold a media event to release a report on toxic releases from the Toxics R Us complex.
3. Hold a media event to release a "Citizens' Report Card" evaluating the environmental performance of Toxics R Us.
4. Hold other media events to release information damaging to Toxics R Us as it is uncovered. These can run the gamut of company activity—from permit violations to the hazardous nature of company products to the company's use of a union-busting consultant.
5. Make the campaign's case on radio and TV talk shows.
6. Mount an initial campaign organizing drive culminating in a large community meeting.
7. Continue conducting research into pollution from Toxics R Us and the company's power structure.
8. Continue meetings with Toxics R Us officials.
9. Conduct delegation meetings with elected officials to get their support for resolutions calling on Toxics R Us to negotiate a good neighbour agreement.
10. Conduct a massive petition drive and letterwriting campaign aimed at getting Toxics R Us to meet the campaign's demands.
11. Pressure official bodies to investigate Toxics R Us by writing letters to agency officials, meeting with those officials, getting elected officials to agitate for agency action, and organizing phone-in campaigns. Target local agencies dealing with hazardous materials, zoning, fire codes, and health and safety; target state agencies dealing with labor relations, environmental protection, and financial transactions.
12. Conduct a candlelight vigil outside the Toxics R Us facility where citizens will pray that the company "does the right thing" and meets a campaign demand.
13. Rally, organize a toxic motorcade, organize a walk of concern, or conduct other appropriate actions, as described in the "Getting Organized" section.
14. Post signs along major streets, on every lawn, in every window, etc., saying "Do the Right Thing, Toxics R Us."
15. Conduct a continuous phone-in campaign generating a regular flow of calls to the offices of Toxics R Us officials.
16. Picket or disrupt meetings of the Business Council, the Chamber of Commerce, the Chemical Manufacturers Association, and the York County Association of Chemical Engineers.
17. Picket the York Athletic Club.

Outreach Plan

"What things should we do to get people involved in our campaign?" In answer, the committee listed:

1. Over the next two months we will mount the first campaign organizing drive, which will culminate in a big community meeting. As part of the drive, we will:

   a) Set the size and geographic boundaries of the area we will put the most effort into (including doorknocking), and the area we will mount a less intensive effort in. With twenty OC members and volunteers doorknocking an average of five hours per week for eight weeks, we should be able to reach the following number of households:

20 members x 5 hours/week x
10 doors/hour x 8 weeks =
8,000 doors or households in 8 weeks

So we should be able to doorknock an area of about 8,000 households in this first big drive. With an average of three people per household, we should be able to knock on the doors of about 24,000 people, or close to half of the neighbourhood. For the doorknocking effort, we will target the half of the neighbourhood closest to Toxics R Us. In the other half of the neighbourhood, we will carry out all outreach activities except doorknocking.

b) Set date, time and place of the big community meeting. It will be held on Tuesday, May 21, 1991, at 7 p.m., at the VFW Stadium Post, 2387 Slough Deth Drive. The attendance goal for the big meeting is 1,000.

c) Hold organizing committee meetings about every ten days during the drive and continue to build the organizing committee.

d) Send letters or flyers to every household in the targeted area shortly after tonight's committee meeting. Send a letter signed by the organizing committee, and a flyer publicizing the community meeting, in hand-addressed envelopes with regular stamps (as opposed to meter imprints, which look too impersonal).

e) After the letter/flyer reaches residents, doorknock every household in the target area over an eight-week period. Record the level of interest of each person talked to at the doors. Recruit new volunteers and OC members at the doors.

f) Hold house meetings on blocks where interest is very high to further explain the toxic pollution problems facing the community and our grassroots campaign to deal with them. Recruit people to the organizing committee.

g) Put up posters publicizing the big meeting.

h) Send out public service announcements on the big meeting and make the follow-up calls necessary to get them printed in newspapers and aired on television.

i) Recruit organizations into the campaign coalition.

j) Within one week of the big meeting, flyer the entire target area door to door.

k) Get churches/synagogues to announce big meeting during services or print meeting announcement in their bulletins. This will require phoning, and in some cases meeting with, clergy before hand. So we should start reaching out to clergy soon.

l) Phone every household that was doorknocked during the seventy-two hours leading up to the Big Meeting.

m) Hold a news conference or media event the day before or the day of the big meeting to generate additional free media publicity. One possibility is to release a key piece of information, or citizens "report card" evaluating Toxics R Us. If we hold a media event at 10:30 a.m. or 1:30 p.m. during the day of an evening meeting, we might be able to get the time and place of the meeting broadcast on local TV and radio news programs during the several hours before meeting time.

n) Flyer shopping centers, churches, and other places during the forty-eight hours before the meeting.

o) Employ sound trucks to broadcast the time and place of the meeting throughout the area during the twenty-four hours leading up to meeting time. These can be people's cars with bullhorns poked out the window.

p) Provide rides to the meeting for people without cars or friends with cars.

q) Carefully plan and organize the big meeting. Be sure all those taking on the various meeting roles are well-prepared. The meeting will consist of:

- An information component describing the toxic hazards being targeted by the campaign
- A citizen speak-out component to give residents the chance to speak their hearts and minds about the pollution
- An action and organizing component, where specific actions are presented to people and voted on, and people are recruited for various tasks.

2. After the first organizing drive, we will continue campaign outreach using the methods used during the drive, but at a much lower level of intensity. We will also to the following:

a) Generate frequent Letters to the Editor.

b) Do tabling at events and shopping areas.

3. After the first organizing drive, we will doorknock the half of the neighbourhood we did not reach during the drive.
4. Conduct outreach and mobilization drives in the weeks leading up to each large turnout meeting, event, or action organized by the campaign. These drives will tend to be about one month in length, and will use the same methods employed during the first organizing drive.

Volunteer Recruitment And Leadership Development

1. To recruit new volunteers, we will:
   a) Ask people who express strong interest at the doors to volunteer.
   b) Recruit volunteers when we speak before organizations to bring them into the campaign coalition.
   c) Circulate volunteer sign-up sheets at all campaign meetings, actions, and events, then do follow-up calls to sign people up for specific tasks at specific times.
   d) Publicize the campaign's volunteer phone number.
2. We must make sure volunteer coordination is well-organized so that each volunteer is plugged into a specific activity.
3. We will develop new campaign leaders by:
   a) Using the "involvement/leadership" scale to guide our efforts.
   b) Always encouraging volunteers to take on new leadership roles.
   c) Preparing each leader for each leadership function (i.e., public speaking, media, doorknocking, etc.).
   d) Holding leadership training workshops to teach various skills.

Getting resources

What funding and other resources do we need to effectively carry out the campaign? What things can we do to raise the necessary resources? Do we have the ability to do the things necessary to obtain these resources? If we are unable to get the resources needed to fully carry out this campaign plan, which elements of the plan are least important and can be cut without weakening the campaign too much?

1. For the first organizing drive (March 21, 1991, to May 21. 1991) we will need the following resources:
   a) Printing $3,200
      (20,000 letter/flyers mailed, $1,400;
      30,000 big meeting flyers, $1,000;
      500 large posters, $500; other, $300)
   b) Postage (16,700 homes @ $.17) $2,839
   c) Phone (provided by a campaign ally)
   d) Headquarters (office of a campaign ally)
   e) **Total** **$6,039**
2. We will raise these resources or trim our resource needs by:
   a) 50/50 raffle (at large meeting) $2,500
      (1,000 people @ 1 ticket each =
      1,000 x $5/ticket =
      $5,000 (-$2,500 prize) = $2,500)
   b) Doorknocking contributions $4,000
      (8,000 doors x half of homes =
      4,000 doors x avg. $1/door = $4,000)
   c) Pass the hat at house meetings $ 250
   d) Money and in-kind help from allies $1,000
   e) **Total** **$7,750**
3. Estimated resource needs for the remainder of the campaign year (May 21, 1991, to March 20, 1992) will be about $6,000. Fundraising ideas to raise the approximately $4,500 needed after we count the surplus from the organizing drive:
   a) 50/50 splits at every big turnout event
   b) Ad book and dinner
   c) Direct fundraising at doors and by phone
   d) Get foundation grants via campaign member organizations.

The Initial Campaign Drive

Weeks 1 and 2—March 1-17, 1991

1. Build the Organizing Committee (OC).
2. Finish Toxics R Us and power structure research.

Week 3—March 18-24, 1991

1. Finish building OC and organize first OC meeting.

2. Start building the campaign coalition. Work to bring in labor first.
3. During the first OC meeting, set the size and geographic boundaries of the area to be targeted for the intensive organizing drive.
4. Set the date, time, and place of the big community meeting.
5. Discuss a mailing to every household in the targeted area.
6. Start doorknocking, and be sure to provide some training for volunteers.
7. Get flyers printed.

Week 4—March 25-31, 1991

1. Continue building the campaign coalition.
2. Continue doorknocking.
3. Organize a house meeting.
4. Recruit new campaign volunteers while doorknocking.

Week 5—April 1-7, 1991

1. Organize the second OC meeting.
2. Continue building the campaign coalition.
3. Organize and hold a media event, and train new leaders to speak at the event.
4. Continue doorknocking and training new doorknockers.
5. Get posters printed.

Week 6—April 8-14, 1991

1. Continue building the campaign coalition.
2. Continue doorknocking, and training doorknockers
3. Start postering.
4. Send out public service announcements (PSA's) to broadcast media.
5. Organize another house meeting, and train new leaders to speak at it.

Week 7—April 15-21, 1991

1. Organize the third OC meeting and include a leadership training workshop on "organizing a successful community meeting."
2. Continue building the campaign coalition.
3. Continue doorknocking.
4. Hold another house meeting.
5. Do follow-up calls to get PSA's aired.
6. Start contacting churches, synagogues, and clergy about publicizing the community-wide meeting.
7. Continue postering.

Week 8—April 22-28, 1991

1. Continue building the campaign coalition.
2. Organize another media event—one that fits the situation at the time.
3. Continue doorknocking.
4. Continue postering.
5. Continue follow-up calls to broadcast media about airing PSA's.
6. Continue clergy contacts.
7. Organize another house meeting.
8. Hold the fourth OC meeting, and include a leadership training workshop on "working with the media."

Week 9—April 29-May 5, 1991

1. Continue building the campaign coalition.
2. Continue doorknocking.
3. Organize another house meeting.
4. Finish postering.
5. Send PSA's to print media; continue follow-up calls to broadcast media.
6. Continue contacting clergy about community meeting announcements.
7. Hold the fifth OC meeting.

Week 10—May 6-12, 1991

1. Continue building the campaign coalition.
2. Continue doorknocking.
3. Hold the last house meeting of the organizing drive.
4. Do follow-up calls to print media on PSA's.
5. Start organizing final door-to-door flyering.
6. Continue clergy contacts.

7. Start planning, organizing, and preparing for the big community-wide meeting. Leadership preparation is especially important.

Week 11—May 13-19, 1991

1. Continue building the campaign coalition.
2. Finish doorknocking.
3. Do final door-to-door flyering.
4. Finish contacting clergy.
5. Start final phoning of every household in area and identify people who need rides to meeting.
6. Start to organize and prepare for media event, to be held on morning of Tuesday, May 21, 1991.
7. Start final mass shopping area flyering.
8. Set-up sound trucks and sound equipment.
9. Hold the last full OC meeting of the organizing drive.
10. Continue community-wide meeting preparation, especially leadership preparation.

Week 12—May 20-26, 1991

1. Hold a media event on morning of Tuesday, May 21, 1991.
2. Finish final door-to-door flyering.
3. Finish final phoning.
4. Do final mass flyering.
5. Deploy sound trucks the day of meeting.
6. Provide rides to the meeting.
7. Hold the community-wide meeting on Tuesday, May 21, 1991.
8. Campaign leaders and volunteers should rest for the rest of the week.

Week 13—May 26-31, 1991

1. Resume building the campaign coalition.
2. Table at Memorial Day weekend picnics and events.
3. Launch next phase of campaign strategy by starting to organize delegation meetings with Toxics R Us officials.

After the Initial Organizing Drive

The rest of this plan assumes that Toxics R Us is unwilling to meet the campaign's initial demands for a long period of time.

Month 4—June 1991

1. Continue building the campaign coalition.
2. Continue strategy of phoning and meeting with company officials.
3. Organize a media event.
4. Organize Delegation Meetings with company officials.
5. Launch strategy to get local governments to pass resolutions calling on Toxics R Us to negotiate a good neighbour agreement by organizing delegation meetings with elected officials.
6. Start organizing a massive petition drive and letter-writing campaign.
7. Begin ongoing doorknocking of that part of area that was not doorknocked during the intensive initial organizing drive.
8. Turn the OC into the Steering Committee (SC) and meet once in June.
9. Conduct volunteer recruitment and leadership development activities.

Month 5—July 1991

1. Continue coalition-building work.
2. Continue effort to win passage of support resolutions by local governments. Mobilize large turnouts at the meetings of the Garden City Common Council and the York County legislature and organize thousands of phone calls into the offices of the members of both bodies.
3. Continue massive petition drive and letterwriting campaign.
4. Hold two SC meetings during the month.
5. Organize one media event during the month.
6. Step up volunteer recruitment efforts. Hold another leadership training workshop.
7. Begin direct fundraising while doorknocking and by phone.
8. Start organizing an ad book campaign and fundraising dinner.

Month 6—August 1991

1. Continue the petition and letterwriting drive.

2. Hold another delegation meeting, along with a news conference to show off the 30,000 petition signatures and bags of letters from citizens.
3. Launch the "arsenal of agencies" strategy by pressuring various agencies to scrutinize the practices of Toxics R Us.
4. Hold a few pickets at gates of Toxics R Us.
5. Continue doorknocking outreach.
6. Continue volunteer recruitment efforts.
7. Continue leadership development activities.
8. Continue the organizing campaign and fundraising dinner preparations.
9. Start an outreach and mobilization drive for a Labor Day action.

Month 7—September 1991

1. Continue pressing "arsenal of agencies" strategy.
2. Organize a joint Labor Day Labor/Community Solidarity Parade and Rally.
3. Continue pickets at the Toxics R Us gates.
4. Continue doorknocking.
5. Continue volunteer recruitment.
6. Continue leadership development efforts.
7. Release ad book and hold dinner.

Month 8—October 1991

1. Continue "arsenal of agencies" strategy.
2. Continue strategy of large turnout actions by organizing a Toxic Motorcade and Rally. Mount an outreach and mobilization drive to build turnout for the action.
3. Post large anti-Toxics R Us signs along all major thoroughfares.
4. Start a phone-in campaign targeting the offices of company officials.
5. Continue doorknocking.
6. Continue volunteer recruitment and leadership development work.

Months 9 and 10—November and December 1991

1. Continue "arsenal of agencies" strategy.
2. Launch a campaign to put pressure on customers and suppliers of Toxics R Us through boycotts and other actions.
3. Launch an effort to pressure individual company officials; start picketing their homes.
4. Massive phone-in campaign targeting the offices of company officials.
5. Picket or disrupt meeting of organizations allied with Toxics R Us.
6. Organize a candlelight vigil outside the gates of the Toxics R Us facility during December.
7. Continue doorknocking and mount outreach and mobilization drives to build turnout for each campaign action or event.
8. Continue volunteer recruitment and leadership development work.
9. Resume direct fundraising at the doors and over the phones.
10. Begin efforts to obtain foundation grants.

Month 11—January 1992

Toxics R Us agrees to initial demands!—negotiations begin.

January 1992 and beyond

1. Campaign focuses on negotiations with Toxics R Us.
2. If negotiations hit a snag, the campaign returns to the escalating strategy used to get Toxics R Us to the negotiating table.

Building Environmental, Labor, and Community Unity

Citizen efforts to win action on local pollution problems are often weakened by the jobs-versus-environment argument. Polluting companies or other targets of grassroots campaigns often try to pit workers against community residents by claiming that adoption of pollution prevention or environmental protection measures will cause a loss of jobs and economic hardships for workers and the community. To counter this "divide and rule" strategy local environmental activists must reach out to workers and their unions from the beginning of the campaign. Campaigns targeting specific facilities should establish contact with the union at the facility, or, if there is no union, with workers themselves. For campaigns targeting governmental entities, the unions operating within the particular jurisdiction could be approached.

Workers at targeted facilities and leaders of unions representing those facilities should be made part of the campaign organizing committee. This will ensure that worker concerns will be incorporated into the campaign. Unions involved in a contract dispute with the management of a polluting facility can also build a coalition of labor, community, and environmental organizations. Such a coalition could mount a campaign aimed at incorporating pollution prevention standards and workplace toxic health and safety hazards issues into the contracts negotiated by the union. Toxic releases or permit violations by the company can be used as ammunition in the union's struggle, and the union could put its clout and resources behind an effort to win pollution prevention programs.

Community/labor/environmental cooperation is enhanced by mutual support. Community/environmental activists can support unions during labor disputes with polluting companies. This type of support work can be carried out in return for union support in a local pollution prevention campaign, or to establish trust in preparation for such a campaign. Unions can support environmental and community organizations with resources such as printing, money, meeting places and phone banks.

A good example showing how organized labor can proactively incorporate environmental issues into collective bargaining is the Canadian Auto Workers (CAW) successful effort to create a Chrysler/CAW Local 444 Joint National Committee on the Environment. The joint committee was formed during the course of collective bargaining during 1990-91 contract negotiations, and is made up of two representatives from the CAW and two from Chrysler. Objectives of the Joint National Committee include providing employees and management of Chrysler with information on, and working for the implementation of:

- **Waste management programs** such as an in-plant "blue box" collection and overall reduction of solid waste.
- **Policies that will reduce overpackaging** of vendor materials and products coming into Chrysler plants.
- **Government policies** that will be used by Chrysler to reduce pollution emissions into the environment.
- **Toxics use reduction** and toxic waste reduction programs.
- **Reduced energy consumption policies.**
- **Policies to improve marketability** of Chrysler products:
  - *Use of more environmentally friendly* auto parts.
  - *A campaign* to advertise the efficiency of large vans when they are used to create van pools.
  - *Development of vehicles* fueled by alternatives such as natural gas, propane, and electricity.
- **Proactive measures** with a view to improving the environment through employee participation.

The conflict between jobs, workers' standard of living and toxics use reduction will not be fully resolved until far-reaching policies are adopted by government and industry to address this serious problem. This, in turn, will only come about when labor, environmental, community, and other organizations join together at national and international levels to make it happen. In the meantime, cooperative efforts by local labor, environmental, and community organizations can succeed in countering the divisive effect of the conflict between jobs and the environment in particular communities.

Resources 7

A Citizen's Guide to Promoting Toxic Waste Reduction, Lauren Kenworthy and Eric Schaeffer, INFORM Inc., 381 Park Ave. S., New York, NY 10016, 212-689-4040. The guide will be updated, expanded and published under the title *Preventing Industrial Toxic Hazards* in spring 1993.

Environmental Choice Program, 107 Sparks St., 2nd Floor, Ottawa, Ontario K1A 0H3. Information on environmentally friendly products.

"Good Neighbour" efforts—for information contact Sanford Lewis, National Toxics Campaign Fund, 37 Temple Place, 4th Floor, Boston, MA 02111, 617-482-1477.

Household Hazardous Waste Management News, quarterly newsletter of the Waste Watch Center, 16 Haverhill St., Andover, MA 01810, 508-470-3044.

Household Hazardous Waste Fact Sheets, New York State Department of Environmental Conservation, Division of Hazardous Substances Regulation, Bureau of Pollution Prevention, 50 Wolf Road, Albany, NY 12233.

The U.S. EPA's Pollution Prevention Information Clearinghouse has a library of over 400 case studies of pollution prevention programs implemented in various industries, plus descriptions of more than 600 federal, state, and local government programs. The clearinghouse can be reached by phoning the RCRA Superfund Hotline at 800-424-9346 or the Small Business Ombudsman Hotline at 800-368-5888 or 703-821-4800.

Appendix 1

U.S. Environmental Protection Agency's List of Lists

The list of chemicals in this appendix is a consolidated one—it contains most of the chemicals that companies are required to report on under the various provisions of the Superfund law as amended in 1986, also known as SARA Title III. Use the first part of this appendix, where chemical names are listed alphabetically with their respective chemical numbers (CAS numbers), to find the CAS number for a specific chemical. Use the second part of the appendix, which begins on page 92 and lists chemicals by CAS numbers in ascending order, to find the reporting requirements for each chemical. The columns to the right of each chemical will show whether a company must submit reports on that particular chemical under section 302, 304, or 313 of the law. This version of the list was released in January 1992.

For section 302 chemicals, called extremely hazardous substances, the minimum amount necessary to plan for an emergency (the threshold planning quantity or TPQ) is shown in pounds. If more than the TPQ is present at a facility, the facility must carry out emergency planning activities to protect workers and the community from a large, sudden release of the substance. If two TPQs are shown in the column, the smaller amount is for the chemical in solid form, the larger amount is for the chemical in liquid form.

The two columns under section 304 show the reporting quantities (RQ) in pounds for each chemical. If these amount, or more, of the particular chemical is released, the release(s) must be reported to local and state emergency planning authorities. Second-column information must also be reported to the federal National Response Center.

The last column, section 313, shows which chemicals must be reported under the Toxics Release Inventory (TRI). Either a "313" or an "X" in the column means that the chemical must be reported under the TRI program.

CAS Number	Chemical Name
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
75-07-0	Acetaldehyde
75-87-6	Acetaldehyde, trichloro-
60-35-5	Acetamide
64-19-7	Acetic acid
108-24-7	Acetic anhydride
67-64-1	Acetone
75-86-5	Acetone cyanohydrin
1752-30-3	Acetone thiosemicarbazide
75-05-8	Acetonitrile
98-86-2	Acetophenone
53-96-3	2-Acetylaminofluorene
506-96-7	Acetyl bromide
75-36-5	Acetyl chloride
591-08-2	1-Acetyl-2-thiourea
107-02-8	Acrolein
79-06-1	Acrylamide
79-10-7	Acrylic acid
107-13-1	Acrylonitrile
814-68-6	Acrylyl chloride
124-04-9	Adipic acid
111-69-3	Adiponitrile
116-06-3	Aldicarb
309-00-2	Aldrin
107-18-6	Allyl alcohol
107-11-9	Allylamine
107-05-1	Allyl chloride
7429-90-5	Aluminum (fume or dust)
1344-28-1	Aluminum oxide (fibrous forms)
20859-73-8	Aluminum phosphide
10043-01-3	Aluminum sulfate
117-79-3	2-Aminoanthraquinone
60-09-3	4-Aminoazobenzene
92-67-1	4-Aminobiphenyl
82-28-0	1-Amino-2-methylanthraquinone
54-62-6	Aminopterin
504-24-5	4-Aminopyridine
78-53-5	Amiton
3734-97-2	Amiton oxalate
61-82-5	Amitrole
7664-41-7	Ammonia
631-61-8	Ammonium acetate
1863-63-4	Ammonium benzoate
1066-33-7	Ammonium bicarbonate
7789-09-5	Ammonium bichromate
1341-49-7	Ammonium bifluoride
10192-30-0	Ammonium bisulfite
1111-78-0	Ammonium carbamate
506-87-6	Ammonium carbonate
12125-02-9	Ammonium chloride
7788-98-9	Ammonium chromate
3012-65-5	Ammonium citrate, dibasic
13826-83-0	Ammonium fluoborate
12125-01-8	Ammonium fluoride
1336-21-6	Ammonium hydroxide
6484-52-2	Ammonium nitrate (solution)
6009-70-7	Ammonium oxalate
5972-73-6	Ammonium oxalate
14258-49-2	Ammonium oxalate
131-74-8	Ammonium picrate
16919-19-0	Ammonium silicofluoride
7773-06-0	Ammonium sulfamate
7783-20-2	Ammonium sulfate (solution)
12135-76-1	Ammonium sulfide
10196-04-0	Ammonium sulfite
14307-43-8	Ammonium tartrate
3164-29-2	Ammonium tartrate
1762-95-4	Ammonium thiocyanate
7803-55-6	Ammonium vanadate
300-62-9	Amphetamine
628-63-7	Amyl acetate
123-92-2	iso-Amyl acetate
626-38-0	sec-Amyl acetate
625-16-1	tert-Amyl acetate
62-53-3	Aniline
88-05-1	Aniline, 2,4,6-trimethyl-
90-04-0	o-Anisidine
104-94-9	p-Anisidine
134-29-2	o-Anisidine hydrochloride
120-12-7	Anthracene
7440-36-0	Antimony
	Antimony Compounds
7647-18-9	Antimony pentachloride
7783-70-2	Antimony pentafluoride
28300-74-5	Antimony potassium tartrate
7789-61-9	Antimony tribromide
10025-91-9	Antimony trichloride
7783-56-4	Antimony trifluoride
1309-64-4	Antimony trioxide
1397-94-0	Antimycin A
86-88-4	Antu
12674-11-2	Aroclor 1016
11104-28-2	Aroclor 1221
11141-16-5	Aroclor 1232
53469-21-9	Aroclor 1242
12672-29-6	Aroclor 1248
11097-69-1	Aroclor 1254
11096-82-5	Aroclor 1260
7440-38-2	Arsenic
1327-52-2	Arsenic acid
7778-39-4	Arsenic acid
	Arsenic Compounds
1303-32-8	Arsenic disulfide
1303-28-2	Arsenic pentoxide
1327-53-3	Arsenic trioxide
1303-33-9	Arsenic trisulfide
1327-53-3	Arsenous oxide
7784-34-1	Arsenous trichloride
7784-42-1	Arsine
1332-21-4	Asbestos (friable)
492-80-8	Auramine
115-02-6	Azaserine
2642-71-9	Azinphos-ethyl
86-50-0	Azinphos-methyl
151-56-4	Aziridine
75-55-8	Aziridine, 2-methyl
7440-39-3	Barium
	Barium Compounds
542-62-1	Barium cyanide
225-51-4	Benz[c]acridine
98-87-3	Benzal chloride
55-21-0	Benzamide
23950-58-5	Benzamide,3,5-dichloro-N-(1,1-dimethyl-2-p
56-55-3	Benz[a]anthracene
98-16-8	Benzenamine, 3-(trifluoromethyl)-
71-43-2	Benzene
98-05-5	Benzenearsonic acid
100-14-1	Benzene, 1-(chloromethyl)-4-nitro-
108-38-3	Benzene, m-dimethyl-
95-47-6	Benzene, o-dimethyl-
106-42-3	Benzene, p-dimethyl-
122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
98-09-9	Benzenesulfonyl chloride
108-98-5	Benzenethiol
92-87-5	Benzidine
3615-21-2	Benzimidazole, 4,5-dichloro-2-(trifluorome
205-99-2	Benzo[b]fluoranthene
207-08-9	Benzo[k]fluoranthene
65-85-0	Benzoic acid
98-07-7	Benzoic trichloride
100-47-0	Benzonitrile
191-24-2	Benzo[ghi]perylene
50-32-8	Benzo[a]pyrene
106-51-4	p-Benzoquinone
98-07-7	Benzotrichloride
98-88-4	Benzoyl chloride
94-36-0	Benzoyl peroxide
100-44-7	Benzyl chloride
140-29-4	Benzyl cyanide
7440-41-7	Beryllium
7787-47-5	Beryllium chloride
	Beryllium Compounds
7787-49-7	Beryllium fluoride
13597-99-4	Beryllium nitrate
7787-55-5	Beryllium nitrate
319-84-6	alpha-BHC
319-85-7	beta-BHC
319-86-8	delta-BHC
15271-41-7	Bicyclo[2.2.1]heptene-2-carbonitrile
1464-53-5	2,2'-Bioxirane
92-52-4	Biphenyl
111-91-1	Bis(2-chloroethoxy) methane
111-44-4	Bis(2-chloroethyl) ether
542-88-1	Bis(chloromethyl) ether
108-60-1	Bis(2-chloro-1-methylethyl)ether
534-07-6	Bis(chloromethyl) ketone
103-23-1	Bis(2-ethylhexyl) adipate
117-81-7	Bis(2-ethylhexyl)phthalate
4044-65-9	Bitoscanate
10294-34-5	Boron trichloride
7637-07-2	Boron trifluoride
353-42-4	Boron trifluoride compound with meth
28772-56-7	Bromadiolone
7726-95-6	Bromine
598-31-2	Bromoacetone
353-59-3	Bromochlorodifluoromethane (Halon 12
75-25-2	Bromoform
74-83-9	Bromomethane
101-55-3	4-Bromophenyl phenyl ether
75-63-8	Bromotrifluoromethane (Halon 1301)
357-57-3	Brucine
106-99-0	1,3-Butadiene
764-41-0	2-Butene, 1,4-dichloro-
123-86-4	Butyl acetate
110-19-0	iso-Butyl acetate
105-46-4	sec-Butyl acetate
540-88-5	tert-Butyl acetate
141-32-2	Butyl acrylate
71-36-3	n-Butyl alcohol
78-92-2	sec-Butyl alcohol
75-65-0	tert-Butyl alcohol
109-73-9	Butylamine
78-81-9	iso-Butylamine
513-49-5	sec-Butylamine
13952-84-6	sec-Butylamine
75-64-9	tert-Butylamine
85-68-7	Butyl benzyl phthalate
106-88-7	1,2-Butylene oxide
84-74-2	n-Butyl phthalate

CAS Number	Chemical Name
123-72-8	Butyraldehyde
107-92-6	Butyric acid
79-31-2	iso-Butyric acid
75-60-5	Cacodylic acid
7440-43-9	Cadmium
543-90-8	Cadmium acetate
7789-42-6	Cadmium bromide
10108-64-2	Cadmium chloride
	Cadmium Compounds
1306-19-0	Cadmium oxide
2223-93-0	Cadmium stearate
7778-44-1	Calcium arsenate
52740-16-6	Calcium arsenite
75-20-7	Calcium carbide
13765-19-0	Calcium chromate
156-62-7	Calcium cyanamide
592-01-8	Calcium cyanide
26264-06-2	Calcium dodecylbenzenesulfonate
7778-54-3	Calcium hypochlorite
8001-35-2	Camphechlor
8001-35-2	Camphene, octachloro-
56-25-7	Cantharidin
105-60-2	Caprolactam
133-06-2	Captan
51-83-2	Carbachol chloride
51-79-6	Carbamic acid, ethyl ester
26419-73-8	Carbamic acid, methyl-, O-(((2,4-dimethyl-
63-25-2	Carbaryl
1563-66-2	Carbofuran
75-15-0	Carbon disulfide
353-50-4	Carbonic difluoride
56-23-5	Carbon tetrachloride
463-58-1	Carbonyl sulfide
786-19-6	Carbophenothion
120-80-9	Catechol
75-69-4	CFC-11
75-71-8	CFC-12
76-14-2	CFC-114
76-15-3	CFC-115
133-90-4	Chloramben
305-03-3	Chlorambucil
57-74-9	Chlordane
	Chlordane (Technical Mixture and Metabolit
470-90-6	Chlorfenvinfos
	Chlorinated Benzenes
	Chlorinated Ethanes
	Chlorinated Naphthalene
	Chlorinated Phenols
7782-50-5	Chlorine
10049-04-4	Chlorine dioxide
24934-91-6	Chlormephos
999-81-5	Chlormequat chloride
494-03-1	Chlornaphazine
107-20-0	Chloroacetaldehyde
79-11-8	Chloroacetic acid
532-27-4	2-Chloroacetophenone
	Chloroalkyl Ethers
106-47-8	p-Chloroaniline
108-90-7	Chlorobenzene
510-15-6	Chlorobenzilate
59-50-7	p-Chloro-m-cresol
124-48-1	Chlorodibromomethane
75-00-3	Chloroethane
107-07-3	Chloroethanol
627-11-2	Chloroethyl chloroformate
110-75-8	2-Chloroethyl vinyl ether
67-66-3	Chloroform
74-87-3	Chloromethane
107-30-2	Chloromethyl methyl ether
542-88-1	Chloromethyl ether
91-58-7	2-Chloronaphthalene
3691-35-8	Chlorophacinone
95-57-8	2-Chlorophenol
	Chlorophenols
7005-72-3	4-Chlorophenyl phenyl ether
126-99-8	Chloroprene
542-76-7	3-Chloropropionitrile
7790-94-5	Chlorosulfanic acid
1897-45-6	Chlorothalonil
3165-93-3	4-Chloro-o-toluidine, hydrochloride
1982-47-4	Chloroxuron
2921-88-2	Chlorpyrifos
21923-23-9	Chlorthiophos
1066-30-4	Chromic acetate
11115-74-5	Chromic acid
7738-94-5	Chromic acid
10025-73-7	Chromic chloride
10101-53-8	Chromic sulfate
7440-47-3	Chromium
	Chromium Compounds
10049-05-5	Chromous chloride
218-01-9	Chrysene
4680-78-8	C.I. Acid Green 3
569-64-2	C.I. Basic Green 4
989-38-8	C.I. Basic Red 1
1937-37-7	C.I. Direct Black 38
2602-46-2	C.I. Direct Blue 6
16071-86-6	C.I. Direct Brown 95
2832-40-8	C.I. Disperse Yellow 3
3761-53-3	C.I. Food Red 5
81-88-9	C.I. Food Red 15
3118-97-6	C.I. Solvent Orange 7
97-56-3	C.I. Solvent Yellow 3
842-07-9	C.I. Solvent Yellow 14
492-80-8	C.I. Solvent Yellow 34
128-66-5	C.I. Vat Yellow 4
7440-48-4	Cobalt
10210-68-1	Cobalt carbonyl
	Cobalt Compounds
62207-76-5	Cobalt, ((2,2'-(1,2-ethanediylbis(nitrilom
7789-43-7	Cobaltous bromide
544-18-3	Cobaltous formate
14017-41-5	Cobaltous sulfamate
	Coke Oven Emissions
64-86-8	Colchicine
7440-50-8	Copper
	Copper Compounds
544-92-3	Copper cyanide
56-72-4	Coumaphos
5836-29-3	Coumatetralyl
8001-58-9	Creosote
120-71-8	p-Cresidine
108-39-4	m-Cresol
95-48-7	o-Cresol
106-44-5	p-Cresol
1319-77-3	Cresol (mixed isomers)
535-89-7	Crimidine
4170-30-3	Crotonaldehyde
123-73-9	Crotonaldehyde, (E)-
98-82-8	Cumene
80-15-9	Cumene hydroperoxide
135-20-6	Cupferron
142-71-2	Cupric acetate
12002-03-8	Cupric acetoarsenite
7447-39-4	Cupric chloride
3251-23-8	Cupric nitrate
5893-66-3	Cupric oxalate
7758-98-7	Cupric sulfate
10380-29-7	Cupric sulfate, ammoniated
815-82-7	Cupric tartrate
	Cyanide Compounds
57-12-5	Cyanides (soluble salts and complexes)
460-19-5	Cyanogen
506-68-3	Cyanogen bromide
506-77-4	Cyanogen chloride
506-78-5	Cyanogen iodide
2636-26-2	Cyanophos
675-14-9	Cyanuric fluoride
110-82-7	Cyclohexane
108-94-1	Cyclohexanone
66-81-9	Cycloheximide
108-91-8	Cyclohexylamine
131-89-5	2-Cyclohexyl-4,6-Dinitrophenol
50-18-0	Cyclophosphamide
94-75-7	2,4-D
94-75-7	2,4-D Acid
94-11-1	2,4-D Esters
94-79-1	2,4-D Esters
94-80-4	2,4-D Esters
1320-18-9	2,4-D Esters
1928-38-7	2,4-D Esters
1928-61-6	2,4-D Esters
1929-73-3	2,4-D Esters
2971-38-2	2,4-D Esters
25168-26-7	2,4-D Esters
53467-11-1	2,4-D Esters
94-75-7	2,4-D, salts and esters
20830-81-3	Daunomycin
96-12-8	DBCP
72-54-8	DDD
72-55-9	DDE
3547-04-4	DDE
50-29-3	DDT
	DDT and Metabolites
17702-41-9	Decaborane(14)
1163-19-5	Decabromodiphenyl oxide
117-81-7	DEHP
8065-48-3	Demeton
919-86-8	Demeton-S-methyl
10311-84-9	Dialifor
2303-16-4	Diallate
615-05-4	2,4-Diaminoanisole
39156-41-7	2,4-Diaminoanisole sulfate
101-80-4	4,4'-Diaminodiphenyl ether
496-72-0	Diaminotoluene
823-40-5	Diaminotoluene
95-80-7	2,4-Diaminotoluene
25376-45-8	Diaminotoluene (mixed isomers)
333-41-5	Diazinon
334-88-3	Diazomethane
53-70-3	Dibenz(a,h)anthracene
132-64-9	Dibenzofuran
189-55-9	Dibenz(a,i)pyrene
19287-45-7	Diborane
96-12-8	1,2-Dibromo-3-chloropropane
106-93-4	1,2-Dibromoethane
124-73-2	Dibromotetrafluoroethane (Halon 2402)
84-74-2	Dibutyl phthalate
1918-00-9	Dicamba
1194-65-6	Dichlobenil
117-80-6	Dichlone
25321-22-6	Dichlorobenzene
95-50-1	o-Dichlorobenzene
95-50-1	1,2-Dichlorobenzene
541-73-1	1,3-Dichlorobenzene
106-46-7	1,4-Dichlorobenzene
25321-22-6	Dichlorobenzene (mixed isomers)
91-94-1	3,3'-Dichlorobenzidine
	Dichlorobenzidine
75-27-4	Dichlorobromomethane
110-57-6	Trans-1,4-dichlorobutene
75-71-8	Dichlorodifluoromethane (CFC-12)
107-06-2	1,2-Dichloroethane
75-34-3	1,1-Dichloroethane
540-59-0	1,2-Dichloroethylene
75-35-4	1,1-Dichloroethylene
156-60-5	1,2-Dichloroethylene
111-44-4	Dichloroethyl ether
108-60-1	Dichloroisopropyl ether
75-09-2	Dichloromethane
542-88-1	Dichloromethyl ether
149-74-6	Dichloromethylphenylsilane
120-83-2	2,4-Dichlorophenol
87-65-0	2,6-Dichlorophenol
696-28-6	Dichlorophenylarsine
78-87-5	1,2-Dichloropropane
26638-19-7	Dichloropropane
8003-19-8	Dichloropropane - Dichloropropene (mixture
78-99-9	1,1-Dichloropropane
142-28-9	1,3-Dichloropropane
542-75-6	1,3-Dichloropropene
78-88-6	2,3-Dichloropropene
75-99-0	2,2-Dichloropropionic acid
542-75-6	1,3-Dichloropropylene
76-14-2	Dichlorotetrafluoroethane (CFC-114)
62-73-7	Dichlorvos
115-32-2	Dicofol
141-66-2	Dicrotophos
60-57-1	Dieldrin
1464-53-5	Diepoxybutane
111-42-2	Diethanolamine
109-89-7	Diethylamine
692-42-2	Diethylarsine
1642-54-2	Diethylcarbamazine citrate
814-49-3	Diethyl chlorophosphate
117-81-7	Di(2-ethylhexyl) phthalate
311-45-5	Diethyl-p-nitrophenyl phosphate
84-66-2	Diethyl phthalate
297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
56-53-1	Diethylstilbestrol
64-67-5	Diethyl sulfate
71-63-6	Digitoxin
2238-07-5	Diglycidyl ether
20830-75-5	Digoxin
94-58-6	Dihydrosafrole
55-91-4	Diisopropylfluorophosphate
115-26-4	Dimefox
60-51-5	Dimethoate
119-90-4	3,3'-Dimethoxybenzidine
124-40-3	Dimethylamine
60-11-7	4-Dimethylaminoazobenzene
60-11-7	Dimethylaminoazobenzene
121-69-7	N,N-Dimethylaniline
57-97-6	7,12-Dimethylbenz[a]anthracene
119-93-7	3,3'-Dimethylbenzidine
79-44-7	Dimethylcarbamyl chloride
75-78-5	Dimethyldichlorosilane
68-12-2	Dimethylformamide
57-14-7	1,1-Dimethyl hydrazine
57-14-7	Dimethylhydrazine
105-67-9	2,4-Dimethylphenol
99-98-9	Dimethyl-p-phenylenediamine
2524-03-0	Dimethyl phosphorochloridothioate
131-11-3	Dimethyl phthalate
77-78-1	Dimethyl sulfate
644-64-4	Dimetilan
25154-54-5	Dinitrobenzene (mixed isomers)
99-65-0	m-Dinitrobenzene
528-29-0	o-Dinitrobenzene
100-25-4	p-Dinitrobenzene
534-52-1	Dinitrocresol
534-52-1	4,6-Dinitro-o-cresol
534-52-1	4,6-Dinitro-o-cresol and salts
25550-58-7	Dinitrophenol
51-28-5	2,4-Dinitrophenol
329-71-5	2,5-Dinitrophenol
573-56-8	2,6-Dinitrophenol
25321-14-6	Dinitrotoluene (mixed isomers)
121-14-2	2,4-Dinitrotoluene
606-20-2	2,6-Dinitrotoluene
610-39-9	3,4-Dinitrotoluene
88-85-7	Dinoseb
1420-07-1	Dinoterb
117-84-0	n-Dioctylphthalate
117-84-0	Di-n-octyl phthalate
123-91-1	1,4-Dioxane
78-34-2	Dioxathion
82-66-6	Diphacinone
122-66-7	1,2-Diphenylhydrazine
	Diphenylhydrazine
152-16-9	Diphosphoramide, octamethyl-
142-84-7	Dipropylamine
85-90-7	Diquat
2764-72-9	Diquat
298-04-4	Disulfoton
514-73-8	Dithiazanine iodide
541-53-7	Dithiobiuret
3288-58-2	O,O-Diethyl S-methyl dithiophosphate
330-54-1	Diuron
27176-87-0	Dodecylbenzenesulfonic acid
316-42-7	Emetine, dihydrochloride
115-29-7	Endosulfan
959-98-8	alpha - Endosulfan
33213-65-9	beta - Endosulfan
	Endosulfan and Metabolites
1031-07-8	Endosulfan sulfate
145-73-3	Endothall
2778-04-3	Endothion
72-20-8	Endrin
7421-93-4	Endrin aldehyde
	Endrin and Metabolites
106-89-8	Epichlorohydrin
51-43-4	Epinephrine
2104-64-5	EPN
50-14-6	Ergocalciferol
379-79-3	Ergotamine tartrate
1622-32-8	Ethanesulfonyl chloride, 2-chloro-
630-20-6	Ethane, 1,1,1,2-tetrachloro-
16752-77-5	Ethanimidothioic acid, N-((methylamino)car
10140-87-1	Ethanol, 1,2-dichloro-, acetate
110-80-5	Ethanol, 2-ethoxy-
563-12-2	Ethion
13194-48-4	Ethoprophos
110-80-5	2-Ethoxyethanol
141-78-6	Ethyl acetate
140-88-5	Ethyl acrylate
100-41-4	Ethylbenzene
538-07-8	Ethylbis(2-chloroethyl)amine
51-79-6	Ethyl carbamate
75-00-3	Ethyl chloride
541-41-3	Ethyl chloroformate
107-12-0	Ethyl cyanide
74-85-1	Ethylene
111-54-6	Ethylenebisdithiocarbamic acid, salts & es
107-15-3	Ethylenediamine
60-00-4	Ethylenediamine-tetraacecic acid (EDTA)
106-93-4	Ethylene dibromide
107-06-2	Ethylene dichloride
371-62-0	Ethylene fluorohydrin
107-21-1	Ethylene glycol
151-56-4	Ethyleneimine
75-21-8	Ethylene oxide
96-45-7	Ethylene thiourea
60-29-7	Ethyl ether
97-63-2	Ethyl methacrylate
62-50-0	Ethyl methanesulfonate
542-90-5	Ethylthiocyanate
52-85-7	Famphur
22224-92-6	Fenamiphos
122-14-5	Fenitrothion
115-90-2	Fensulfothion
1185-57-5	Ferric ammonium citrate
2944-67-4	Ferric ammonium oxalate
55488-87-4	Ferric ammonium oxalate
7705-08-0	Ferric chloride
7783-50-8	Ferric fluoride
10421-48-4	Ferric nitrate
10028-22-5	Ferric sulfate
10045-89-3	Ferrous ammonium sulfate
7758-94-3	Ferrous chloride
7720-78-7	Ferrous sulfate
7782-63-0	Ferrous sulfate
4301-50-2	Fluenetil
2164-17-2	Fluometuron
206-44-0	Fluoranthene
86-73-7	Fluorene
7782-41-4	Fluorine
640-19-7	Fluoroacetamide
144-49-0	Fluoroacetic acid
62-74-8	Fluoroacetic acid, sodium salt
359-06-8	Fluoroacetyl chloride
51-21-8	Fluorouracil
944-22-9	Fonofos
50-00-0	Formaldehyde
107-16-4	Formaldehyde cyanohydrin
23422-53-9	Formetanate hydrochloride
64-18-6	Formic acid
2540-82-1	Formothion
17702-57-7	Formparanate
21548-32-3	Fosthietan
76-13-1	Freon 113
3878-19-1	Fuberidazole
110-17-8	Fumaric acid
110-00-9	Furan
109-99-9	Furan, tetrahydro-
98-01-1	Furfural
13450-90-3	Gallium trichloride
18883-66-4	D-Glucose, 2-deoxy-2-[[(methylnitrosc
765-34-4	Glycidylaldehyde
	Glycol Ethers

CAS Number	Chemical Name
70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-
86-50-0	Guthion
	Haloethers
	Halomethanes
353-59-3	Halon 1211
75-63-8	Halon 1301
124-73-2	Halon 2402
76-44-8	Heptachlor
	Heptachlor and Metabolites
1024-57-3	Heptachlor epoxide
118-74-1	Hexachlorobenzene
87-68-3	Hexachloro-1,3-butadiene
87-68-3	Hexachlorobutadiene
77-47-4	Hexachlorocyclopentadiene
58-89-9	Hexachlorocyclohexane (gamma isomer)
67-72-1	Hexachloroethane
1335-87-1	Hexachloronaphthalene
70-30-4	Hexachlorophene
1888-71-7	Hexachloropropene
757-58-4	Hexaethyl tetraphosphate
822-06-8	Hexamethylene-1,6-diisocyanate
4835-11-4	Hexamethylenediamine, N,N'-dibutyl-
680-31-9	Hexamethylphosphoramide
110-54-3	Hexane
302-01-2	Hydrazine
1615-80-1	Hydrazine, 1,2-diethyl-
57-14-7	Hydrazine, 1,1-dimethyl-
540-73-8	Hydrazine, 1,2-dimethyl-
122-66-7	Hydrazine, 1,2-diphenyl-
10034-93-2	Hydrazine sulfate
122-66-7	Hydrazobenzene
7647-01-0	Hydrochloric acid
74-90-8	Hydrocyanic acid
7664-39-3	Hydrofluoric acid
7647-01-0	Hydrogen chloride (gas only)
74-90-8	Hydrogen cyanide
7664-39-3	Hydrogen fluoride
7722-84-1	Hydrogen peroxide (Conc.> 52%)
7783-07-5	Hydrogen selenide
7783-06-4	Hydrogen sulfide
80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl-
123-31-9	Hydroquinone
193-39-5	Indeno(1,2,3-cd)pyrene
13463-40-6	Iron, pentacarbonyl-
297-78-9	Isobenzan
78-83-1	Isobutyl alcohol
78-84-2	Isobutyraldehyde
78-82-0	Isobutyronitrile
102-36-3	Isocyanic acid, 3,4-dichlorophenyl ester
465-73-6	Isodrin
55-91-4	Isofluorphate
78-59-1	Isophorone
4098-71-9	Isophorone diisocyanate
78-79-5	Isoprene
42504-46-1	Isopropanolamine dodecylbenzene sulfon
67-63-0	Isopropyl alcohol (mfg-strong acid pr
108-23-6	Isopropyl chloroformate
80-05-7	4,4'-Isopropylidenediphenol
119-38-0	Isopropylmethylpyrazolyl dimethylcarba
120-58-1	Isosafrole
2763-96-4	5-(Aminomethyl)-3-isoxazolol
143-50-0	Kepone
78-97-7	Lactonitrile
303-34-4	Lasiocarpine
7439-92-1	Lead
	Lead Compounds
301-04-2	Lead acetate
7784-40-9	Lead arsenate
7645-25-2	Lead arsenate
10102-48-4	Lead arsenate
7758-95-4	Lead chloride
13814-96-5	Lead fluoborate
7783-46-2	Lead fluoride
10101-63-0	Lead iodide
10099-74-8	Lead nitrate
7446-27-7	Lead phosphate
7428-48-0	Lead stearate
1072-35-1	Lead stearate
52652-59-2	Lead stearate
56189-09-4	Lead stearate
1335-32-6	Lead subacetate
15739-80-7	Lead sulfate
7446-14-2	Lead sulfate
1314-87-0	Lead sulfide
592-87-0	Lead thiocyanate
21609-90-5	Leptophos
541-25-3	Lewisite
58-89-9	Lindane
14307-35-8	Lithium chromate
7580-67-8	Lithium hydride
121-75-5	Malathion
110-16-7	Maleic acid
108-31-6	Maleic anhydride
123-33-1	Maleic hydrazide
109-77-3	Malononitrile
12427-38-2	Maneb
7439-96-5	Manganese
	Manganese Compounds
12108-13-3	Manganese, tricarbonyl methylcyclopent
101-68-8	MBI
101-14-4	MBOCA
51-75-2	Mechlorethamine
148-82-3	Melphalan
950-10-7	Mephosfolan
2032-65-7	Mercaptodimethur
1600-27-7	Mercuric acetate
7487-94-7	Mercuric chloride
592-04-1	Mercuric cyanide
10045-94-0	Mercuric nitrate
21908-53-2	Mercuric oxide
7783-35-9	Mercuric sulfate
592-85-8	Mercuric thiocyanate
10415-75-5	Mercurous nitrate
7782-86-7	Mercurous nitrate
7439-97-6	Mercury
	Mercury Compounds
628-86-4	Mercury fulminate
10476-95-6	Methacrolein diacetate
760-93-0	Methacrylic anhydride
126-98-7	Methacrylonitrile
920-46-7	Methacryloyl chloride
30674-80-7	Methacryloyloxyethyl isocyanate
10265-92-6	Methamidophos
62-75-9	Methanamine, N-methyl-N-nitroso-
558-25-8	Methanesulfonyl fluoride
67-56-1	Methanol
91-80-5	Methapyrilene
950-37-8	Methidathion
2032-65-7	Methiocarb
16752-77-5	Methomyl
72-43-5	Methoxychlor
109-86-4	2-Methoxyethanol
151-38-2	Methoxyethylmercuric acetate
96-33-3	Methyl acrylate
74-83-9	Methyl bromide
74-87-3	Methyl chloride
80-63-7	Methyl 2-chloroacrylate
71-55-6	Methyl chloroform
79-22-1	Methyl chloroformate
56-49-5	3-Methylcholanthrene
101-14-4	4,4'-Methylenebis(2-chloroaniline)
101-61-1	4,4'-Methylenebis(N,N-dimethyl)benzenamine
101-68-8	Methylenebis(phenylisocyanate)
74-95-3	Methylene bromide
75-09-2	Methylene chloride
101-77-9	4,4'-Methylenedianiline
78-93-3	Methyl ethyl ketone
78-93-3	Methyl ethyl ketone (MEK)
1338-23-4	Methyl ethyl ketone peroxide
60-34-4	Methyl hydrazine
74-88-4	Methyl iodide
108-10-1	Methyl isobutyl ketone
624-83-9	Methyl isocyanate
556-61-6	Methyl isothiocyanate
74-93-1	Methyl mercaptan
502-39-6	Methylmercuric dicyanamide
80-62-6	Methyl methacrylate
298-00-0	Methyl parathion
3735-23-7	Methyl phenkapton
676-97-1	Methyl phosphonic dichloride
1634-04-4	Methyl tert-butyl ether
556-64-9	Methyl thiocyanate
56-04-2	Methylthiouracil
75-79-6	Methyltrichlorosilane
78-94-4	Methyl vinyl ketone
1129-41-5	Metolcarb
7786-34-7	Mevinphos
315-18-4	Mexacarbate
90-94-8	Michler's ketone
	Fine mineral fibers
50-07-7	Mitomycin C
1313-27-5	Molybdenum trioxide
76-15-3	Monochloropentafluoroethane (CFC-115)
6923-22-4	Monocrotophos
75-04-7	Monoethylamine
74-89-5	Monomethylamine
2763-96-4	Muscimol
505-60-2	Mustard gas
300-76-5	Naled
91-20-3	Naphthalene
1338-24-5	Naphthenic acid
130-15-4	1,4-Naphthoquinone
134-32-7	alpha-Naphthylamine
91-59-8	beta-Naphthylamine
7440-02-0	Nickel
	Nickel Compounds
15699-18-0	Nickel ammonium sulfate
13463-39-3	Nickel carbonyl
7718-54-9	Nickel chloride
37211-05-5	Nickel chloride
557-19-7	Nickel cyanide
12054-48-7	Nickel hydroxide
14216-75-2	Nickel nitrate
7786-81-4	Nickel sulfate
54-11-5	Nicotine
54-11-5	Nicotine and salts
65-30-5	Nicotine sulfate
7697-37-2	Nitric acid
10102-43-9	Nitric oxide
139-13-9	Nitrilotriacetic acid
100-01-6	p-Nitroaniline
99-59-2	5-Nitro-o-anisidine
98-95-3	Nitrobentene
92-93-3	4-Nitrobiphenyl
1122-60-7	Nitrocyclohexane
1836-75-5	Nitrofen
10102-44-0	Nitrogen dioxide
10544-72-6	Nitrogen dioxide
51-75-2	Nitrogen mustard
55-63-0	Nitroglycerin
25154-55-6	Nitrophenol (mixed isomers)
554-84-7	m-Nitrophenol
100-02-7	p-Nitrophenol
88-75-5	2-Nitrophenol
100-02-7	4-Nitrophenol
	Nitrophenols
79-46-9	2-Nitropropane
	Nitrosamines
924-16-3	N-Nitrosodi-n-butylamine
1116-54-7	N-Nitrosodiethanolamine
55-18-5	N-Nitrosodiethylamine
62-75-9	N-Nitrosodimethylamine
62-75-9	Nitrosodimethylamine
86-30-6	N-Nitrosodiphenylamine
156-10-5	p-Nitrosodiphenylamine
621-64-7	N-Nitrosodi-n-propylamine
759-73-9	N-Nitroso-N-ethylurea
684-93-5	N-Nitroso-N-methylurea
4549-40-0	N-Nitrosomethylvinylamine
59-89-2	N-Nitrosomorpholine
615-53-2	N-Nitroso-N-methylurethane
16543-55-8	N-Nitrosonornicotine
100-75-4	N-Nitrosopiperidine
930-55-2	N-Nitrosopyrrolidine
1321-12-6	Nitrotoluene
99-08-1	m-Nitrotoluene
88-72-2	o-Nitrotoluene
99-99-0	p-Nitrotoluene
99-55-8	5-Nitro-o-toluidine
991-42-4	Norbormide
2234-13-1	Octachloronaphthalene
	Organorhodium Complex (PMN-82-147)
20816-12-0	Osmium oxide OsO4 (T-4)-
20816-12-0	Osmium tetroxide
630-60-4	Ouabain
23135-22-0	Oxamyl
78-71-7	Oxetane, 3,3-bis(chloromethyl)-
75-21-8	Oxirane
2497-07-6	Oxydisulfoton
10028-15-6	Ozone
30525-89-4	Paraformaldehyde
123-63-7	Paraldehyde
1910-42-5	Paraquat
2074-58-2	Paraquat methosulfate
56-38-2	Parathion
298-00-0	Parathion-methyl
12002-03-8	Paris green
1336-36-3	PCBs
82-68-8	PCNB
19624-22-7	Pentaborane
608-93-5	Pentachlorobenzene
76-01-7	Pentachloroethane
82-68-8	Pentachloronitrobenzene
87-86-5	PCP
87-86-5	Pentachlorophenol
2570-26-5	Pentadecylamine
504-60-9	1,3-Pentadiene
79-21-0	Peracetic acid
127-18-4	Perchloroethylene
594-42-3	Perchloromethylmercaptan
62-44-2	Phenacetin
85-01-8	Phenanthrene
108-95-2	Phenol
64-00-6	Phenol, 3-(1-methylethyl)-, methylcarb
4418-66-0	Phenol, 2,2'-thiobis[4-chloro-6-methyl
58-36-6	Phenoxarsine, 10,10'-oxydi-
696-28-6	Phenyl dichloroarsine
106-50-3	p-Phenylenediamine
59-88-1	Phenylhydrazine hydrochloride
62-38-4	Phenylmercuric acetate
62-38-4	Phenylmercury acetate
90-43-7	2-Phenylphenol
2097-19-0	Phenylsilatrane
103-85-5	Phenylthiourea
298-02-2	Phorate
4104-14-7	Phosacetim
947-02-4	Phosfolan
75-44-5	Phosgene
732-11-6	Phosmet
13171-21-6	Phosphamidon
7803-51-2	Phosphine
2703-13-1	Phosphonothioic acid, methyl-, O-ethyl
50782-69-9	Phosphonothioic acid, methyl-, S-(2-(bi
2665-30-7	Phosphonothioic acid, methyl-, O-(4-nit
7664-38-2	Phosphoric acid
3254-63-5	Phosphoric acid, dimethyl 4-(methylthic
2587-90-8	Phosphorothioic acid, O,O-dimethyl-S-(2
7723-14-0	Phosphorus (yellow or white)
7723-14-0	Phosphorus
10025-87-3	Phosphorus oxychloride
10026-13-8	Phosphorus pentachloride
1314-56-3	Phosphorus pentoxide
7719-12-2	Phosphorus trichloride
	Phthalate Esters
85-44-9	Phthalic anhydride
57-47-6	Physostigmine
57-64-7	Physostigmine, salicylate (1:1)
109-06-8	2-Picoline
88-89-1	Picric acid
124-87-8	Picrotoxin
110-89-4	Piperidine
23505-41-1	Pirimifos-ethyl
	Polybrominated Biphenyls (PBBs)
1336-36-3	Polychlorinated biphenyls
	Polycyclic organic matter
	Polynuclear Aromatic Hydrocarbons
7784-41-0	Potassium arsenate
10124-50-2	Potassium arsenite
7778-50-9	Potassium bichromate
7789-00-6	Potassium chromate
151-50-8	Potassium cyanide
1310-58-3	Potassium hydroxide
7722-64-7	Potassium permanganate
506-61-6	Potassium silver cyanide
2631-37-0	Promecarb
78-87-5	Propane 1,2-dichloro-
1120-71-4	1,3-Propane sultone
1120-71-4	Propane sultone
2312-35-8	Propargite
107-19-7	Propargyl alcohol
106-96-7	Propargyl bromide
57-57-8	beta-Propiolactone
123-38-6	Propionaldehyde
79-09-4	Propionic acid
123-62-6	Propionic anhydride
107-12-0	Propionitrile
542-76-7	Propionitrile, 3-chloro-
70-69-9	Propiophenone, 4'-amine
114-26-1	Propoxur
109-61-5	Propyl chloroformate
107-10-8	n-Propylamine
115-07-1	Propylene (Propene)
75-55-8	Propyleneimine
75-56-9	Propylene oxide
621-64-7	Di-n-propylnitrosamine
2275-18-5	Prothoate
129-00-0	Pyrene
121-29-9	Pyrethrins
121-21-1	Pyrethrins
8003-34-7	Pyrethrins
110-86-1	Pyridine
504-24-5	Pyridine, 4-amino-
54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidi
140-76-1	Pyridine, 2-methyl-5-vinyl-
1124-33-8	Pyridine, 4-nitro-, 1-oxide
53558-25-1	Pyriminil
91-22-5	Quinoline
106-51-4	Quinone
82-68-8	Quintozene
50-55-5	Reserpine
108-46-3	Resorcinol
81-07-2	Saccharin (manufacturing)
81-07-2	Saccharin and salts
94-59-7	Safrole
14167-18-1	Salcomine
107-44-8	Sarin
7783-00-8	Selenious acid
12039-52-0	Selenious acid, dithallium(1+) sa
7782-49-2	Selenium
	Selenium Compounds
7446-08-4	Selenium dioxide
7791-23-3	Selenium oxychloride
7488-56-4	Selenium sulfide
630-18-4	Selenourea
563-41-7	Semicarbazide hydrochloride
3037-72-7	Silane, (4-aminobutyl)diethoxyme
7440-22-4	Silver
	Silver Compounds
506-64-9	Silver cyanide
7761-88-8	Silver nitrate
93-72-1	Silvex (2,4,5-TP)
7440-23-5	Sodium
7631-89-2	Sodium arsenate
7784-46-5	Sodium arsenite
26628-22-8	Sodium azide (Na(N3))
10588-01-9	Sodium bichromate
1333-83-1	Sodium bifluoride
7631-90-5	Sodium bisulfite
124-65-2	Sodium cacodylate
7775-11-3	Sodium chromate
143-33-9	Sodium cyanide (Na(CN))
25155-30-0	Sodium dodecylbenzenesulfonate
7681-49-4	Sodium fluoride
62-74-8	Sodium fluoroacetate
16721-80-5	Sodium hydrosulfide
1310-73-2	Sodium hydroxide
7681-52-9	Sodium hypochlorite
10022-70-5	Sodium hypochlorite
124-41-4	Sodium methylate
7632-00-0	Sodium nitrite

CAS Number	Chemical Name
10026-13-8	Phosphorus pentachloride
1314-56-3	Phosphorus pentoxide
7719-12-2	Phosphorus trichloride
	Phthalate Esters
85-44-9	Phthalic anhydride
57-47-6	Physostigmine
57-64-7	Physostigmine, salicylate (1:1)
109-06-8	2-Picoline
88-89-1	Picric acid
124-87-8	Picrotoxin
110-89-4	Piperidine
23505-41-1	Pirimifos-ethyl
	Polybrominated Biphenyls (PBBs)
1336-36-3	Polychlorinated biphenyls
	Polycyclic organic matter
	Polynuclear Aromatic Hydrocarbons
7784-41-0	Potassium arsenate
10124-50-2	Potassium arsenite
7778-50-9	Potassium bichromate
7789-00-6	Potassium chromate
151-50-8	Potassium cyanide
1310-58-3	Potassium hydroxide
7722-64-7	Potassium permanganate
506-61-6	Potassium silver cyanide
2631-37-0	Promecarb
78-87-5	Propane 1,2-dichloro-
1120-71-4	1,3-Propane sultone
1120-71-4	Propene sultone
2312-35-8	Propargite
107-19-7	Propargyl alcohol
106-96-7	Propargyl bromide
57-57-8	beta-Propiolactone
123-38-6	Propionaldehyde
79-09-4	Propionic acid
123-62-6	Propionic anhydride
107-12-0	Propionitrile
542-76-7	Propionitrile, 3-chloro-
70-69-9	Propiophenone, 4'-amino
114-26-1	Propoxur
109-61-5	Propyl chloroformate
107-10-8	n-Propylamine
115-07-1	Propylene (Propene)
75-55-8	Propyleneimine
75-56-9	Propylene oxide
621-64-7	Di-n-propylnitrosamine
2275-18-5	Prothoate
129-00-0	Pyrene
121-29-9	Pyrethrins
121-21-1	Pyrethrins
8003-34-7	Pyrethrins
110-86-1	Pyridine
504-24-5	Pyridine, 4-amino-
54-11-5	Pyridine, 3-(1-methyl-2-pyrrolid
140-76-1	Pyridine, 2-methyl-5-vinyl-
1124-33-0	Pyridine, 4-nitro-, 1-oxide
53558-25-1	Pyriminil
91-22-5	Quinoline
106-51-4	Quinone
82-68-8	Quintozene
50-55-5	Reserpine
108-46-3	Resorcinol
81-07-2	Saccharin (manufacturing)
81-07-2	Saccharin and salts
94-59-7	Safrole
14167-18-1	Salcomine
107-44-8	Sarin
7783-00-8	Selenious acid
12039-52-0	Selenious acid, dithallium(1+) sa
7782-49-2	Selenium
	Selenium Compounds
7446-08-4	Selenium dioxide
7791-23-3	Selenium oxychloride
7488-56-4	Selenium sulfide
630-10-4	Selenourea
563-41-7	Semicarbazide hydrochloride
3037-72-7	Silane, (4-aminobutyl)diethoxymet
7440-22-4	Silver
	Silver Compounds
506-64-9	Silver cyanide
7761-88-8	Silver nitrate
93-72-1	Silvex (2,4,5-TP)
7440-23-5	Sodium
7631-89-2	Sodium arsenate
7784-46-5	Sodium arsenite
26628-22-8	Sodium azide (Na(N3))
10588-01-9	Sodium bichromate
1333-83-1	Sodium bifluoride
7631-90-5	Sodium bisulfite
124-65-2	Sodium cacodylate
7775-11-3	Sodium chromate
143-33-9	Sodium cyanide (Na(CN))
25155-30-0	Sodium dodecylbenzenesulfonate
7681-49-4	Sodium fluoride
62-74-8	Sodium fluoroacetate
16721-80-5	Sodium hydrosulfide
1310-73-2	Sodium hydroxide
7681-52-9	Sodium hypochlorite
10022-70-5	Sodium hypochlorite
124-41-4	Sodium methylate
7632-00-0	Sodium nitrite
7558-79-4	Sodium phosphate, dibasic
10039-32-4	Sodium phosphate, dibasic
10140-65-5	Sodium phosphate, dibasic
7601-54-9	Sodium phosphate, tribasic
7758-29-4	Sodium phosphate, tribasic
7785-84-4	Sodium phosphate, tribasic
10181-89-0	Sodium phosphate, tribasic
18124-56-8	Sodium phosphate, tribasic
10361-89-4	Sodium phosphate, tribasic
13410-01-0	Sodium selenate
10102-18-8	Sodium selenite
7782-82-3	Sodium selenite
18102-20-2	Sodium tellurite
900-95-8	Stannane, acetoxytriphenyl-
7789-06-2	Strontium chromate
57-24-9	Strychnine
57-24-9	Strychnine, and salts
60-41-3	Strychnine, sulfate
100-42-5	Styrene
96-09-3	Styrene oxide
3689-24-5	Sulfotep
3569-57-1	Sulfoxide, 3-chloropropyl octyl
7446-09-5	Sulfur dioxide
7664-93-9	Sulfuric acid
8014-95-7	Sulfuric acid (fuming)
12771-08-3	Sulfur monochloride
1314-80-3	Sulfur phosphide
7783-60-0	Sulfur tetrafluoride
7446-11-9	Sulfur trioxide
93-76-5	2,4,5-T acid
2008-46-0	2,4,5-T amines
1319-72-8	2,4,5-T amines
3813-14-7	2,4,5-T amines
6369-96-6	2,4,5-T amines
6369-97-7	2,4,5-T amines
93-79-8	2,4,5-T esters
1928-47-8	2,4,5-T esters
2545-59-7	2,4,5-T esters
25168-15-4	2,4,5-T esters
61792-07-2	2,4,5-T esters
13560-99-1	2,4,5-T salts
77-81-6	Tabun
13494-80-9	Tellurium
7783-80-4	Tellurium hexafluoride
107-49-3	Tepp
13071-79-9	Terbufos
95-94-3	1,2,4,5-Tetrachlorobenzene
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
79-34-5	1,1,2,2-Tetrachloroethane
127-18-4	Tetrachloroethylene
58-90-2	2,3,4,6-Tetrachlorophenol
961-11-5	Tetrachlorvinphos
3689-24-5	Tetraethyldithiopyrophosphate
78-00-2	Tetraethyl lead
107-49-3	Tetraethyl pyrophosphate
597-64-8	Tetraethyltin
75-74-1	Tetramethyllead
509-14-8	Tetranitromethane
1314-32-5	Thallic oxide
7440-28-0	Thallium
	Thallium Compounds
563-68-8	Thallium(I) acetate
6533-73-9	Thallium(I) carbonate
7791-12-0	Thallium chloride TlCl
10102-45-1	Thallium(I) nitrate
10031-59-1	Thallium sulfate
7446-18-6	Thallium(I) sulfate
6533-73-9	Thallous carbonate
7791-12-0	Thallous chloride
2757-18-8	Thallous malonate
7446-18-6	Thallous sulfate
62-55-5	Thioacetamide
2231-57-4	Thiocarbazide
139-65-1	4,4'-Thiodianiline
39196-18-4	Thiofanox
74-93-1	Thiomethanol
297-97-2	Thionazin
108-98-5	Thiophenol
79-19-6	Thiosemicarbazide
62-56-6	Thiourea
5344-82-1	Thiourea, (2-chlorophenyl)-
614-78-8	Thiourea, (2-methylphenyl)-
86-88-4	Thiourea, 1-naphthalenyl-
137-26-8	Thiram
1314-20-1	Thorium dioxide
7550-45-0	Titanium tetrachloride
119-93-7	o-Tolidine
108-88-3	Toluene
25376-45-8	Toluenediamine
91-08-7	Toluene-2,6-diisocyanate
584-84-9	Toluene-2,4-diisocyanate
26471-62-5	Toluenediisocyanate (mixed isomers)
95-53-4	o-Toluidine
106-49-0	p-Toluidine
636-21-5	o-Toluidine hydrochloride
8001-35-2	Toxaphene
32534-95-5	2,4,5-TP esters
1031-47-6	Triamiphos
68-76-8	Triaziquone
24017-47-8	Triazofos

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
50-00-0	Formaldehyde	500		100	313
50-07-7	Mitomycin C	500/10,000		10	
50-14-6	Ergocalciferol	1,000/10,000	1		
50-18-0	Cyclophosphamide			10	
50-29-3	DDT			1	
50-32-8	Benzo[a]pyrene			1	
50-55-5	Reserpine			5,000	
51-21-8	Fluorouracil	500/10,000	1		
51-28-5	2,4-Dinitrophenol			10	313
51-43-4	Epinephrine			1,000	
51-75-2	Nitrogen mustard	10	1		313
51-75-2	Mechlorethamine	10	1		X
51-79-6	Urethane			100	313
51-79-6	Carbamic acid, ethyl ester			100	X
51-79-6	Ethyl carbamate			100	X
51-83-2	Carbachol chloride	500/10,000	1		
52-68-6	Trichlorfon			100	313
52-85-7	Famphur			1,000	
53-70-3	Dibenz[a,h]anthracene			1	
53-96-3	2-Acetylaminofluorene			1	313
54-11-5	Nicotine	100		100	
54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-,(S)	100		100	
54-11-5	Nicotine and salts			100	
54-62-6	Aminopterin	500/10,000	1		
55-18-5	N-Nitrosodiethylamine			1	313
55-21-0	Benzamide				313
55-63-0	Nitroglycerin			10	313
55-91-4	Icoftuorphaze	100		100	
55-91-4	Diisopropylfluorophosphate	100		100	
56-04-2	Methylthiouracil			10	
56-23-5	Carbon tetrachloride			10	313
56-25-7	Cantharidin	100/10,000	1		
56-38-2	Parathion	100		10	313
56-49-5	3-Methylcholanthrene			10	
56-53-1	Diethylstilbestrol			1	
56-55-3	Benz[a]anthracene			10	
56-72-4	Coumaphos	100/10,000		10	
57-12-5	Cyanides (soluble salts and complexes)			10	
57-14-7	1,1-Dimethyl hydrazine	1,000		10	313
57-14-7	Dimethylhydrazine	1,000		10	X

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
57-14-7	Hydrazine, 1,1-dimethyl-	1,000		10	X
57-24-9	Strychnine	100/10,000		10	
57-24-9	Strychnine, and salts			10	
57-47-6	Physostigmine	100/10,000	1		
57-57-8	beta-Propiolactone	500		1+	313
57-64-7	Physostigmine, salicylate (1:1)	100/10,000	1		
57-74-9	Chlordane	1,000		1	313
57-97-6	7,12-Dimethylbenz[a]anthracene			1	
58-36-6	Phenoxarsine, 10,10'-oxydi-	500/10,000	1		
58-89-9	Lindane	1,000/10,000		1	313
58-89-9	Hexachlorocyclohexane (gamma isomer)	1,000/10,000		1	X
58-90-2	2,3,4,6-Tetrachlorophenol			10	
59-50-7	p-Chloro-m-cresol			5,000	
59-88-1	Phenylhydrazine hydrochloride	1,000/10,000	1		
59-89-2	N-Nitrosomorpholine			1+	313
60-00-4	Ethylenediamine-tetraacetic acid (EDTA)			5,000	
60-09-3	4-Aminoazobenzene				313
60-11-7	4-Dimethylaminoazobenzene			10	313
60-11-7	Dimethylaminoazobenzene			10	X
60-29-7	Ethyl ether			100	
60-34-4	Methyl hydrazine	500		10	313
60-35-5	Acetamide			1+	313
60-41-3	Strychnine, sulfate	100/10,000	1		
60-51-5	Dimethoate	500/10,000		10	
60-57-1	Dieldrin			1	
61-82-5	Amitrole			10	
62-38-4	Phenylmercury acetate	500/10,000		100	
62-38-4	Phenylmercuric acetate	500/10,000		100	
62-44-2	Phenacetin			100	
62-50-0	Ethyl methanesulfonate			1	
62-53-3	Aniline	1,000		5,000	313
62-55-5	Thioacetamide			10	313
62-56-6	Thiourea			10	313
62-73-7	Dichlorvos	1,000		10	313
62-74-8	Sodium fluoroacetate	10/10,000		10	
62-74-8	Fluoroacetic acid, sodium salt	10/10,000		10	
62-75-9	N-Nitrosodimethylamine	1,000		10	313
62-75-9	Nitrosodimethylamine	1,000		10	X
62-75-9	Methanamine, N-methyl-N-nitroso-	1,000		10	X
63-25-2	Carbaryl			100	313

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
64-00-6	Phenol, 3-(1-methylethyl)-, methylcarbamat	500/10,000	1		
64-18-6	Formic acid			5,000	
64-19-7	Acetic acid			5,000	
64-67-5	Diethyl sulfate			1+	313
64-86-8	Colchicine	10/10,000	1		
65-30-5	Nicotine sulfate	100/10,000	1		
65-85-0	Benzoic acid			5,000	
66-75-1	Uracil mustard			10	
66-81-9	Cycloheximide	100/10,000	1		
67-56-1	Methanol			5,000	313
67-63-0	Isopropyl alcohol (mfg-strong acid process				313
67-64-1	Acetone			5,000	313
67-66-3	Chloroform	10,000		10	313
67-72-1	Hexachloroethane			100	313
68-12-2	Dimethylformamide			1+	
68-76-8	Triaziquone				313
70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-			10	
70-30-4	Hexachlorophene			100	
70-69-9	Propiophenone, 4'-amino	100/10,000	1		
71-36-3	n-Butyl alcohol			5,000	313
71-43-2	Benzene			10	313
71-55-6	1,1,1-Trichloroethane			1,000	313
71-55-6	Methyl chloroform			1,000	X
71-63-6	Digitoxin	100/10,000	1		
72-20-8	Endrin	500/10,000		1	
72-43-5	Methoxychlor			1	313
72-54-8	DDD			1	
72-55-9	DDE			1	
72-57-1	Trypan blue			10	
74-83-9	Bromomethane	1,000		1,000	313
74-83-9	Methyl bromide	1,000		1,000	X
74-85-1	Ethylene				313
74-87-3	Chloromethane			100	313
74-87-3	Methyl chloride			100	X
74-88-4	Methyl iodide			100	313
74-89-5	Monomethylamine			100	
74-90-8	Hydrogen cyanide	100		10	313
74-90-8	Hydrocyanic acid	100		10	X
74-93-1	Methyl mercaptan	500		100	
74-93-1	Thiomethanol	500		100	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
74-95-3	Methylene bromide			1,000	313
75-00-3	Chloroethane			100	313
75-00-3	Ethyl chloride			100	X
75-01-4	Vinyl chloride			1	313
75-04-7	Monoethylamine			100	
75-05-8	Acetonitrile			5,000	313
75-07-0	Acetaldehyde			1,000	313
75-09-2	Dichloromethane			1,000	313
75-09-2	Methylene chloride			1,000	X
75-15-0	Carbon disulfide	10,000		100	313
75-20-7	Calcium carbide			10	
75-21-8	Ethylene oxide	1,000		10	313
75-21-8	Oxirane	1,000		10	X
75-25-2	Bromoform			100	313
75-25-2	Tribromomethane			100	X
75-27-4	Dichlorobromomethane			5,000	313
75-34-3	1,1-Dichloroethane			1,000	
75-35-4	Vinylidene chloride			100	313
75-35-4	1,1-Dichloroethylene			100	X
75-36-5	Acetyl chloride			5,000	
75-44-5	Phosgene	10		10	313
75-50-3	Trimethylamine			100	
75-55-8	Propyleneimine	10,000		1	313
75-55-8	Aziridine, 2-methyl	10,000		1	X
75-56-9	Propylene oxide	10,000		100	313
75-60-5	Cacodylic acid			1	
75-63-8	Bromotrifluoromethane (Halon 1301)				313
75-63-8	Halon 1301				X
75-64-9	tert-Butylamine			1,000	
75-65-0	tert-Butyl alcohol				313
75-69-4	Trichlorofluoromethane (CFC-11)			5,000	313
75-69-4	CFC-11			5,000	X
75-69-4	Trichloromonofluoromethane			5,000	X
75-71-8	Dichlorodifluoromethane (CFC-12)			5,000	313
75-71-8	CFC-12			5,000	X
75-74-1	Tetramethyllead	100	1		
75-77-4	Trimethylchlorosilane	1,000	1		
75-78-5	Dimethyldichlorosilane	500	1		
75-79-6	Methyltrichlorosilane	500	1		
75-86-5	Acetone cyanohydrin	1,000		10	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
75-87-6	Acetaldehyde, trichloro-			5,000	
75-99-0	2,2-Dichloropropionic acid			5,000	
76-01-7	Pentachloroethane			10	
76-02-8	Trichloroacetyl chloride	500	1		
76-13-1	Freon 113				313
76-14-2	Dichlorotetrafluoroethane (CFC-114)				313
76-14-2	CFC-114				X
76-15-3	Monochloropentafluoroethane (CFC-115)				313
76-15-3	CFC-115				X
76-44-8	Heptachlor			1	313
77-47-4	Hexachlorocyclopentadiene	100		10	313
77-78-1	Dimethyl sulfate	500		100	313
77-81-6	Tabun	10	1		
78-00-2	Tetraethyl lead	100		10	
78-34-2	Dioxathion	500	1		
78-53-5	Amiton	500	1		
78-59-1	Isophorone			5,000	
78-71-7	Oxetane, 3,3-bis(chloromethyl)-	500	1		
78-79-5	Isoprene			100	
78-81-9	Iso-Butylamine			1,000	
78-82-0	Isobutyronitrile	1,000	1		
78-83-1	Isobutyl alcohol			5,000	
78-84-2	Isobutyraldehyde				313
78-87-5	1,2-Dichloropropane			1,000	313
78-87-5	Propane 1,2-dichloro-			1,000	X
78-88-6	2,3-Oichloropropene			100	313
78-92-2	sec-Butyl alcohol				313
78-93-3	Methyl ethyl ketone			5,000	313
78-93-3	Methyl ethyl ketone (MEK)			5,000	X
78-94-4	Methyl vinyl ketone	10	1		
78-97-7	Lactonitrile	1,000	1		
78-99-9	1,1-Dichloropropane			1,000	
79-00-5	1,1,2-Trichloroethane			100	313
79-01-6	Trichloroethylene			100	313
79-06-1	Acrylamide	1,000/10,000		5,000	313
79-09-4	Propionic acid			5,000	
79-10-7	Acrylic acid			5,000	313
79-11-8	Chloroacetic acid	100/10,000		1+	313
79-19-6	Thiosemicarbazide	100/10,000		100	
79-21-0	Peracetic acid	500	1		313

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
79-22-1	Methyl chloroformate	500		1,000	
79-31-2	Iso-Butyric acid			5,000	
79-34-5	1,1,2,2-Tetrachloroethane			100	313
79-44-7	Dimethylcarbamyl chloride			1	313
79-46-9	2-Nitropropane			10	313
80-05-7	4,4'-Isopropylidenediphenol				313
80-15-9	Cumene hydroperoxide			10	313
80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl-			10	X
80-62-6	Methyl methacrylate			1,000	313
80-63-7	Methyl 2-chloroacrylate	500	1		
81-07-2	Saccharin (manufacturing)			100	313
81-07-2	Saccharin and salts			100	
81-81-2	Warfarin	500/10,000		100	
81-81-2	Warfarin, & salts, conc.>0.3%			100	
81-88-9	C.I. Food Red 15				313
82-28-0	1-Amino-2-methylanthraquinone				313
82-66-6	Diphacinone	10/10,000	1		
82-68-8	Quintozene			100	313
82-68-8	Pentachloronitrobenzene			100	X
82-68-8	PCNB			100	X
83-32-9	Acenaphthene			100	
84-66-2	Diethyl phthalate			1,000	313
84-74-2	Dibutyl phthalate			10	313
84-74-2	n-Butyl phthalate			10	X
85-00-7	Diquat			1,000	
85-01-8	Phenanthrene			5,000	
85-44-9	Phthalic anhydride			5,000	313
85-68-7	Butyl benzyl phthalate			100	313
86-30-6	N-Nitrosodiphenylamine			100	313
86-50-0	Azinphos-methyl	10/10,000		1	
86-50-0	Guthion	10/10,000		1	
86-73-7	Fluorene			5,000	
86-88-4	Antu	500/10,000		100	
86-88-4	Thiourea, 1-naphthalenyl-	500/10,000		100	
87-62-7	2,6-Xylidine				313
87-65-0	2,6-Dichlorophenol			100	
87-68-3	Hexachloro-1,3-butadiene			1	313
87-68-3	Hexachlorobutadiene			1	X
87-86-5	Pentachlorophenol			10	313
87-86-5	PCP			10	X

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
88-05-1	Aniline, 2,4,6-trimethyl-	500	1		
88-06-2	2,4,6-Trichlorophenol			10	313
88-72-2	o-Nitrotoluene			1,000	
88-75-5	2-Nitrophenol			100	313
88-85-7	Dinoseb	100/10,000		1,000	
88-89-1	Picric acid				313
90-04-0	o-Anisidine			1+	313
90-43-7	2-Phenylphenol				313
90-94-8	Michler's ketone				313
91-08-7	Toluene-2,6-diisocyanate	100		100	313
91-20-3	Naphthalene			100	313
91-22-5	Quinoline			5,000	313
91-58-7	2-Chloronaphthalene			5,000	
91-59-8	beta-Nephthylamine			10	313
91-80-5	Methapyrilene			5,000	
91-94-1	3,3'-Dichlorobenzidine			1	313
92-52-4	Biphenyl			1+	313
92-67-1	4-Aminobiphenyl			1+	313
92-87-5	Benzidine			1	313
92-93-3	4-Nitrobiphenyl			1+	313
93-72-1	Silvex (2,4,5-TP)			100	
93-76-5	2,4,5-T acid			1,000	
93-79-8	2,4,5-T esters			1,000	
94-11-1	2,4-D Esters			100	
94-36-0	Benzoyl peroxide				313
94-58-6	Dihydrosafrole			10	
94-59-7	Safrole			100	313
94-75-7	2,4-D			100	313
94-75-7	2,4-D Acid			100	X
94-75-7	2,4-D, salts and esters			100	
94-79-1	2,4-D Esters			100	
94-80-4	2,4-D Esters			100	
95-47-6	o-Xylene			1,000	313
95-47-6	Benzene, o-dimethyl-			1,000	X
95-48-7	o-Cresol	1,000/10,000		1,000	313
95-50-1	1,2-Dichlorobenzene			100	313
95-50-1	o-Dichlorobenzene			100	X
95-53-4	o-Toluidine			100	313
95-57-8	2-Chlorophenol			100	
95-63-6	1,2,4-Trimethylbenzene				313

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
95-80-7	2,4-Diaminotoluene			10	313
95-94-3	1,2,4,5-Tetrachlorobenzene			5,000	
95-95-4	2,4,5-Trichlorophenol			10	313
96-09-3	Styrene oxide			1+	313
96-12-8	1,2-Dibromo-3-chloropropane			1	313
96-12-8	DBCP			1	X
96-33-3	Methyl acrylate				313
96-45-7	Ethylene thiourea			10	313
97-56-3	C.I. Solvent Yellow 3				313
97-63-2	Ethyl methacrylate			1,000	
98-01-1	furfural			5,000	
98-05-5	Benzenearsonic acid	10/10,000	1		
98-07-7	Benzoic trichloride	100		10	313
98-07-7	Benzotrichloride	100		10	X
98-09-9	Benzenesulfonyl chloride			100	
98-13-5	Trichlorophenylsilane	500	1		
98-16-8	Benzenamine, 3-(trifluoromethyl)-	500	1		
98-82-8	Cumene			5,000	313
98-86-2	Acetophenone			5,000	
98-87-3	Benzal chloride	500		5,000	313
98-88-4	Benzoyl chloride			1,000	313
98-95-3	Nitrobenzene	10,000		1,000	313
99-08-1	m-Nitrotoluene			1,000	
99-35-4	1,3,5-Trinitrobenzene			10	
99-55-8	5-Nitro-o-toluidine			100	
99-59-2	5-Nitro-o-anisidine				313
99-65-0	m-Dinitrobenzene			100	313
99-98-9	Dimethyl-p-phenylenediamine	10/10,000	1		
99-99-0	p-Nitrotoluene			1,000	
100-01-6	p-Nitroaniline			5,000	
100-02-7	4-Nitrophenol			100	313
100-02-7	p-Nitrophenol			100	X
100-14-1	Benzene, 1-(chloromethyl)-4-nitro-	500/10,000	1		
100-25-4	p-Dinitrobenzene			100	313
100-41-4	Ethylbenzene			1,000	313
100-42-5	Styrene			1,000	313
100-44-7	Benzyl chloride	500		100	313
100-47-0	Benzonitrile			5,000	
100-75-4	N-Nitrosopiperidine			10	313
101-14-4	4,4'-Methylenebis(2-chloroaniline)			10	313

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
101-14-4	MBOCA			10	X
101-55-3	4-Bromophenyl phenyl ether			100	
101-61-1	4,4'-Methylenebis(N,N-dimethyl)benzenamine				313
101-68-8	Methylenebis(phenylisocyanate)			1+	313
101-68-8	MBI			1+	X
101-77-9	4,4'-Methylenedianiline			1+	313
101-80-4	4,4'-Diaminodiphenyl ether				313
102-36-3	Isocyanic acid, 3,4-dichlorophenyl ester	500/10,000	1		
103-23-1	Bis(2-ethylhexyl) adipate				313
103-85-5	Phenylthiourea	100/10,000		100	
104-94-9	p-Anisidine				313
105-46-4	sec-Butyl acetate			5,000	
105-60-2	Caprolactam			1+	
105-67-9	2,4-Dimethylphenol			100	313
106-42-3	p-Xylene			1,000	313
106-42-3	Benzene, p-dimethyl-			1,000	X
106-44-5	p-Cresol			1,000	313
106-46-7	1,4-Dichlorobenzene			100	313
106-47-8	p-Chloroaniline			1,000	
106-49-0	p-Toluidine			100	
106-50-3	p-Phenylenediamine			1+	313
106-51-4	Quinone			10	313
106-51-4	p-Benzoquinone			10	X
106-88-7	1,2-Butylene oxide			1+	313
106-89-8	Epichlorohydrin	1,000		100	313
106-93-4	1,2-Dibromoethane			1	313
106-93-4	Ethylene dibromide			1	X
106-96-7	Propargyl bromide	10	1		
106-99-0	1,3-Butadiene			1+	313
107-02-8	Acrolein	500		1	313
107-05-1	Allyl chloride			1,000	313
107-06-2	1,2-Dichloroethane			100	313
107-06-2	Ethylene dichloride			100	X
107-07-3	Chloroethanol	500	1		
107-10-8	n-Propylamine			5,000	
107-11-9	Allylamine	500	1		
107-12-0	Propionitrile	500		10	
107-12-0	Ethyl cyanide	500		10	
107-13-1	Acrylonitrile	10,000		100	313
107-15-3	Ethylenediamine	10,000		5,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
107-16-4	Formaldehyde cyanohydrin	1,000	1		
107-18-6	Allyl alcohol	1,000		100	313
107-19-7	Propargyl alcohol			1,000	
107-20-0	Chloroacetaldehyde			1,000	
107-21-1	Ethylene glycol			1+	313
107-30-2	Chloromethyl methyl ether	100		10	313
107-44-8	Sarin	10	1		
107-49-3	Tepp	100		10	
107-49-3	Tetraethyl pyrophosphate	100		10	
107-92-6	Butyric acid			5,000	
108-05-4	Vinyl acetate	1,000		5,000	313
108-05-4	Vinyl acetate monomer	1,000		5,000	X
108-10-1	Methyl isobutyl ketone			5,000	313
108-23-6	Isopropyl chloroformate	1,000	1		
108-24-7	Acetic anhydride			5,000	
108-31-6	Maleic anhydride			5,000	313
108-38-3	m-Xylene			1,000	313
108-38-3	Benzene, m-dimethyl-			1,000	X
108-39-4	m-Cresol			1,000	313
108-46-3	Resorcinol			5,000	
108-60-1	Bis(2-chloro-1-methylethyl)ether			1,000	313
108-60-1	Dichloroisopropyl ether			1,000	X
108-88-3	Toluene			1,000	313
108-90-7	Chlorobenzene			100	313
108-91-8	Cyclohexylamine	10,000	1		
108-94-1	Cyclohexanone			5,000	
108-95-2	Phenol	500/10,000		1,000	313
108-98-5	Thiophenol	500		100	
108-98-5	Benzenethiol	500		100	
109-06-8	2-Picoline			5,000	
109-61-5	Propyl chloroformate	500	1		
109-73-9	Butylamine			1,000	
109-77-3	Malononitrile	500/10,000		1,000	
109-86-4	2-Methoxyethanol				313
109-89-7	Diethylamine			1,000	
109-99-9	Furan, tetrahydro-			1,000	
110-00-9	Furan	500		100	
110-16-7	Maleic acid			5,000	
110-17-8	Fumaric acid			5,000	
110-19-0	Iso-Butyl acetate			5,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
110-54-3	Hexane			1+	
110-57-6	Trans-1,4-dichlorobutene	500	1		
110-75-8	2-Chloroethyl vinyl ether			1,000	
110-80-5	2-Ethoxyethanol			1,000	313
110-80-5	Ethanol, 2-ethoxy-			1,000	X
110-82-7	Cyclohexane			1,000	313
110-86-1	Pyridine			1,000	313
110-89-4	Piperidine	1,000	1		
111-42-2	Diethanolamine			1+	313
111-44-4	Bis(2-chloroethyl) ether	10,000		10	313
111-44-4	Dichloroethyl ether	10,000		10	X
111-54-6	Ethylenebisdithiocarbamic acid, salts & es			5,000	
111-69-3	Adiponitrile	1,000	1		
111-91-1	Bis(2-chloroethoxy) methane			1,000	
114-26-1	Propoxur			1+	313
115-02-6	Azaserine			1	
115-07-1	Propylene (Propene)				313
115-21-9	Trichloroethylsilane	500	1		
115-26-4	Bimefox	508	1		
115-29-7	Endosulfan	10/10,000		1	
115-32-2	Dicofol			10	313
115-90-2	Fensulfothion	500	1		
116-06-3	Aldicarb	100/10,000		1	
117-79-3	2-Aminoanthraquinone				313
117-80-6	Dichlone			1	
117-81-7	Di(2-ethylhexyl) phthalate			180	313
117-81-7	Bis(2-ethylhexyl)phthalate			100	X
117-81-7	DEHP			100	X
117-84-0	n-Dioctylphthalate			5,000	313
117-84-0	Di-n-octyl phthalate			5,000	X
118-74-1	Hexachlorobenzene			10	313
119-38-0	Isopropylmethylpyrazolyl dimethylcarbamate	500	1		
119-90-4	3,3'-Dimethoxybenzidine			100	313
119-93-7	3,3'-Dimethylbenzidine			10	313
119-93-7	o-Tolidine			10	X
120-12-7	Anthracene			5,000	313
120-58-1	Isosafrole			188	313
120-71-8	p-Cresidine				313
120-80-9	Catechol			1+	313
120-82-1	1,2,4-Trichlorobenzene			100	313

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
120-83-2	2,4-Dichlorophenol			100	313
121-14-2	2,4-Dinitrotoluene			10	313
121-21-1	Pyrethrins			1	
121-29-9	Pyrethrins			1	
121-44-8	Triethylamine			5,000	
121-69-7	N,N-Dimethylaniline			1+	313
121-75-5	Malathion			100	
122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-			5,000	
122-14-5	Fenitrothion	500	1		
122-66-7	1,2-Diphenylhydrazine			10	313
122-66-7	Hydrazine, 1,2-diphenyl-			10	X
122-66-7	Hydrazobenzene			10	X
123-31-9	Hydroquinone	508/10,000		1+	313
123-33-1	Maleic hydrazide			5,000	
123-38-6	Propionaldehyde			1+	313
123-62-6	Propionic anhydride			5,000	
123-63-7	Paraldehyde			1,000	
123-72-8	Butyraldehyde				313
123-73-9	Crotonaldehyde, (E)-	1,000		100	
123-86-4	Butyl acetate			5,000	
123-91-1	1,4-Dioxane			100	313
123-92-2	Iso-Amyl acetate			5,808	
124-04-9	Adipic acid			5,008	
124-40-3	Dimethylamine			1,000	
124-41-4	Sodium methylate			1,000	
124-48-1	Chlorodibromomethane			100	
124-65-2	Sodium cacodylate	100/10,000	1		
124-73-2	Bibromotetrafluoroethane (Halon 2402)				313
124-73-2	Halon 2402				X
124-87-8	Picrotoxin	500/18,000	1		
126-72-7	Tris(2,3-dibromopropyl) phosphate			10	313
126-98-7	Methacrylonitrile	500		1,000	
126-99-8	Chloroprene			1+	313
127-18-4	Tetrachloroethylene			100	313
127-18-4	Perchloroethylene			100	X
127-82-2	Zinc phenolsulfonate			5,000	
128-66-5	C.I. Vat Yellow 4				313
129-00-0	Pyrene	1,000/10,000		5,000	
129-06-6	Warfarin sodium	100/10,000	1		
130-15-4	1,4-Naphthoquinone			5,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
131-11-3	Dimethyl phthalate			5,000	313
131-74-8	Ammonium picrate			10	
131-89-5	2-Cyclohexyl-4,6-Dinitrophenol			100	
132-64-9	Dibenzofuran			1+	313
133-06-2	Captan			10	313
133-90-4	Chloramben			1+	313
134-29-2	o-Anisidine hydrochloride				313
134-32-7	alpha-Naphthylamine			100	313
135-20-6	Cupferron				313
137-26-8	Thiram			10	
139-13-9	Nitrilotriacetic acid				313
139-65-1	4,4'-Thiodianiline				313
140-29-4	Benzyl cyanide	500	1		
140-76-1	Pyridine, 2-methyl-5-vinyl-	500	1		
140-88-5	Ethyl acrylate			1,000	313
141-32-2	Butyl acrylate				313
141-66-2	Dicrotophos	100	1		
141-78-6	Ethyl acetate			5,000	
142-28-9	1,3-Dichloropropane			5,000	
142-71-2	Cupric acetate			100	
142-84-7	Dipropylamine			5,000	
143-33-9	Sodium cyanide (Na(CN))	100		10	
143-50-0	Kepone			1	
144-49-0	Fluoroacetic acid	10/10,000	1		
145-73-3	Endothall			1,000	
148-82-3	Melphalan			1	
149-74-6	Dichloromethylphenylsilane	1,000	1		
151-38-2	Methoxyethylmercuric acetate	500/10,000	1		
151-50-8	Potassium cyanide	100		10	
151-56-4	Ethyleneimine	500		1	313
151-56-4	Aziridine	500		1	X
152-16-9	Diphosphoramide, octamethyl-	100		100	
156-10-5	p-Nitrosodiphenylamine				313
156-60-5	1,2-Dichloroethylene			1,000	
156-62-7	Calcium cyanamide			1+	313
189-55-9	Dibenz(a,i)pyrene			10	
191-24-2	Benzo(ghi)perylene			5,000	
193-39-5	Indeno(1,2,3-cd)pyrene			100	
205-99-2	Benzo(b)fluoranthene			1	
206-44-0	Fluoranthene			100	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
207-08-9	Benzo(k)fluoranthene			5,000	
208-96-8	Acenaphthylene			5,000	
218-01-9	Chrysene			100	
225-51-4	Benz(c)acridine			100	
297-78-9	Isobenzan	100/10,000	1		
297-97-2	Thionazin	500		100	
297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate	500		100	
298-00-0	Parathion-methyl	100/10,000		100	
298-00-0	Methyl parathion	100/10,000		100	
298-02-2	Phorate	10		10	
298-04-4	Disulfoton	500		1	
308-62-9	Amphetamine	1,000	1		
300-76-5	Naled			10	
301-04-2	Lead acetate			5,000	
302-01-2	Hydrazine	1,000		1	313
303-34-4	Lasiocarpine			10	
305-03-3	Chlorambucil			10	
309-00-2	Aldrin	500/10,000		1	313
311-45-5	Diethyl-p-nitrophenyl phosphate			100	
315-18-4	Mexacarbate	500/10,000		1,000	
316-42-7	Emetine, dihydrochloride	1/10,000	1		
319-84-6	alpha-BHC			10	
319-85-7	beta-BHC			1	
319-86-8	delta-BHC			1	
327-98-0	Trichloronate	500	1		
329-71-5	2,5-Dinitrophenol			10	
330-54-1	Diuron			100	
333-41-5	Diazinon			1	
334-88-3	Diazomethane			1+	313
353-42-4	Boron trifluoride compound with methyl eth	1,000	1		
353-50-4	Carbonic difluoride			1,000	
353-59-3	Bromochlorodifluoromethane (Halon 1211)				313
353-59-3	Halon 1211				X
357-57-3	Brucine			100	
359-06-8	Fluoroacetyl chloride	10	1		
371-62-0	Ethylene fluorohydrin	10	1		
379-79-3	Ergotamine tartrate	500/10,000	1		
460-19-5	Cyanogen			100	
463-58-1	Carbonyl sulfide			1+	313
465-73-6	Isodrin	100/10,000		1	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
470-90-6	Chlorfenvinfos	500	1		
492-80-8	C.I. Solvent Yellow 34			100	313
492-80-8	Auramine			100	X
494-03-1	Chlornaphazine			100	
496-72-0	Diaminotoluene			10	
502-39-6	Methylmercuric dicyanamide	500/10,000	1		
504-24-5	Pyridine, 4-amino-	500/10,000		1,000	
504-24-5	4-Aminopyridine	500/10,000		1,000	
504-60-9	1,3-Pentadiene			100	
505-60-2	Mustard gas	500	1		313
506-61-6	Potassium silver cyanide	500		1	
506-64-9	Silver cyanide			1	
506-68-3	Cyanogen bromide	500/10,000		1,000	
506-77-4	Cyanogen chloride			10	
506-78-5	Cyanogen iodide	1,000/10,000	1		
506-87-6	Ammonium carbonate			5,000	
506-96-7	Acetyl bromide			5,000	
509-14-8	Tetranitromethane	500		10	
510-15-6	Chlorobenzilate			10	313
513-49-5	sec-Butylamine			1,000	
514-73-8	Dithiazanine iodide	500/10,000	1		
528-29-0	o-Dinitrobenzene			100	313
532-27-4	2-Chloroacetophenone			1+	313
534-07-6	Bis(chloromethyl) ketone	10/10,000	1		
534-52-1	Dinitrocresal	10/10,000		10	
534-52-1	4,6-Dinitro-o-cresol	10/10,000		10	313
534-52-1	4,6-Dinitro-o-cresol and salts			10	
535-89-7	Crimidine	100/10,000	1		
538-07-8	Ethylbis(2-chloroethyl)amine	500	1		
540-59-0	1,2-Dichloroethylene				313
540-73-8	Hydrazine, 1,2-dimethyl-			1	
540-84-1	2,2,4-Trimethylpentane			1+	
540-88-5	tert-Butyl acetate			5,000	
541-09-3	Uranyl acetate			100	
541-25-3	Lewisite	10	1		
541-41-3	Ethyl chloroformate				313
541-53-7	Dithiobiuret	100/10,000		100	
541-73-1	1,3-Dichlorobenzene			100	313
542-62-1	Barium cyanide			10	
542-75-6	1,3-Dichloropropylene			100	313

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
542-75-6	1,3-Dichloropropene			100	X
542-76-7	Propionitrile, 3-chloro-	1,000		1,000	
542-76-7	3-Chloropropionitrile	1,000		1,000	
542-88-1	Bis(chloromethyl) ether	100		10	313
542-88-1	Chloromethyl ether	100		10	X
542-88-1	Dichloromethyl ether	100		10	X
542-90-5	Ethylthiocyanate	10,000	1		
543-90-8	Cadmium acetate			10	
544-18-3	Cobaltous formate			1,000	
544-92-3	Copper cyanide			10	
554-84-7	m-Nitrophenol			100	
555-77-1	Tris(2-chloroethyl)amine	100	1		
556-61-6	Methyl isothiocyanate	500	1		
556-64-9	Methyl thiocyanate	10,000	1		
557-19-7	Nickel cyanide			10	
557-21-1	Zinc cyanide			10	
557-34-6	Zinc acetate			1,000	
557-41-5	Zinc formate			1,000	
558-25-8	Methanesulfonyl fluoride	1,000	1		
563-12-2	Ethion	1,000		10	
563-41-7	Semicarbazide hydrochloride	1,000/10,000	1		
563-68-8	Thallium(I) acetate			100	
569-64-2	C.I. Basic Green 4				313
573-56-8	2,6-Dinitrophenol			10	
584-84-9	Toluene-2,4-diisocyanate	500		100	313
591-08-2	1-Acetyl-2-thiourea			1,000	
592-01-8	Calcium cyanide			10	
592-04-1	Mercuric cyanide			1	
592-85-8	Mercuric thiocyanate			10	
592-87-0	Lead thiocyanate			100	
593-60-2	Vinyl bromide			1+	313
594-42-3	Perchloromethylmercaptan	500		100	
594-42-3	Trichloromethanesulfenyl chloride	500		100	
597-64-8	Tetraethyltin	100	1		
598-31-2	Bromoacetone			1,000	
606-20-2	2,6-Dinitrotoluene			100	313
608-93-5	Pentachlorobenzene			10	
609-19-8	3,4,5-Trichlorophenol			10	
610-39-9	3,4-Dinitrotoluene			10	
614-78-8	Thiourea, (2-methylphenyl)-	500/10,000	1		

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
615-05-4	2,4-Diaminoanisole				313
615-53-2	N-Nitroso-N-methylurethane			1	
621-64-7	N-Nitrosodi-n-propylamine			10	313
621-64-7	Di-n-propylnitrosamine			10	X
624-83-9	Methyl isocyanate	500		1	313
625-16-1	tert-Amyl acetate			5,000	
626-38-0	sec-Amyl acetate			5,000	
627-11-2	Chloroethyl chloroformate	1,000	1		
628-63-7	Amyl acetate			5,000	
628-86-4	Mercury fulminate			10	
630-10-4	Selenourea			1,000	
630-20-6	Ethane, 1,1,1,2-tetrachloro-			100	
630-60-4	Ouabain	100/10,000	1		
631-61-8	Ammonium acetate			5,000	
636-21-5	o-Toluidine hydrochloride			100	313
639-58-7	Triphenyltin chloride	500/10,000	1		
640-19-7	Fluoroacetamide	100/10,000		100	
644-64-4	Dimetilan	500/10,000	1		
675-14-9	Cyanuric fluoride	100	1		
676-97-1	Methyl phosphonic dichloride	100	1		
680-31-9	Hexamethylphosphoramide			1+	313
684-93-5	N-Nitroso-N-methylurea			1	313
692-42-2	Diethylarsine			1	
696-28-6	Phenyl dichloroarsine	500		1	
696-28-6	Dichlorophenylarsine	500		1	
732-11-6	Phosmet	10/10,000	1		
757-58-4	Hexaethyl tetraphosphate			100	
759-73-9	N-Nitroso-N-ethylurea			1	313
760-93-0	Methacrylic anhydride	500	1		
764-41-0	2-Butene, 1,4-dichloro-			1	
765-34-4	Glycidylaldehyde			10	
786-19-6	Carbophenothion	500	1		
814-49-3	Diethyl chlorophosphate	500	1		
814-68-6	Acrylyl chloride	100	1		
815-82-7	Cupric tartrate			100	
822-06-0	Hexamethylene-1,6-diisocyanate			1+	
823-40-5	Diaminotoluene			10	
824-11-3	Trimethylolpropane phosphite	100/10,000	1		
842-07-9	C.I. Solvent Yellow 14				313
900-95-8	Stannane, acetoxytriphenyl-	500/10,000	1		

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	Section 304 CERCLA RQ	Sec 313
919-86-8	Demeton-S-methyl	500	1		
920-46-7	Methacryloyl chloride	100	1		
924-16-3	N-Nitrosodi-n-butylamine			10	313
930-55-2	N-Nitrosopyrrolidine			1	
933-75-5	2,3,6-Trichlorophenol			10	
933-78-8	2,3,5-Trichlorophenol			10	
944-22-9	Fonofos	500	1		
947-82-4	Phosfaian	100/10,000	1		
950-10-7	Mephosfolan	500	1		
950-37-8	Methidathion	500/10,000	1		
959-98-8	alpha - Endosulfan			1	
961-11-5	Tetrachlorvinphos				313
989-38-8	C.I. Basic Red 1				313
991-42-4	Norbormide	100/10,000	1		
998-30-1	Triethoxysilane	500	1		
999-81-5	Chlormequat chloride	100/10,000	1		
1024-57-3	Heptachlor epoxide			1	
1031-07-8	Endosulfan sulfate			1	
1031-47-6	Trimiphos	500/10,000	1		
1066-30-4	Chromic acetate			1,000	
1066-33-7	Ammonium bicarbonate			5,000	
1066-45-1	Trimethyltin chloride	500/10,000	1		
1072-35-1	Lead stearate			5,000	
1111-78-0	Ammonium carbamate			5,000	
1116-54-7	N-Nitrosodiethanolamine			1	
1120-71-4	Propane sultone			10	313
1120-71-4	1,3-Propane sultone			10	X
1122-60-7	Nitrocyclohexane	500	1		
1124-33-0	Pyridine, 4-nitro-, 1-oxide	500/10,000	1		
1129-41-5	Metalcarb	100/10,000	1		
1163-19-5	Decabromodiphenyl oxide				313
1185-57-5	Ferric ammonium citrate			1,000	
1194-65-6	Dichlobenil			100	
1300-71-6	Xylenol			1,000	
1303-28-2	Arsenic pentoxide	100/10,000		1	
1303-32-8	Arsenic disulfide			1	
1303-33-9	Arsenic trisulfide			1	
1306-19-0	Cadmium oxide	100/10,000	1		
1309-64-4	Antimony trioxide			1,000	
1310-58-3	Potassium hydroxide			1,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
1310-73-2	Sodium hydroxide			1,000	
1313-27-5	Molybdenum trioxide				313
1314-20-1	Thorium dioxide				313
1314-32-5	Thallic oxide			100	
1314-56-3	Phosphorus pentoxide	10	1		
1314-62-1	Vanadium pentoxide	100/10,000		1,000	
1314-80-3	Sulfur phosphide			100	
1314-84-7	Zinc phosphide	500		100	
1314-84-7	Zinc phosphide (conc. <= 10%)	500		100	
1314-84-7	Zinc phosphide (conc. > 10%)	500		100	
1314-87-0	Lead sulfide			5,000	
1319-72-8	2,4,5-T amines			5,000	
1319-77-3	Cresol (mixed isomers)			100	313
1320-18-9	2,4-D Esters			100	
1321-12-6	Nitrotoluene			1,000	
1327-52-2	Arsenic acid			1	
1327-53-3	Arsenous oxide	100/10,000		1	
1327-53-3	Arsenic trioxide	100/10,000		1	
1330-20-7	Xylene (mixed isomers)			1,000	313
1332-07-6	Zinc borate			1,000	
1332-21-4	Asbestos (friable)			1	313
1333-83-1	Sodium bifluoride			100	
1335-32-6	Lead subacetate			100	
1335-87-1	Hexachloronaphthalene				313
1336-21-6	Ammonium hydroxide			1,000	
1336-36-3	Polychlorinated biphenyls			1	313
1336-36-3	PCBs			1	X
1338-23-4	Methyl ethyl ketone peroxide			10	
1338-24-5	Naphthenic acid			100	
1341-49-7	Ammonium bifluoride			100	
1344-28-1	Aluminum oxide (fibrous forms)				313
1397-94-0	Antimycin A	1,000/10,000			
1420-07-1	Dinoterb	500/10,000	1		
1464-53-5	Diepoxybutane	500		10	313
1464-53-5	2,2'-Bioxirane	500		10	X
1558-25-4	Trichloro(chloromethyl)silane	100	1		
1563-66-2	Carbofuran	10/10,000		10	
1582-09-8	Trifluralin			1*	313
1600-27-7	Mercuric acetate	500/10,000	1		
1615-80-1	Hydrazine, 1,2-diethyl-			10	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
1622-32-8	Ethanesulfonyl chloride, 2-chloro-	500	1		
1634-04-4	Methyl tert-butyl ether			1*	313
1642-54-2	Diethylcarbamazine citrate	100/10,000	1		
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)			1	
1752-30-3	Acetone thiosemicarbazide	1,000/10,000	1		
1762-95-4	Ammonium thiocyanate			5,000	
1836-75-5	Nitrofen				313
1863-63-4	Ammonium benzoate			5,000	
1888-71-7	Hexachloropropene			1,000	
1897-45-6	Chlorothalonil				313
1910-42-5	Paraquat	10/10,000	1		
1918-00-9	Dicamba			1,000	
1928-38-7	2,4-D Esters			100	
1928-47-8	2,4,5-T esters			1,000	
1928-61-6	2,4-D Esters			100	
1929-73-3	2,4-D Esters			100	
1937-37-7	C.I. Direct Black 38				313
1982-47-4	Chloroxuron	500/10,000	1		
2001-95-8	Valinomycin	1,000/10,000	1		
2008-46-0	2,4,5-T amines			5,000	
2032-65-7	Methiocarb	500/10,000		10	
2032-65-7	Mercaptodimethur	500/10,000		10	
2074-50-2	Paraquat methosulfate	10/10,000	1		
2097-19-0	Phenylsilatrane	100/10,000	1		
2104-64-5	EPN	100/10,000	1		
2164-17-2	Fluometuron				313
2223-93-0	Cadmium stearate	1,000/10,000	1		
2231-57-4	Thiocarbazide	1,000/10,000	1		
2234-13-1	Octachloronaphthalene				313
2238-07-5	Diglycidyl ether	1,000	1		
2275-18-5	Prothoate	100/10,000	1		
2303-16-4	Diallate			100	313
2312-35-8	Propargite			10	
2497-07-6	Oxydisulfoton	500	1		
2524-03-0	Dimethyl phosphorochloridothioate	500	1		
2540-82-1	Formothion	100	1		
2545-59-7	2,4,5-T esters			1,000	
2570-26-5	Pentadecylamine	100/10,000	1		
2587-90-8	Phosphorothioic acid, O,O-dimethyl-S-(2-(m	500	1		
2602-46-2	C.I. Direct Blue 6				313

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
2631-37-8	Promecarb	500/10,000	1		
2636-26-2	Cyanophos	1,000	1		
2642-71-9	Azinphos-ethyl	100/10,000	1		
2665-30-7	Phosphonothioic acid, methyl-, O-(4-nitrop	500	1		
2703-13-1	Phosphonothioic acid, methyl-, O-ethyl O-(	500	1		
2757-18-8	Thallous malonate	100/10,000	1		
2763-96-4	Muscimol	500/10,000		1,000	
2763-96-4	5-(Aminomethyl)-3-isoxazolol	500/10,000		1,000	
2764-72-9	Diquat			1,000	
2778-04-3	Endothion	500/10,000	1		
2832-40-8	C.I. Disperse Yellow 3				313
2921-88-2	Chlorpyrifos			1	
2944-67-4	Ferric ammonium oxalate			1,000	
2971-38-2	2,4-D Esters			100	
3012-65-5	Ammonium citrate, dibasic			5,000	
3037-72-7	Silane, (4-aminobutyl)diethoxymethyl-	1,000	1		
3118-97-6	C.I. Solvent Orange 7				313
3164-29-2	Ammonium tartrate			5,000	
3165-93-3	4-Chloro-o-toluidine, hydrochloride			100	
3251-23-8	Cupric nitrate			100	
3254-63-5	Phosphoric acid, dimethyl 4-(methylthio) p	500	1		
3288-58-2	O,O-Diethyl S-methyl dithiophosphate			5,000	
3486-35-9	Zinc carbonate			1,000	
3547-04-4	DDE			1*	
3569-57-1	Sulfoxide, 3-chloropropyl octyl	500	1		
3615-21-2	Benzimidazole, 4,5-dichloro-2-(trifluorome	500/10,000	1		
3689-24-5	Sulfatep	500		100	
3689-24-5	Tetraethyldithiopyrophosphate	500		100	
3691-35-8	Chlorophacinone	100/10,000	1		
3734-97-2	Amiton oxalate	100/10,000	1		
3735-23-7	Methyl phenkapton	500	1		
3761-53-3	C.I. Food Red 5				313
3813-14-7	2,4,5-T amines			5,000	
3878-19-1	Fuberidazole	100/10,000	1		
4044-65-9	Bitoscanate	500/10,000	1		
4098-71-9	Isophorone diisocyanate	100	1		
4104-14-7	Phascetim	100/10,000	1		
4170-30-3	Crotonaldehyde	1,000		100	
4301-50-2	Fluenetil	100/10,000	1		
4418-66-0	Phenol, 2,2'-thiobis(4-chloro-6-methyl-	100/10,000	1		

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
4549-40-0	N-Nitrosomethylvinylamine			10	313
4680-78-8	C.I. Acid Green 3				313
4835-11-4	Hexamethylenediamine, N,N'-dibutyl-	500	1		
5344-82-1	Thiourea, (2-chlorophenyl)-	100/10,000		100	
5836-29-3	Coumatetralyl	500/10,000	1		
5893-66-3	Cupric oxalate			100	
5972-73-6	Ammonium oxalate			5,000	
6009-70-7	Ammonium oxalate			5,000	
6369-96-6	2,4,5-T amines			5,000	
6369-97-7	2,4,5-T amines			5,000	
6484-52-2	Ammonium nitrate (solution)				313
6533-73-9	Thallous carbonate	100/10,000		100	
6533-73-9	Thallium(I) carbonate	100/10,000		100	
6923-22-4	Monocrotophos	10/10,000	1		
7005-72-3	4-Chlorophenyl phenyl ether			5,000	
7421-93-4	Endrin aldehyde			1	
7428-48-0	Lead stearate			5,000	
7429-90-5	Aluminum (fume or dust)				313
7439-92-1	Lead			1*	313
7439-96-5	Manganese				313
7439-97-6	Mercury			1	313
7440-02-0	Nickel			100*	313
7440-22-4	Silver			1,000*	313
7440-23-5	Sodium			10	
7440-28-0	Thallium			1,000*	313
7440-36-0	Antimony			5,000*	313
7440-38-2	Arsenic			1*	313
7440-39-3	Barium				313
7440-41-7	Beryllium			10*	313
7440-43-9	Cadmium			10*	313
7440-47-3	Chromium			5,000*	313
7440-48-4	Cobalt				313
7440-50-8	Copper			5,000*	313
7440-62-2	Vanadium (fume or dust)				313
7440-66-6	Zinc (fume or dust)			1,000*	313
7440-66-6	Zinc			1,000*	
7446-08-4	Selenium dioxide			10	
7446-09-5	Sulfur dioxide	500	1		
7446-11-9	Sulfur trioxide	100	1		
7446-14-2	Lead sulfate			100	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
7446-18-6	Thallous sulfate	100/10,000		100	
7446-18-6	Thallium(I) sulfate	100/10,000		100	
7446-27-7	Lead phosphate			1	
7447-39-4	Cupric chloride			10	
7487-94-7	Mercuric chloride	500/10,000	1		
7488-56-4	Selenium sulfide			10	
7550-45-0	Titanium tetrachloride	100		1*	313
7558-79-4	Sodium phosphate, dibasic			5,000	
7580-67-8	Lithium hydride	100	1		
7601-54-9	Sodium phosphate, tribasic			5,000	
7631-89-2	Sodium arsenate	1,000/10,000		1	
7631-90-5	Sodium bisulfite			5,000	
7632-00-0	Sodium nitrite			100	
7637-07-2	Boron trifluoride	500	1		
7645-25-2	Lead arsenate			1	
7646-85-7	Zinc chloride			1,000	
7647-01-0	Hydrochloric acid			5,000	313
7647-01-0	Hydrogen chloride (gas only)	500		5,000	X
7647-18-9	Antimony pentachloride			1,000	
7664-38-2	Phosphoric acid			5,000	313
7664-39-3	Hydrogen fluoride	100		100	313
7664-39-3	Hydrofluoric acid	100		100	X
7664-41-7	Ammonia	500		100	313
7664-93-9	Sulfuric acid	1,000		1,000	313
7681-49-4	Sodium fluoride			1,000	
7681-52-9	Sodium hypochlorite			100	
7697-37-2	Nitric acid	1,000		1,000	313
7699-45-8	Zinc bromide			1,000	
7705-08-0	Ferric chloride			1,000	
7718-54-9	Nickel chloride			100	
7719-12-2	Phosphorus trichloride	1,000		1,000	
7720-78-7	Ferrous sulfate			1,000	
7722-64-7	Potassium permanganate			100	
7722-84-1	Hydrogen peroxide (conc.> 52%)	1,000	1		
7723-14-0	Phosphorus (yellow or white)	100		1	313
7723-14-0	Phosphorus	100		1	
7726-95-6	Bromine	500	1		
7733-02-0	Zinc sulfate			1,000	
7738-94-5	Chromic acid			10	
7758-29-4	Sodium phosphate, tribasic			5,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
7758-94-3	Ferrous chloride			100	
7758-95-4	Lead chloride			100	
7758-98-7	Cupric sulfate			10	
7761-88-8	Silver nitrate			1	
7773-06-0	Ammonium sulfamate			5,000	
7775-11-3	Sodium chromate			10	
7778-39-4	Arsenic acid			1	
7778-44-1	Calcium arsenate	500/10,000		1	
7778-50-9	Potassium bichromate			10	
7778-54-3	Calcium hypochlorite			10	
7779-86-4	Zinc hydrosulfite			1,000	
7779-88-6	Zinc nitrate			1,000	
7782-41-4	Fluorine	500		10	
7782-49-2	Selenium			100*	313
7782-50-5	Chlorine	100		10	313
7782-63-0	Ferrous sulfate			1,000	
7782-82-3	Sodium selenite			100	
7782-86-7	Mercurous nitrate			10	
7783-00-8	Selenious acid	1,000/10,000		10	
7783-06-4	Hydrogen sulfide	500		100	
7783-07-5	Hydrogen selenide	10	1		
7783-20-2	Ammonium sulfate (solution)				313
7783-35-9	Mercuric sulfate			10	
7783-46-2	Lead fluoride			100	
7783-49-5	Zinc fluoride			1,000	
7783-50-8	Ferric fluoride			100	
7783-56-4	Antimony trifluoride			1,000	
7783-60-0	Sulfur tetrafluoride	100	1		
7783-70-2	Antimony pentafluoride	500	1		
7783-80-4	Tellurium hexafluoride	100	1		
7784-34-1	Arsenous trichloride	500		1	
7784-40-9	Lead arsenate			1	
7784-41-0	Potassium arsenate			1	
7784-42-1	Arsine	100	1		
7784-46-5	Sodium arsenite	500/10,000		1	
7785-84-4	Sodium phosphate, tribasic			5,000	
7786-34-7	Mevinphos	500		10	
7786-81-4	Nickel sulfate			100	
7787-47-5	Beryllium chloride			1	
7787-49-7	Beryllium fluoride			1	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
10101-63-0	Lead iodide			100	
10101-89-0	Sodium phosphate, tribasic			5,000	
10102-06-4	Uranyl nitrate			100	
10102-18-8	Sodium selenite	100/10,000		100	
10102-20-2	Sodium tellurite	500/10,000	1		
10102-43-9	Nitric oxide	100		10	
10102-44-0	Nitrogen dioxide	100		10	
10102-45-1	Thallium(I) nitrate			100	
10102-48-4	Lead arsenate			1	
10108-64-2	Cadmium chloride			10	
10124-50-2	Potassium arsenite	500/10,000		1	
10124-56-8	Sodium phosphate, tribasic			5,000	
10140-65-5	Sodium phosphate, dibasic			5,000	
10140-87-1	Ethanol, 1,2-dichloro-, acetate	1,000	1		
10192-30-0	Ammonium bisulfite			5,000	
10196-04-0	Ammonium sulfite			5,000	
10210-68-1	Cobalt carbonyl	10/10,000	1		
10265-92-6	Methamidophos	100/10,000	1		
10294-34-5	Boron trichloride	500	1		
10311-84-9	Bialifor	100/10,000	1		
10361-89-4	Sodium phosphate, tribasic			5,000	
10380-29-7	Cupric sulfate, ammoniated			100	
10415-75-5	Mercurous nitrate			10	
10421-48-4	Ferric nitrate			1,000	
10476-95-6	Methacrolein diacetate	1,000	1		
10544-72-6	Nitrogen dioxide			10	
10588-01-9	Sodium bichromate			10	
11096-82-5	Aroclor 1260			1	
11097-69-1	Aroclor 1254			1	
11104-28-2	Aroclor 1221			1	
11115-74-5	Chromic acid			10	
11141-16-5	Aroclor 1232			1	
12002-03-8	Paris green	500/10,000		1	
12002-03-8	Cupric acetoarsenite	500/10,000		1	
12039-52-0	Selenious acid, dithallium(1+) salt			1,000	
12054-48-7	Nickel hydroxide			10	
12108-13-3	Manganese, tricarbonyl methylcyclopentadie	100	1		
12122-67-7	Zineb				313
12125-01-8	Ammonium fluoride			100	
12125-02-9	Ammonium chloride			5,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
7787-55-5	Beryllium nitrate			1	
7788-98-9	Ammonium chromate			10	
7789-00-6	Potassium chromate			10	
7789-06-2	Strontium chromate			10	
7789-09-5	Ammonium bichromate			10	
7789-42-6	Cadmium bromide			10	
7789-43-7	Cobaltous bromide			1,000	
7789-61-9	Antimony tribromide			1,000	
7790-94-5	Chlorosulfonic acid			1,000	
7791-12-0	Thallous chloride	100/10,000		100	
7791-12-0	Thallium chloride TlCl	100/10,000		100	
7791-23-3	Selenium oxychloride	500	1		
7803-51-2	Phosphine	500		100	
7803-55-6	Ammonium vanadate			1,000	
8001-35-2	Toxaphene	500/10,000		1	313
8001-35-2	Camphechlor	500/10,000		1	X
8001-35-2	Camphene, octachloro-	500/10,000		1	X
8001-58-9	Creosote			1	313
8003-19-8	Dichloropropane - Dichloropropene (mixture			100	
8003-34-7	Pyrethrins			1	
8014-95-7	Sulfuric acid (fuming)			1,000	
8065-48-3	Demeton	500	1		
10022-70-5	Sodium hypochlorite			100	
10025-73-7	Chromic chloride	1/10,000	1		
10025-87-3	Phosphorus oxychloride	500		1,000	
10025-91-9	Antimony trichloride			1,000	
10026-11-6	Zirconium tetrachloride			5,000	
10026-13-8	Phosphorus pentachloride	500	1		
10028-15-6	Ozone	100	1		
10028-22-5	Ferric sulfate			1,000	
10031-59-1	Thallium sulfate	100/10,000		100	
10034-93-2	Hydrazine sulfate				313
10039-32-4	Sodium phosphate, dibasic			5,000	
10043-01-3	Aluminum sulfate			5,000	
10045-89-3	Ferrous ammonium sulfate			1,000	
10045-94-0	Mercuric nitrate			10	
10049-04-4	Chlorine dioxide				313
10049-05-5	Chromous chloride			1,000	
10099-74-8	Lead nitrate			100	
10101-53-8	Chromic sulfate			1,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
12135-76-1	Ammonium sulfide			100	
12427-38-2	Maneb				313
12672-29-6	Aroclor 1248			1	
12674-11-2	Aroclor 1016			1	
12771-08-3	Sulfur monochloride			1,000	
13071-79-9	Terbufos	100	1		
13171-21-6	Phosphamidon	100	1		
13194-48-4	Ethoprophos	1,000	1		
13410-01-0	Sodium selenate	100/10,000	1		
13450-90-3	Gallium trichloride	500/10,000	1		
13463-39-3	Nickel carbonyl	1		10	
13463-40-6	Iron, pentacarbonyl-	100	1		
13494-80-9	Tellurium	500/10,000	1		
13560-99-1	2,4,5-T salts			1,000	
13597-99-4	Beryllium nitrate			1	
13746-89-9	Zirconium nitrate			5,000	
13765-19-0	Calcium chromate			10	
13814-96-5	Lead fluoborate			188	
13826-83-0	Ammonium fluoborate			5,800	
13952-84-6	sec-Butylamine			1,080	
14817-41-5	Cobaltous sulfamate			1,080	
14167-18-1	Salcomine	500/10,000	1		
14216-75-2	Nickel nitrate			100	
14258-49-2	Ammonium oxalate			5,000	
14307-35-8	Lithium chromate			10	
14307-43-8	Ammonium tartrate			5,808	
14639-97-5	Zinc ammonium chloride			1,000	
14639-98-6	Zinc ammonium chloride			1,000	
14644-61-2	Zirconium sulfate			5,000	
15271-41-7	Bicyclo[2.2.1]heptane-2-carbonitrile, 5-ch	500/10,000	1		
15699-18-0	Nickel ammonium sulfate			100	
15739-80-7	Lead sulfate			100	
15950-66-8	2,3,4-Trichlorophenol			10	
16071-86-6	C.I. Direct Brown 95				313
16543-55-8	N-Nitrosonornicotine				313
16721-80-5	Sodium hydrosulfide			5,000	
16752-77-5	Methomyl	500/10,000		100	
16752-77-5	Ethanimidothioic acid, N-[[methylamino)car	580/10,000		108	
16871-71-9	Zinc silicofluoride			5,000	
16919-19-0	Ammonium silicofluoride			1,000	

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CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
16923-95-8	Zirconium potassium fluoride			1,000	
17702-41-9	Decaborane(14)	500/10,000	1		
17702-57-7	Formparanate	100/10,000	1		
18883-66-4	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino			1	
19287-45-7	Diborane	100	1		
19624-22-7	Pentaborane	500	1		
20816-12-0	Osmium tetroxide			1,000	313
20816-12-0	Osmium oxide OsO4 (T-4)-			1,000	X
20830-75-5	Digoxin	10/10,000	1		
20830-81-3	Daunomycin			10	
20859-73-8	Aluminum phosphide	500		100	
21548-32-3	Fosthietan	500	1		
21609-90-5	Leptophos	500/10,000	1		
21908-53-2	Mercuric oxide	500/10,000	1		
21923-23-9	Chlorthiophos	500	1		
22224-92-6	Fenamiphos	10/10,000	1		
23135-22-0	Oxamyl	100/10,000	1		
23422-53-9	Formetanate hydrochloride	500/10,000	1		
23505-41-1	Pirimifos-ethyl	1,000	1		
23950-58-5	Benzamide,3,5-dichloro-N-(1,1-dimethyl-2-p			5,000	
24017-47-8	Triazofos	500	1		
24934-91-6	Chlormephos	500	1		
25154-54-5	Dinitrobenzene (mixed isomers)			100	
25154-55-6	Nitrophenol (mixed isomers)			100	
25155-30-0	Sodium dodecylbenzenesulfonate			1,000	
25167-82-2	Trichlorophenol			10	
25168-15-4	2,4,5-T esters			1,000	
25168-26-7	2,4-D Esters			100	
25321-14-6	Dinitrotoluene (mixed isomers)			18	313
25321-22-6	Dichlorobenzene (mixed isomers)			100	313
25321-22-6	Dichlorobenzene			108	X
25376-45-8	Diaminotoluene (mixed isomers)			10	313
25376-45-8	Toluenediamine			10	X
25550-58-7	Dinitrophenol			10	
26264-06-2	Calcium dodecylbenzenesulfonate			1,000	
26419-73-8	Carbamic acid, methyl-, O-(((2,4-dimethyl-	100/10,000	1		
26471-62-5	Toluenediisocyanate (mixed isomers)			100	313
26628-22-8	Sodium azide (Na(N3))	500		1,080	
26638-19-7	Dichloropropane			1,000	
27137-85-5	Trichloro(dichlorophenyl)silane	500	1		

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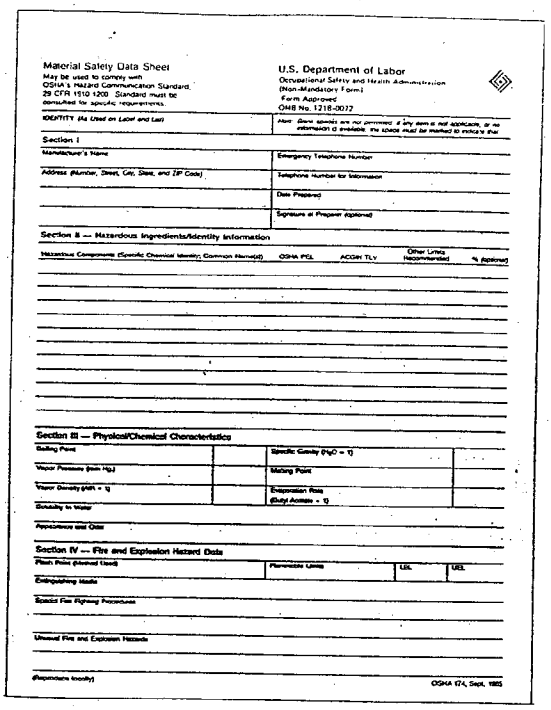
CAS Number	Chemical Name	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
27176-87-0	Dodecylbenzenesulfonic acid			1,000	
27323-41-7	Triethanolamine dodecylbenzene sulfonate			1,000	
27774-13-6	Vanadyl sulfate			1,000	
28300-74-5	Antimony potassium tartrate			108	
28347-13-9	Xylylene dichloride	100/10,000	1		
28772-56-7	Bromadiolone	100/10,000	1		
30525-89-4	Paraformaldehyde			1,000	
30674-80-7	Methacryloyloxyethyl isocyanate	100	1		
32534-95-5	2,4,5-TP esters			100	
33213-65-9	beta - Endosulfan			1	
36478-76-9	Uranyl nitrate			100	
37211-05-5	Nickel chloride			100	
39156-41-7	2,4-Diaminoanisole sulfate				313
39196-18-4	Thiofanox	100/10,000		100	
42504-46-1	Isopropanolamine dodecylbenzene sulfonate			1,000	
50782-69-9	Phosphonothioic acid, methyl-, S-(2-(bis(1	100	1		
52628-25-8	Zinc ammonium chloride			1,000	
52652-59-2	Lead stearate			5,000	
52740-16-6	Calcium arsenite			1	
53467-11-1	2,4-D Esters			100	
53469-21-9	Aroclor 1242			1	
53558-25-1	Pyriminil	100/10,000	1		
55488-87-4	Ferric ammonium oxalate			1,000	
56189-09-4	Lead stearate			5,000	
58270-08-9	Zinc, dichloro(4,4-dimethyl-5(((methylami	100/10,000	1		
61792-07-2	2,4,5-T esters			1,000	
62207-76-5	Cobalt, ((2,2'-(1,2-ethanediylbis(nitrilom	100/10,000	1		
**	Organorhodium Complex (PMN-82-147)	10/10,000	1		

Page 30

Chemical Category	Sec. 302(EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Sec 313
Antimony Compounds			***	313
Arsenic Compounds			***	313
Barium Compounds				313
Beryllium Compounds			***	313
cadmium compounds			***	313
Chlordane (Technical Mixture and Metabolites)			***	
Chlorinated Benzenes			***	
Chlorinated Ethenes			***	
Chlorinated Naphthalene			***	
Chlorophenols			***	313
Chlorinated Phenols			***	X
Chloroalkyl Ethers			***	
Chromium Compounds			***	313
Cobalt Compounds			1*	313
Coke Oven Emissions			1	
Copper Compounds			***	313
Cyanide Compounds			***	313
DDT and Metabolites			***	
Dichlorobenzidine			***	
Diphenylhydrazine			***	
Endosulfan and Metabolites			***	
Endrin and Metabolites			***	
Glycol Ethers			1*	313
Haloethers			***	
Halomethanes			***	
Heptachlor and Metabolites			***	
Lead Compounds			***	313
Manganese Compounds			1*	313
Mercury Compounds			***	313
Fine mineral fibers			1*	
Nickel Compounds			***	313
Nitrophenols			***	
Nitrosamines			***	
Phthalate Esters			***	
Polybrominated Biphenyls (PBBs)				313
Polycyclic organic matter			1*	
Polynuclear Aromatic Hydrocarbons			***	
Selenium Compounds			***	313
Silver compounds			***	313
Thallium Compounds			***	313
Zinc Compounds			***	313

Appendix 2

Sample MSDS, Tier I, and Tier II Forms



Material Safety Data Sheet
May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name | Emergency Telephone Number

Address (Number, Street, City, State, and ZIP Code) | Telephone Number for Information

Date Prepared

Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)

Section III — Physical/Chemical Characteristics

Boiling Point		Specific Gravity (H_2O = 1)	
Vapor Pressure (mm Hg.)		Melting Point	
Vapor Density (air = 1)		Evaporation Rate (Butyl Acetate = 1)	
Solubility in Water			
Appearance and Odor			

Section IV — Fire and Explosion Hazard Data

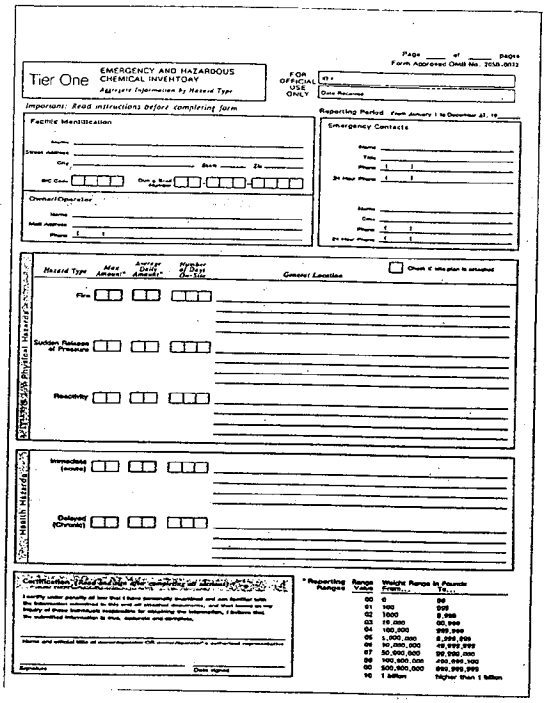
Flash Point (Method Used)	Flammable Limits	LEL	UEL
Extinguishing Media			

Special Fire Fighting Procedures

Unusual Fire and Explosion Hazards

(Reproduction locally)

OSHA 174, Sept. 1985



Tier One
EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY
Aggregate Information by Hazard Type

FOR OFFICIAL USE ONLY

Important: Read instructions before completing form

Reporting Period From January 1 to December 31, 19__

Facility Identification

Emergency Contacts

Owner/Operator

Hazard Type | Max. Amount | Average Daily Amount | Number of Days On Site | General Location

Physical Hazards: Fire; Sudden Release of Pressure; Reactivity

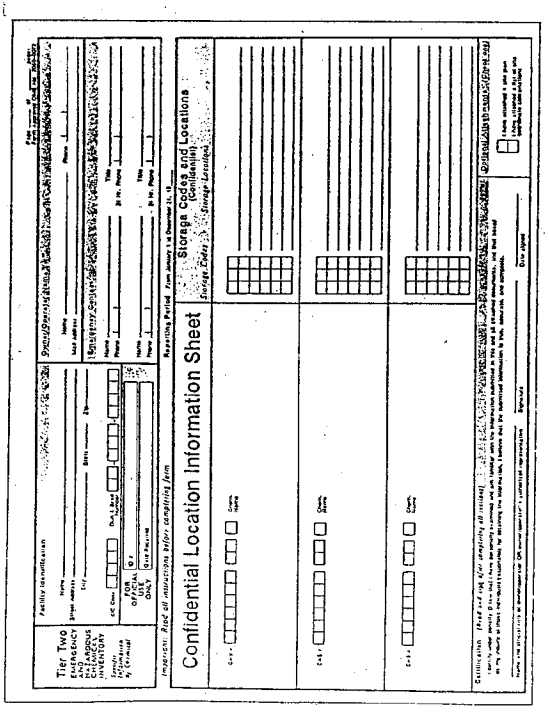
Health Hazards: Immediate (acute); Delayed (Chronic)

Check if site plan is attached

Certification

* Reporting Ranges

Range Value	Weight Range in Pounds From...	To...
01	1	99
02	100	999
03	1,000	9,999
04	10,000	99,999
05	100,000	999,999
06	1,000,000	9,999,999
07	10,000,000	49,999,999
08	50,000,000	99,999,999
09	100,000,000	499,999,999
10	500,000,000	999,999,999
11	1 billion	Higher than 1 billion



Tier Two
EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY
Emergency and Hazardous Chemical Inventory

FOR OFFICIAL USE ONLY

Important: Read all instructions before completing form

Facility Identification

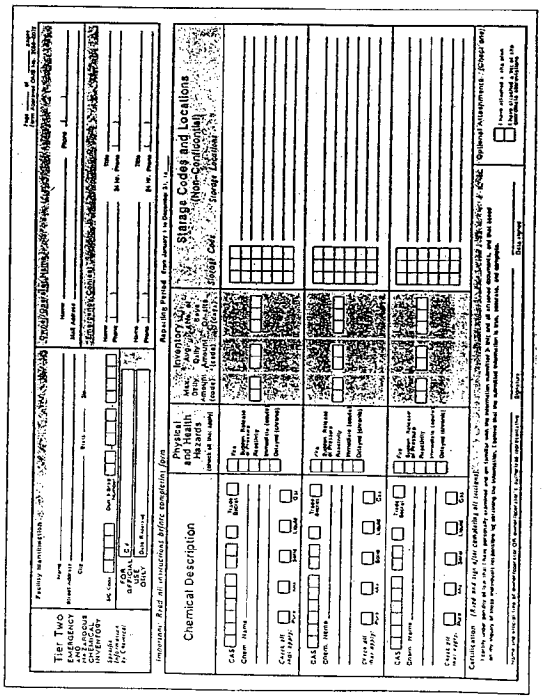
Reporting Period From January 1 to December 31, 19__

Confidential Location Information Sheet

Storage Codes and Locations (Confidential)
Storage Codes: 1 = Storage Location

Certification

Optional Attachments



Tier Two
EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY
Emergency and Hazardous Chemical Inventory

FOR OFFICIAL USE ONLY

Important: Read all instructions before completing form

Facility Identification

Reporting Period From January 1 to December 31, 19__

Chemical Description

Physical and Health Hazards

Inventory (Max. Daily Amount / Average Daily Amount)

Storage Codes and Locations (Non-Confidential)
Storage Codes: 1 = Storage Location

Certification

Optional Attachments

Appendix 3

Industries Covered by TRI Right-to-Know Reporting Requirements

2011 to 2099—Food and Kindred Products
2111 to 2141—Tobacco Manufacturers

2211 to 2299—Textile Mill Products
2311 to 2399—Apparel and Other Finished Products made from Fabrics and Other Similar Materials

2411 to 2499—Lumber and Wood Products, (Except Furniture)
2511 to 2599—Furniture and Fixtures
2611 to 2661—Paper and Allied Products

2711 to 2795—Printing, Publishing and Allied Industries

2811 to 2899—Chemicals and Allied Products
2911 to 2999—Petroleum Refining and Related Industries
3011 to 3079—Rubber and Miscellaneous Plastics Products

3111 to 3199—Leather and Leather Products

3211 to 3299—Stone, Clay, Glass and Concrete Products

3311 to 3399—Primary Metal Industries
3411 to 3499—Fabricated Metal Products, except Machinery and Transportation Equipment

3511 to 3599—Machinery Except Electrical
3611 to 3699—Electrical and Electronic Machinery, Equipment and Supplies

3711 to 3799—Transportation Equipment

3811 to 3873—Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks

3911 to 3999—Miscellaneous Manufacturing Industries:
- Jewelry, precious metal
- Silverware, platedware and stainless steel ware
- Jewelers' findings and materials and lapidary work
- Musical instruments
- Dolls
- Games, toys and children's vehicles except dolls and bicycles
- Sporting and athletic goods not elsewhere classified
- Pens, mechanical pencils and parts
- Lead pencils, crayons and artists' materials
- Marking devices
- Carbon paper and inked ribbons
- Costume jewelry and costume novelties, except precious metal
- Feathers, plumes and artificial trees and flowers
- Buttons
- Needles, pins, hooks and eyes and similar notions
- Brooms and brushes
- Signs and advertising displays
- Burial caskets
- Linoleum, asphalted-felt-base and other hard surface floor coverings not elsewhere classified
- Manufacturing industries not elsewhere classified

Appendix 4

Sample Form Rs

EPA United States Environmental Protection Agency

FORM R TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

WHERE TO SEND COMPLETED FORMS:
1. EPCRA Reporting Center, P.O. Box 23779, Washington, DC 20026-3779, ATTN: TOXIC CHEMICAL RELEASE INVENTORY
2. APPROPRIATE STATE OFFICE (See instructions in Appendix F)

Enter "X" here if this is a revision

For EPA use only

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR

19 ____

SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 3 trade secret? ☐ Yes (Answer question 2.2; Attach substantiation forms) ☐ No (Do not answer 2.2; Go to Section 3)

2.2 If yes in 2.1, is this copy: ☐ Sanitized ☐ Unsanitized

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official

Signature | Date Signed

SECTION 4. FACILITY IDENTIFICATION

Facility or Establishment Name | TRI Facility ID Number

Street Address

City | County

4.1 State | Zip Code

Mailing Address (if different from street address)

City

State | Zip Code

PUT LABEL HERE

EPA United States Environmental Protection Agency

EPA FORM R

PART I. FACILITY IDENTIFICATION INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 4. FACILITY IDENTIFICATION (Continued)

4.2	This report contains information for: (Important: check only one)	a. ☐ An entire facility b. ☐ Part of a facility
4.3	Technical Contact	Name; Telephone Number (include area code)
4.4	Public Contact	Name; Telephone Number (include area code)
4.5	SIC Code (4-digit)	a. b. c. d. e. f.
4.6	Latitude and Longitude	Latitude: Degrees, Minutes, Seconds; Longitude: Degrees, Minutes, Seconds
4.7	Dun & Bradstreet Number(s) (9 digits)	a. b.
4.8	EPA Identification Number(s) (RCRA I.D. No.) (12 characters)	a. b.
4.9	Facility NPDES Permit Number(s) (9 characters)	a. b.
4.10	Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)	a. b.

SECTION 5. PARENT COMPANY INFORMATION

5.1 Name of Parent Company ☐ NA

5.2 Parent Company's Dun & Bradstreet Number ☐ NA (9 digits)

EPA
United States Environmental Protection Agency

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you complete Section 2 below.)

1.1 CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)

1.2 Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)

1.3 Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "yes." Generic Name must be structurally descriptive.)

SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you complete Section 1 above.)

2.1 Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY (Important: Check all that apply.)

3.1 Manufacture the toxic chemical:
a. ☐ Produce
b. ☐ Import
If produce or import:
c. ☐ For on-site use/processing
d. ☐ For sale/distribution
e. ☐ As a byproduct
f. ☐ As an impurity

3.2 Process the toxic chemical:
a. ☐ As a reactant
b. ☐ As a formulation component
c. ☐ As an article component
d. ☐ Repackaging

3.3 Otherwise use the toxic chemical:
a. ☐ As a chemical processing aid
b. ☐ As a manufacturing aid
c. ☐ Ancillary or other use

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1 ☐ (Enter two-digit code from instruction package.)

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United States Environmental Protection Agency

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 5. RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

			A. Total Release (pounds/year) (enter range code from instructions or estimate)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	☐ NA			
5.2	Stack or point air emissions	☐ NA			
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
5.3.1	Stream or Water Body Name				
5.3.2	Stream or Water Body Name				
5.3.3	Stream or Water Body Name				
5.4	Underground Injections on-site	☐ NA			
5.5	Releases to land on-site				
5.5.1	Landfill	☐ NA			
5.5.2	Land treatment/ application farming	☐ NA			
5.5.3	Surface Impoundment	☐ NA			
5.5.4	Other disposal	☐ NA			

☐ Check here only if additional Section 5.3 information is provided on page 5 of this form.

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United States Environmental Protection Agency

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 5.3 ADDITIONAL INFORMATION ON RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

5.3 Discharges to receiving streams or water bodies (enter one name per box)	A. Total Release (pounds/year) (enter range code from instructions or estimate)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.3.__ Stream or Water Body Name			
5.3.__ Stream or Water Body Name			
5.3.__ Stream or Water Body Name			

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTW)

6.1.A Total Quantity Transferred to POTWs and Basis of Estimate

6.1.A.1 Total Transfers (pounds/year) (enter range code or estimate)	6.1.A.2 Basis of Estimate (enter code)

6.1.B POTW Name and Location Information

6.1.B.__ POTW Name	6.1.B.__ POTW Name
Street Address	Street Address
City / County	City / County
State / Zip Code	State / Zip Code

If additional pages of Part II, Sections 5.3 and/or 6.1 are attached, indicate the total number of pages in this box ☐ and indicate which Part II, Sections 5.3/6.1 page this is, here ☐ (example: 1, 2, 3, etc.)

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United States Environmental Protection Agency

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.__ Off-site EPA Identification Number (RCRA ID No.)

Off-Site Location Name

Street Address

City / County

State / Zip Code

Is location under control of reporting facility or parent company? ☐ Yes ☐ No

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.__ Off-site EPA Identification Number (RCRA ID No.)

Off-Site Location Name

Street Address

City / County

State / Zip Code

Is location under control of reporting facility or parent company? ☐ Yes ☐ No

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1. M
2.	2.	2. M
3.	3.	3. M
4.	4.	4. M

If additional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box ☐ and indicate which Part II, Section 6.2 page this is, here ☐ (example: 1, 2, 3, etc.)

EPA Form 9350-1 (Rev. 5/14/92) - Previous editions are obsolete.

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

Appendix 5

State TRI Information Contacts

Illinois

Mr. Joe Goodner
Emergency Planning Unit
Illinois EPA
P.O. Box 19276
2200 Churchill Rd.
Springfield, IL 62794-9276
217-785-0830

Indiana

Mr. John Rose
Indiana Emergency Response Commission
5500 West Bradbury Ave.
Indianapolis, IN 46241
317-243-5176

Michigan

Kent Kanagy
Title III Coordinator
Michigan Department of Natural Resources
Environmental Response Division, Title III Notification
P.O. Box 30028
Lansing, MI 48909
517-373-8481

Minnesota

Mr. Paul Aasen
Minnesota Emergency Response Commission
175 Bigelow Bldg.
450 N. Syndicate St.
St. Paul, MN 55104
612-643-3000

New York

William Miner
Emergency Coordinator
New York Emergency Response Commission
New York State Department of
Environmental Conservation
Bureau of Spill Response
50 Wolf Rd. #340
Albany, NY 12233-4107

Ohio

Ms. Cindy Sferra-DeWulf
Division of Air Pollution Control
1600 Watermark Dr.
Columbus, OH 43215
614-644-3604

Pennsylvania

Ms. Lynn Snead
Bureau of Right-to-Know
1503 Labor and Industry Bldg.
Seventh and Forrester Sts.
Harrisburg, PA 17120
717-783-2071

Wisconsin

Mr. Russ Dumst
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707
608-266-9255

Appendix 6

Sample Freedom of Information Request

Date

New York State Department of Environmental Conservation
(or other targeted state or federal department)
Freedom of Information Act Officer
Address

Dear Sir or Madam:

Pursuant to the Freedom of Information Act, I am requesting to see the following SPDES (or other relevant category of information) files:

1. Company, facility, address, and (if you know it) permit number

2. Other companies, facilities, addresses, and permit numbers

Specifically, I am requesting to see permit applications, draft permits, Monthly Discharge Monitoring Reports, and correspondence from citizens and industry with respect to each permit (or other relevant categories of specific documents). If possible, I would like to review the files on (date several weeks hence).

Thank you for your assistance. Feel free to contact me at (daytime phone) if you have any questions.

Sincerely,

(signature)

Name
Address

Appendix 7

Unit Conversions

The shorthand formula for calculating the average amount of material in pounds discharged under a Clean Water Act discharge permit is:

F x C x D x 8.36

where F = flow, in millions of gallons per day, C = concentration, in milligrams per liter (both numbers are typically found in NPDES permits), and D = days per year of facility operation (note that the facility may not operate every day; it might be closed on weekends).

This kind of formula uses one or more "conversion factors" (in this case they have all been calculated and shortened down to a single number, 8.36) to translate data from one unit of measure to another. In this example, we are starting with units of millions of gallons per day, milligrams per liter, and days per year; the formula converts this to units of pounds per year.

This is a system based on the fact that anything multiplied by one equals itself: when we multiply by a conversion factor, it has the same effect as multiplying by one. For example, since one gram is equal to 1000 milligrams, the conversion factor

1 gram/1000 milligrams

is equal to one. Likewise the the conversion factor

2.2 pounds/kilogram

is also equal to one. Using conversion factors in an equation, since they are always equal to one, affects only the units of measure.

Here's how the shortened version of the formula is derived from the expanded version. We start with the original units of measure—in the case of a typical NPDES permit, that would be millions of gallons per day (the amount of discharge), milligrams per liter (the concentration in the discharge of some substance, say, chromium), and the days of facility operation per year:

F millions of gallons/day x
C milligrams/liter x
D days of operation/year

Multiplying this out as it stands would be nonsensical becuase liters and gallons are different forms of measuring the volume of a liquid. To reach a figure of any value at all, you would have to convert gallons to liters or vice versa. In this example we will do both that and another conversion: changing the weight unit of measure, milligrams (like liters, the European way of measuring things), into pounds (like gallons, the English and American way of measuring things).

To do this you add in various conversion factors:

F million gallons/day x
C milligrams/liter x
D days of operation/year x
1 kilogram/1,000,000 milligrams x
2.2 pounds/kilogram
x 3.8 liters/gallon
= P pounds/year

The "liters/gallon" element makes the volume-of-liquid conversion, and the "kilogram/milligrams" and "pounds/kilogram" elements make the weight conversion.

During figuring, the gallons units in the first and sixth elements cancel out, since one is in the numerator and the other in the denominator; likewise the millions in the first and fourth elements cancel out, as do the milligrams in the second and fourth elements, the kilograms in the fourth and fifth elements, the liters in the second and sixth elements, and the days in the first and third elements. All that's left is the variable numbers (that you get from the permits), the conversion numbers (like 2.2), and the pounds and years units.

After canceling out and multiplying, the formula is:

F x C x D x 8.36 = P pounds/year

For a facility operating 340 days per year with a flow of 4 million gallons per day and a concentration of 57 milligrams of chromium per liter, the formula would be:

4 x 57 x 340 x 8.36 = 648,067 pounds/year

If the original figures are not in the same units as described here, alter the formula's conversions as needed. For instance, if the concentration is listed in grams per liter instead of milligrams per liter, then the concentration variable shown above as "C milligrams/liter" would instead be "C grams/liter." Accordingly, the conversion factor of "1 kilogram/1,000,000 milligrams" would be changed to "1 kilogram/1000 grams."

This appendix is an extensively edited version of an appendix in "A Citizen's Toxic Waste Audit Manual," by Ben Gordon and Peter Montague, Greenpeace U.S.A., 1990.

Appendix 8

INFORM Facility Toxic Waste and Pollution Prevention Assessment

Plant Visit Information

Plant: _____

Date Of Visit: _____

Company Representatives: _____

Worksheet 4
Corporate Commitment

Question	Company Response
A. Source Reduction Policy	
i. Does your company have a working definition of source reduction? What is it? When was it first established?	
ii. Does your company have a written policy favoring source reduction as the most desirable waste management option? If so, may we have a copy? Who establishes the policy?	
iii. Is the policy corporation-wide or plant-specific?	
iv. Is your source reduction program a multimedia program? That is, does it cover chemical releases to air, water, and land?	
v. Do you have specific source reduction plans for specific chemicals?	
vi. For specific industrial processes?	
vii. Does your plan include specific source reduction goals? How are they measured?	
viii. Are source reduction options considered during the engineering phase when planning new product lines?	

Worksheet 4
Corporate Commitment

Question	Company Response
B. Company Leadership	
i. Is there an individual responsible for source reduction within your plant? If so, what is that individual's title and technical/program management background?	
ii. Is there a department or division at the company or plant that is responsible for source reduction? If so, how is it staffed, where is it located, and what are its general responsibilities?	
iii. How do this division and individual fit into the overall corporate structure? That is, to whom do they report and who reports to them?	
iv. To what extent are the managers and operators of your production processes involved in source reduction? For example, do they identify opportunities, implement changes, or measure progress? (Research shows that many source reduction opportunities are identified by production personnel.)	
C. Source Reduction Incentives	
i. Is there an incentive system that encourages employees to come up with suggestions for source reduction? What are the incentives?	
ii. Is there a source reduction training program? If so, please describe.	
iii. Is source reduction information transmitted throughout the plant/company in the form of newsletters/staff meetings? May we see written examples?	

Plant Visit Information

Plant: _____

Date Of Visit: _____

Company Representatives: _____

Worksheet 5
Waste-Related Data Collection

Question	Facility Level (facility-level materials accounting)	Process Level (process-level source reduction inventory)
A. Facility and Process Level Data		
i. Does the company collect waste-related data at this plant?		
ii. How are materials tracked (as specific chemicals, by waste categories, as products, etc.)?		
iii. Which chemicals and/or waste categories are tracked?		
iv. Does the company track materials released to all environmental media (air, land, and water)?		
v. Are materials tracked in each environmental medium regardless of whether they are regulated in them?		
vi. Are materials tracked in both production and nonproduction areas of the plant? (Nonproduction areas include storage, loading, transfer, and pollution control sites.)		
vii. Are chemical-specific materials balances performed to assure identification of all major sources and quantities of waste generated?		

Worksheet 5
Waste-Related Data Collection

Question	Facility Level (facility-level materials accounting)	Process Level (process-level source reduction inventory)
viii. If a materials balance is not performed, why not?		
ix. Are the nature and levels of uncertainty in the measurement mathods used identified?		
x. How are these levels of uncertainty factored into the analysis of the overall results? (Make sure you get some numbars on the amount of material not captured by the measurement methods used.)		
xi. Who sees the results of the data collection program?		
xii. What are the data used for?		
xiii. How do these data factor into evaluations of both the source reduction policy and the specific actions taken to achieve reductions in waste generation?		
xiv. How frequently are the data collected?		
xv. Who performs the collection procedure? What is this person's educational and professional background?		

Worksheet 5
Waste-Related Data Collection

Question	Facility Level (facility-level materials accounting)	Process Level (process-level source reduction inventory)
xvi. Have you computerized this information?		
xvii. Have you established a base year from which present and future accomplishments are measured? If so, what is that year?		

Question	Company Response
B. Progress Reports	
i. Does the plant prepare progress reports?	
ii. How do you measure source reduction accomplishments (e.g., by pounds per unit of production)?	
C. Full Cost Accounting	
i. Are waste-related costs accounted back to their source in the company's cost accounting system? Or does the company treat environmental costs as a fixed overhead expense?	
ii. Are wastes released to all environmental media included in the cost accounting?	
iii. Are costs designated by specific chemicals, chemical categories, or waste categories?	

Worksheet 5
Waste-Related Data Collection

Question	Company Response
iv. What types of costs are captured by the full cost accounting method you use:	
a. Materials (e.g., the costs of wasted starting materials and lost products)?	
b. Waste handling (e.g., capital and operational expenses for on-site recycling, treatment, storage, or disposal facilities; transportation and other expenses for wastes sent off-site)?	
c. Regulatory compliance?	
d. Insurance?	
e. Future liabilities from waste generation (e.g., accidents, worker illness, or waste site clean-up)?	
f. Public and customer relations dealing with waste issues?	
g. Other (please specify)?	

Appendix 9

Sources of Information in Canada

A User Guide: Who to Contact at Statistics Canada. An extremely useful guide for anyone who wants to tap into the experts at Statistics Canada. Lists all department heads. Available free through the Public Affairs Section of Statistics Canada.

Canadian Key Business Directory. Published annually by Dun and Bradstreet. Provides basic data about large Canadian businesses.

The Card Service. One of many useful services offered by the Financial Post Information Service. Includes in-depth profiles of hundreds of Canadian companies on handy index cards.

Competitive Strategy: Techniques for Analyzing Industries and Competitors, by Michael E. Porter. Contains an excellent section on conducting an industry analysis.

Directory of Directors. Published each year by the Financial Post Company. Lists key Canadian business people, their backgrounds, and the corporate boards they sit on.

Inter-Corporate Ownership. Published by Statistics Canada every couple of years. It reveals the degree of foreign ownership and the corporate structure of companies operating in Canada.

Finding Canadian Facts Fast: How to Research Information About Almost Anybody or Anything—Quickly, Cheaply, and Legally, Stephen Overbury.

Survey of Industrials; Survey of Mines and Energy Resources; and *Survey of Predecessor and Defunct Companies.* Three directories published annually by the Financial Post Company.

Who Owns Whom in North America. Published annually by Dun and Bradstreet. It shows the structure of companies, including a list of subsidiaries and associated companies.

Appendix 10

Known Health Effects of TRI Chemicals

Reprinted with permission from INFORM's A Citizen's Guide to Promoting Toxic Waste Reduction, *by Lauren Kenworthy and Eric Schaeffer. The guide is available from INFORM at 381 Park Ave. S., New York, NY 10016, 212-689-4040. The guide will be updated, expanded, and published under the title Preventing Industrial Toxic Hazards in spring 1993.*

Table C-1 Alphabetical Listing

Chemical Name	CAS Number	Carcinogenicity	Heritable genetic or chromosomal damage	Developmental toxicity (including teratogenicity)	Reproductive toxicity	Acute toxicity	Chronic (systemic) toxicity	Neurotoxicity	Environmental toxicity	Bioaccumulation	Persistence in the Environment
Acetaldehyde	75-07-0	X				X		X			
Acetamide	60-35-5	X					X				X
Acetone	67-64-1							X			
Acetonitrile	75-05-8			X	X	X	X				X
2-Acetylaminofluorene	53-96-3	X									
Acrolein	107-02-8					X	X		X		
Acrylamide	79-06-1		X			X	X	X	X		
Acrylic acid	79-10-7						X				
Acrylonitrile	107-13-1	X		X	X	X			X		
Aldrin	309-00-2	X		X	X	X	X		X	X	
Allyl chloride	107-05-1	X		X		X	X	X	X		
alpha-Naphthylamine	134-32-7	X									
Aluminum oxide	1344-28-1						X				
Aluminum (fume or dust)	7429-90-5										
1-Amino-2-methylanthraquinone	82-28-0	X									
4-Aminoazobenzene	60-09-3	X									
4-Aminobiphenyl	92-67-1	X									
Ammonia	7664-41-7					X	X			X	
Ammonium nitrate (solution)	6484-52-2						X				
Ammonium sulfate (solution)	7783-20-2								X		
Aniline	62-53-3	X				X	X		X		
o-Anisidine hydrochloride	134-29-2	X									
o-Anisidine	90-04-0	X					X	X			
p-Anisidine	104-94-9										
Anthracene	120-12-7						X		X	X	
Antimony	7440-36-0				X						
Arsenic	7440-38-2	X									
Asbestos (friable)	1332-21-4	X					X				
Auramine	492-80-8	X									
Barium	7440-39-3										
Benzal chloride	98-87-3	X				X					
Benzamide	55-21-0										

Table C-1 Alphabetical Listing

Chemical Name	CAS Number	Carcinogenicity	Heritable genetic or chromosomal damage	Developmental toxicity (including teratogenicity)	Reproductive toxicity	Acute toxicity	Chronic (systemic) toxicity	Neurotoxicity	Environmental toxicity	Bioaccumulation	Persistence in the Environment
Benzene	71-43-2	X			X	X		X			
Benzidine	92-87-5	X					X	X			
p-Benzoquinone	106-51-4					X	X				
Benzotrichloride	98-07-7	X				X		X			
Benzoyl chloride	98-88-4						X				
Benzoyl peroxide	94-36-0							X			
Benzyl chloride	100-44-7	X			X		X	X	X		
Beryllium	7440-41-7	X				X	X		X		
Biphenyl	92-52-4			X			X		X		
Bis(2-ethylhexyl) adipate	103-23-1	X	X								
Bromoform	75-25-2						X	X	X		
1,3-Butadiene	106-99-0	X			X	X	X				
1-Butanol	71-36-3						X				
Butyl acrylate	141-32-2								X		
sec-Butyl alcohol	78-92-2										
tert-Butyl alcohol	75-60-5										
Butyl benzyl phthalate	85-68-7						X		X		
1,2-Butylene oxide	106-88-7										
Butyraldehyde	123-72-8								X		
Cadmium	7440-43-9	X			X	X	X		X		
Calcium cyanamide	156-62-7						X				
Captan	133-06-2	X	X	X	X	X			X		X
Carbaryl	63-25-2			X	X	X	X	X	X	X	X
Carbon disulfide	75-15-0			X	X		X	X	X		X
Carbon tetrachloride	56-23-5	X		X			X				
Carbonyl sulfide	463-58-1						X		X		X
Catechol	120-80-9					X					
Chloramben	133-90-4	X									
Chlordane	57-74-9	X		X	X	X	X	X		X	
Chlorine	7782-50-5					X	X		X		
Chlorine dioxide	10049-04-4			X	X						
Chloroacetic acid	79-11-8					X					
2-Chloroacetophenone	532-27-4					X					
Chlorobenzene	108-90-7						X		X		
Chlorobenzilate	510-15-6	X							X		
Chloroform	67-66-3	X		X	X	X			X		X
Chloromethyl methyl ether	107-30-2	X				X					
Chloroprene	126-99-8		X	X	X		X	X			
Chlorothalonil	1897-45-6	X							X		
Chromium	7440-47-3	X					X		X		
Cobalt	7440-48-4						X				
Copper	7440-50-8			X	X				X		
p-Cresidine	120-71-8	X									
m-Cresol	108-39-4					X			X		
o-Cresol	95-48-7					X			X		
p-Cresol	106-44-5					X			X		
Cresol (mixed isomers)	1319-77-3					X	X		X		
Cumene hydroperoxide	80-15-9					X			X		
Cupferron	135-20-6	X									
Cyanide compounds	57-12-5								X		

Table C-1 Alphabetical Listing

Chemical Name	CAS Number	Carcinogenicity	Heritable genetic or chromosomal damage	Developmental toxicity (including teratogenicity)	Reproductive toxicity	Acute toxicity	Chronic (systemic) toxicity	Neurotoxicity	Environmental toxicity	Bioaccumulation	Persistence in the Environment
Cyclohexane	110-82-7							X			
C.I. Acid Blue 9, diammonium salt	2650-18-2										
C.I. Acid Blue 9, disodium salt	3844-45-9	X									
C.I. Acid Green 3	4680-78-8	X									
C.I. Basic Green 4	569-64-2					X		X			
C.I. Basic Red 1	989-38-8	X									
C.I. Direct Black 38	1937-37-7	X									
C.I. Direct Blue 6	2602-46-2	X		X							
C.I. Direct Brown 95	16071-86-6	X									
C.I. Disperse Yellow 3	2832-40-8	X									
C.I. Food Red 15	81-88-9	X					X				
C.I. Food Red 5	3761-53-3	X									
C.I. Solvent Orange 7	3118-97-6										
C.I. Solvent Yellow 14	842-07-9	X									
C.I. Solvent Yellow 3	97-56-3	X									
C.I. Vat Yellow 4	128-66-5	X							X		
2,4-D	94-75-7			X	X	X	X				
Decabromodiphenyl oxide	1163-19-5	X						X			
Diallate	2303-16-4	X									
2,4-Diaminoanisole	615-05-4	X			X			X			
2,4-Diaminoanisole sulfate	39156-41-7	X									
4,4'-Diaminodiphenyl ether	101-80-4	X									
2,4-Diaminotoluene	95-80-7	X	X				X				
Diazomethane	334-88-3										
Dibenzofuran	132-64-9										
1,2-Dibromo-3-chloropropane	96-12-8	X		X	X	X	X				
Dibutyl phthalate	84-74-2			X	X		X	X	X		
Dichlorobenzene	25321-22-6	X					X	X	X		
m-Dichlorobenzene	541-73-1							X			
o-Dichlorobenzene	95-50-1							X	X		
p-Dichlorobenzene	106-46-7							X	X		
3,3'-Dichlorobenzidine	91-94-1	X					X	X	X		
Dichlorobromomethane	75-27-4	X									
Dichloroethyl ether	111-44-4	X									X
1,1-Dichloroethylene	75-35-4	X				X	X				
Dichloroisopropyl ether	108-60-1	X		X	X		X		X		
Dichloromethyl ether	542-88-1	X				X					
2,4-Dichlorophenol	120-83-2										
1,3-Dichloropropene	542-75-6	X				X	X		X		
Dichlorvos	62-73-7			X	X	X			X		X
Dicofol	115-32-2	X				X			X		
1:2,3:4-Diepoxybutane	1464-53-5	X	X			X					
Diethanolamine	111-42-2	X									
Diethyl sulfate	64-67-5	X	X						X		
Diethylhexyl phthalate	117-81-7	X	X	X	X		X		X	X	
Diethylphthalate	84-66-2										
3,3'-Dimethoxybenzidine	119-90-4	X							X		
Dimethyl sulfate	77-78-1	X	X			X					
4-Dimethylaminoazobenzene	60-11-7	X							X		
N,N-Dimethylaniline	121-69-7					X	X			X	

Table C-1 Alphabetical Listing

Chemical Name	CAS Number	Carcinogenicity	Reproductive toxicity (including teratogenicity)	Developmental toxicity (including teratogenicity)	Reproductive toxicity	Acute toxicity	Chronic (systemic) toxicity	Neurotoxicity	Environmental toxicity	Bioaccumulation	Persistence in the Environment
3,3'-Dimethylbenzidine	119-93-7	X									
Dimethylcarbamyl chloride	79-44-7	X				X					
1,1-Dimethylhydrazine	57-14-7	X				X			X		
2,4-Dimethylphenol	105-67-9								X		
Dimethylphthalate	131-11-3					X			X		
2,4-Dinitrophenol	51-28-5			X	X	X	X		X		
2,4-Dinitrotoluene	121-14-2	X					X		X		
2,6-Dinitrotoluene	606-20-2					X			X		
4,6-Dinitro-o-cresol	534-52-1					X			X		
Dioxane	123-91-1	X									
1,2-Diphenylhydrazine	122-66-7	X							X		
Di-n-octylphthalate	117-84-0					X	X			X	
Di-n-propylnitrosamine	621-64-7	X									
Epichlorohydrin	106-89-8	X	X		X	X	X		X		X
Ethyl acrylate	140-88-5	X		X			X		X		X
Ethyl carbamate (urethane)	51-79-6	X	X								
Ethyl chloride	75-00-3										
Ethyl chloroformate	541-41-3					X					
Ethylbenzene	100-41-4			X	X		X		X		
Ethylene	74-85-1						X				
Ethylene dibromide	106-93-4	X	X	X	X	X	X		X		
Ethylene dichloride	107-06-2	X	X								X
Ethylene glycol	107-21-1						X				
Ethylene glycol monoethyl ether	110-80-5			X	X		X				
Ethylene oxide	75-21-8	X	X	X	X	X	X		X		X
Ethyleneimine	151-56-4	X	X		X	X	X		X		X
Ethylenethiourea	96-45-7	X	X	X	X		X				
Fluometuron	2164-17-2	X					X		X		
Formaldehyde	50-00-0	X	X		X		X		X		
Freon 113	76-13-1						X				
Heptachlor	76-44-8	X				X	X		X	X	
Hexachlorobenzene	118-74-1	X		X	X	X	X		X	X	
Hexachlorobutadiene	87-68-3	X		X	X	X	X		X	X	
Hexachlorocyclopentadiene	77-47-4			X	X	X	X	X	X	X	X
Hexachloroethane	67-72-1	X		X	X		X				
Hexachloronaphthalene	1335-87-1										
Hexamethylphosphoramide	680-31-9	X	X				X				
Hydrazine	302-01-2	X				X			X		
Hydrazine sulfate	10034-93-2	X									
Hydrochloric acid	7647-01-0					X	X				
Hydrogen cyanide	74-90-8					X	X		X		
Hydrogen fluoride	7664-39-3		X	X	X	X	X				
Hydroquinone	123-31-9					X	X		X		
Isobutyraldehyde	78-84-2						X				
Isopropyl alcohol	67-63-0	X					X	X			
4,4'-Isopropylidenediphenol	80-05-7										
Lead	7439-92-1			X	X			X			
Lindane	58-89-9	X		X	X	X			X	X	
Maleic anhydride	108-31-6										
Maneb	1247-38-2			X	X		X	X	X		

Table C-1 Alphabetical Listing

Chemical Name	CAS Number	Carcinogenicity	Reproductive toxicity (including teratogenicity)	Developmental toxicity (including teratogenicity)	Reproductive toxicity	Acute toxicity	Chronic (systemic) toxicity	Neurotoxicity	Environmental toxicity	Bioaccumulation	Persistence in the Environment
Manganese	7439-96-5							X			
MBI	101-68-8										
Melamine	108-78-1	X			X						
Mercury	7439-97-6				X		X	X	X		
Methanol	67-56-1							X			
Methoxychlor	72-43-5			X	X			X	X	X	
2-Methoxyethanol	109-86-4			X	X		X				
Methyl acrylate	96-33-3								X		
Methyl bromide	74-83-9					X	X	X	X		X
Methyl chloride	74-87-3			X	X		X				X
1-Methyl ethyl benzene (Cumene)	98-82-8						X	X	X		
Methyl ethyl ketone (MEK)	78-93-3			X	X		X	X			
Methyl hydrazine	60-34-4	X				X	X		X		
Methyl iodide	74-88-4	X						X			X
Methyl isobutyl ketone	108-10-1						X	X			
Methyl isocyanate	624-83-9					X					
Methyl methacrylate	80-62-6				X		X				
Methyl tert-butyl ether	1634-04-4										
Methylene bromide	74-95-3							X			
Methylene chloride	75-09-2	X									X
4,4'-Methylenebis (2-chloroaniline)	101-14-4	X									
4,4'-Methylenebis (N,N-dimethyl)	101-61-1	X									
4,4'-Methylenedianiline	101-77-9						X				
Michler's ketone	90-94-8	X									
Molybdenum trioxide	1313-27-5					X	X	X			
Mustard gas	505-60-2	X	X			X					
Naphthalene	91-20-3								X	X	
beta-Naphthylamine	91-59-8	X									
Nickel	7440-02-0	X		X	X		X		X		
Nitric acid	7697-37-2					X					
Nitrilotriacetic acid	139-13-9	X					X				
Nitrobenzene	98-95-3				X	X	X		X		
4-Nitrobiphenyl	92-93-3	X									
Nitrofen	1836-75-5	X			X	X					
Nitrogen mustard	51-75-2	X	X	X	X	X					
Nitroglycerin	55-63-0								X		
2-Nitrophenol	88-75-5						X	X	X		
p-Nitrophenol	100-02-7					X	X	X	X		
2-Nitropropane	79-46-9	X		X	X	X	X				
N-Nitrosodiethylamine	55-18-5	X	X	X	X	X					
N-Nitrosodimethylamine	62-75-9	X	X			X					
N-Nitrosodiphenylamine	86-30-6	X							X		
p-Nitrosodiphenylamine	156-10-5	X									
N-Nitrosodi-n-butylamine	924-16-3	X									
N-Nitrosomethylvinylamine	4549-40-0	X	X			X					
N-Nitrosomorpholine	59-89-2	X	X	X			X				
N-Nitrosonornicotine	16543-55-8	X									
N-Nitrosopiperidine	100-75-4	X	X			X	X				
N-Nitroso-N-ethyl urea	759-73-9	X	X	X	X						
N-Nitroso-N-methylurea	684-93-5	X	X	X		X					

Table C-1 Alphabetical Listing

Chemical Name	CAS Number	Carcinogenicity	Reproductive toxicity (including teratogenicity)	Developmental toxicity (including teratogenicity)	Reproductive toxicity	Acute toxicity	Chronic (systemic) toxicity	Neurotoxicity	Environmental toxicity	Bioaccumulation	Persistence in the Environment
5-Nitro-o-anisidine	99-59-2	X									
Octachloronaphthalene	2234-13-1				X				X		
Osmium tetroxide	20816-12-0					X					
Parathion	56-38-2			X	X	X	X		X		
PCBs	1336-36-3	X									
Pentachloronitrobenzene (PCNB)	82-68-8	X		X	X				X	X	
Pentachlorophenol	87-86-5			X	X	X			X	X	
Peracetic acid	79-21-0					X	X				
Phenol	108-95-2			X		X			X	X	
p-Phenylenediamine	106-50-3		X			X					
2-Phenylphenol	90-43-7	X									
Phosgene	75-44-5					X					X
Phosphoric acid	7664-38-2										
Phosphorous (yellow or white)	7723-14-0				X	X	X		X		
Phthalic anhydride	85-44-9							X			
Picric acid	88-89-1								X		
1,3-Propane sultone	1120-71-4	X									
beta-Propiolactone	57-57-8	X	X				X				
Propionaldehyde	123-38-6							X	X		
Propoxur	114-26-1							X			
Propylene	115-07-1										
Propylene dichloride	78-87-5	X							X		
Propylene oxide	75-56-9	X	X				X	X	X		X
Propyleneimine	75-55-8	X					X				
Pyridine	110-86-1								X		
Quinoline	91-22-5								X		
Saccharin	81-07-2	X	X	X	X						
Safrole	94-59-7	X			X			X			
Selenium	7782-49-2			X	X				X		
Sodium hydroxide (solution)	1310-73-2								X		
Sodium sulfate (solution)	7757-82-6								X		
Styrene	100-42-5	X	X				X		X		
Styrene oxide	96-09-3	X		X	X						
Sulfuric acid	7664-93-9					X	X		X		
Terephthalic acid	100-21-0						X	X			
1,1,2,2-Tetrachloroethane	79-34-5	X		X			X		X		
Tetrachloroethylene	127-18-4	X		X	X		X		X		X
Tetrachlorvinphos	961-11-5	X									
Thallium	7440-28-0										
Thioacetamide	62-55-5	X	X				X				
4,4'-Thiodianiline	139-65-1	X			X						
Thiourea	62-56-6	X		X	X	X					
Thorium dioxide	1314-20-1										
Titanium dioxide	13464-67-7										
Titanium tetrachloride	7550-45-0					X					
Toluene	108-88-3			X	X				X		
Toluenediamine	25376-45-8	X	X				X				
Toluene-2,4-diisocyanate	584-84-9					X					
Toluene-2,6-diisocyanate	91-08-7					X	X				
o-Toluidine hydrochloride	636-21-5	X									

Table C-1 Alphabetical Listing

Chemical Name	CAS Number	Carcinogenicity	Reproductive toxicity (including teratogenicity)	Developmental toxicity (including teratogenicity)	Reproductive toxicity	Acute toxicity	Chronic (systemic) toxicity	Neurotoxicity	Environmental toxicity	Bioaccumulation	Persistence in the Environment
o-Toluidine	95-53-4	X					X		X		
Toxaphene	8001-35-2	X		X	X	X	X	X	X		
Triaziquone	68-76-8	X	X		X						
Trichlorfon	52-68-6			X	X	X	X		X		X
1,2,4-Trichlorobenzene	120-82-1			X			X		X	X	
1,1,1-Trichloroethane	71-55-6			X	X				X		X
1,1,2-Trichloroethane	79-00-5	X					X		X		
Trichloroethylene	79-01-6	X		X	X		X				
2,4,5-Trichlorophenol	95-95-4						X		X		
2,4,6-Trichlorophenol	88-06-2	X							X		
Trifluralin	1582-09-8	X		X	X		X		X		
1,2,4-Trimethylbenzene	95-63-6								X		
Tris (2,3-dibromopropyl) phosphate	126-72-7	X	X	X	X						
Vanadium (fume or dust)	7440-62-2										
Vinyl acetate	108-05-4						X		X		
Vinyl bromide	593-60-2										
Vinyl chloride	75-01-4	X	X	X	X		X				
m-Xylene	108-38-3			X			X		X		
o-Xylene	95-47-6			X	X		X		X		
p-Xylene	106-42-3			X					X		
Xylene (mixed isomers)	1330-20-7			X	X		X		X		
2,6-Xylidine	87-62-7						X				
Zinc (fume or dust)	7440-66-6								X		
Zineb	12122-67-7								X		

Appendix 11: Sample Toxics

Chemical or Waste	Tier I and Tier II Data	Toxic Release Inventory Data							Clean Water Act Data			RCRA Data		
		Maximum Amount Onsite at One Time	Non-point Air Emissions	Point Air Emissions	Releases to Water	Underground Injection	Releases to Land	Offsite Transfer	Average Daily Amount in Discharges	Average Monthly Amount in Discharges	Annual Amount in Discharges	Groundwater Monitoring Data	Hazardous Wastes Onsite	Hazardous Wastes Shipped Offsite

Assessment Table

Clean Air Act Data	Permit Data			Health and Environmental Effects								
Annual Air Emissions	NPDES Permit Limits	RCRA Permit Limits	Air Permit Limits	Carcinogenicity	Heritable Genetic and Chromosomal Mutations	Developmental Toxicity (Including Teratogenicity)	Reproductive Toxicity	Acute Toxicity	Chronic (System) Toxicity	Neurotoxicity	Bioaccumulation	Persistence in the Environment

Appendix 12

Holding a Meeting

General Points

1. Know why you're meeting—what you want out of it.
2. Meetings should be fun, exciting, have spirit.
3. The point is to get something done, build the organization, build interest and commitment—people should want to come back.
4. You need to have a sense that what the organization is doing is important.
5. People's needs should be roughly met. People come to meetings for a variety of reasons—social, personal fulfillment, fun.

Agenda

1. A written agenda helps everyone know the focus of the meeting—what items will be considered and when.
2. It's impossible to talk about everything—*limit the number of items to four or five.*
3. Agendas should be prepared in advance with some thought given to alternative handling of items—avoid "What do you want to do?" statements. Instead, have suggestions for how to proceed.
4. Have open discussion items at the end of the meeting as a way of handling outside issues that are raised, but which are not central to the work that needs to be done. *Open discussion comes at the end of the meeting* and should be limited in time.
5. Determine people's activities in the meeting, such as giving reports, ahead of time. This avoids participation by only a few.
6. Decide what work needs to be done—what will be the "up" part of the meeting—and structure the meeting around this.

Chair

1. You should have one.
2. The chair is the leader for the meeting, not just a moderator. He or she has responsibility for moving the meeting ahead, encouraging participation, and *getting the agenda accomplished.*
3. At small meetings, new members should be introduced to the group and made to feel welcome.

Setting

1. Everyone should be able to see each other—have a circle for informal meetings, seating around a table for more formal ones.
2. Have pleasant surroundings that are free of outside distractions. This will make everyone feel comfortable and be more productive.
3. Avoid meeting in a large room if it's a small group—it gives a lost feeling.

Before the meeting ends

1. Everyone should leave with something to do. This reinforces commitment and will give members an opportunity to brag at the next meeting (if they've done it) or feel group pressure (if they haven't).
2. Make sure that everyone's major concerns are raised—this gives them a stake in the meeting and the group.
3. The chair should sum up discussion and provide a focus for the next meeting based on what has been discussed and tasks that are to be done.

Adapted from a 1974 flyer by the Midwest Academy.

Appendix 13

Organizations That Can Provide Guidance on Lobbying

Canadian Environmental Law Association
517 College St. #401
Toronto, Ontario M6G 4A2
416-977-2410

Citizen Action
600 W. Fullerton
Chicago, Illinois 60614
312-975-3670

Citizens Environmental Coalition
33 Central Ave.
Albany, New York 12210
518-462-5527

Citizen Action of New York
94 Central Ave.
Albany, New York 12206
518-465-4600

Great Lakes Natural Resource Center
National Wildlife Federation
802 Monroe St.
Ann Arbor, Michigan 48104
313-769-3351

Sierra Club Great Lakes Program
214 N. Henry St. #203
Madison, Wisconsin 53703

Organizations That Train Community Organizers

Center for Community Change
1000 Wisconsin Ave. NW
Washington, D.C. 20007
202-342-0519

Industrial Areas Foundation
675 W. Jericho Turnpike
Huntington, New York 11743
516-354-1076

Midwest Academy
225 W. Ohio St. #250
Chicago, Illinois 60610
312-645-6010

New England Training for Community Organizers
235 Promenade St.
Providence, Rhode Island 02908

National Training and Information Center
810 N. Milwaukee Ave.
Chicago, Illinois 60622
312-243-3035

Appendix 14

Using the Media To Get Your Message Out

The Press Release

The purpose of a press release is:

1. To announce an upcoming event and invite the press to cover it.
2. To issue a statement or take a stand on a news development or issue.
3. To provide background information or to supplement late-breaking news.

Form

Neatness counts. Thousands of releases cross the desks of editors and reporters, and a simple method of elimination is to discard those that do not look professional. No typos, misspellings or cross-outs.

Contents

- The lead (first) paragraph should answer at least two of the five W's: who, what, when, where, and why. The second paragraph should answer the others.
- It helps to have a quotable first paragraph. Pick your priorities carefully. Your lead should convince the editors to cover the story. If they aren't hooked by the lead, they won't read the rest.
- Releases can be longer than one page (typed double-spaced) if necessary, but follow the inverted pyramid rule of diminishing importance. Put essential information near the top so the editor can cut from the tail up.
- Always include the title of the person you are writing about (John Doe, legislative assistant to Rep. Mary Smith.) Include the names of all noteworthy participants and, if for the local press, include addresses of local residents.
- Enclose statements of opinion in quotation marks and attribute to the speaker (Candidate X stated, xxx) *Never editorialize in a news release.*
- Have a standard closing paragraph, stating succinctly the purpose of your group or campaign: "Win with Women '80 is a comprehensive campaign to ensure xxx. A project of the xxx-member National Women's Political Caucus, Win With Women works on . . . "

The Backgrounder

Backgrounders are releases with all the information anyone could possibly want on your particular campaign or organization.

Getting a Release to the Media

Mailing Lists

- The key to good media coverage is a good mailing list. It should be extensive, covering all media and appropriate reporters in the area. Some cities have media guides, often published by the local public relations association. Call the local association or a local PR firm to see if one exists. If not, you may be able to get names from organizations you work with, such as the PR department of the business of one of your board members.
- Read the newspapers, and follow radio and TV news to decide who would be the most logical person to contact. Call the various media, say who you are and what your campaign is about, then find out who should be receiving your releases.
- Develop personal contacts with sympathetic reporters (for an organization dealing with women's issues, for example, feminist reporters or journalists who specialize in women's movement news). They will appreciate your keeping them posted and may get you coverage even when they cannot cover an event themselves. People in your organization may have personal contacts of their own among the press. Use these in addition to your basic mailing list.
- Never send a release to more than one person at the same newspaper. Nothing makes enemies faster than having two editors plan to use the same story in different sections of one day's paper.

- Basic mailing lists. This is how the first line on your mailing label should read:
  - City Desk (for daily newspapers)
  - News Assignment Desk (radio and television)
  - Local News Desk (wire services and periodicals)
  - Political Desk (newspapers and television)
  - Women's Editor, Labor Editor, Finance Editor, etc. (where applicable)
  - Photo Desk (newspapers, wire services, periodicals)
  - Editor (weeklies)
- College, PTA, club, church, community group and business newspapers and newsletters provide another useful source of publicity. Many unions also publish newspapers and newsletters.
- Lists should be typed on copier labels. Make as many sets as possible at one time. It can be a real crisis to have an emergency release to send and no labels.
- Lists should be divided by medium: dailies, television, radio, weeklies, labor press, etc. Releases are often earmarked for a particular audience.

Press Release Form

- Logo, preferably letterhead, or heading
- Date of issue
- Release date ("immediate," or a.m./p.m. and date)
- Contact name and phone (always office *and* home)
- Headline (succinct and informative)
- Indent paragraphs five spaces, double space, with a 1.5-inch margin
- When a release runs more than one page, head each page with a shortened version of the headline
- For a release running more than one page, use the word "more" at the bottom of each page

The Daybook

- All press and publicity owes a debt to the Associated Press and United Press International wire services. In many major cities AP and UPI put out complete teletype listings of coming events received and used by all television, radio and print media. If you have a solid story, you can telephone it in to the Daybook without mailing a release, although it is preferable to send a written notice.
- If you are phoning in a story, do it at least twelve hours before the event.
- If you telephone no one else on follow-up (see below), call the Daybook. ("Hello, I want to make sure you have our event for noon tomorrow.")
- In many cities private wire services such as the PR New York News Service offer the same service for a fee or free to members. When you pay, you are sure that the story will go out, though that doesn't make it any more newsworthy. Political party leaders or the press office of your congressperson would know if this service is available in your area.

Timing

- Mailing a press release too early is worse than mailing it too late. If it comes too far in advance, it will be shunted aside and forgotten. If you have a hot last-minute story, you can always dispense with a release and phone it in.
- Releases should arrive three to five days before an event to enable assignment editors to put someone on your story. One exception may be the "family" section stories. These editors often insist upon receiving stories about planned events several weeks in advance. Check with your local editors.
- Weekly newspapers also have earlier deadlines, so check with them for proper timing.

Telephone Follow-Up

Call news desks and city desks, the Daybook, special reporters and those you have sent the release to by name.

Wrong follow-up

I just wanted to call and tell you that Candidate X is having a news conference today, and since she has such a terrific position on child care, and it's so relevant . . .

Right follow-up

Who	*This is xxx from Candidate X's press staff. I'm calling to tell you that . . .*
What	*Candidate X will tour . . .*
Where	*the Morningside Day Care Center*
When	*on Tuesday, March 6 . . .*
Why	*and will have something to say about its*

funding.

Special fact *This will be her first statement on day care since the mayor cut day care funding.*

More info *If you need to reach me, my name is xxx. My number is xxx, at home, xxx.*

- Call personal contacts in advance when you are sure that they have received the release. Be sure to follow up with reporters who have been assigned to you in the past. A good contact, or someone interested in your campaign or candidate, should have more lead time in order to be free to cover you.
- It is your job to let reporters know what is going on and their job to decide whether it is important.
- Don't risk losing the reporter's interest by rambling on about peripheral concerns.
- Add any last-minute news that might not be in the release, e.g., the "special fact": "Celebrity will be present." Try to give them a hook=why it's a hot story, personalities, photo possibilities, whatever.
- Don't browbeat reporters or editors. Give them the impression that you have a solid story that will be handled professionally and will come out on time.
- When you should call:
  - Event is 10 a.m. to noon=call from noon to 4:30 p.m. the previous day.
  - Event is noon to 2 p.m.=call from 8 to 9 a.m. the same day, or 3:30 to 5:30 p.m. the previous day.
  - Event is 3 to 5 p.m.=call from 8 to 10 a.m. the same day.

Writing a Release

Write short paragraphs (one or two sentences) at all times. Here is a simple, direct lead that tells an editor what he or she needs to know:

A demonstration protesting unfair welfare practices in the Englewood community will be held Monday, April 4, at 10 a.m. in front of City Hall. The picket line is being organized by the Englewood Community Union, a neighborhood organization devoted to improved welfare, housing and education in the area, according to Jack Steele, president of the group.

Perhaps your release is a statement, not an announcement of an event. Here's one way to do it:

Opposition to the proposed "stop-and-frisk" bill was expressed Friday in a letter to Governor Kerner from the Neighborhood Improvement Association of Hyde Park, which called the bill "unconstitutional, prejudicial to minority groups and fascistic."

In the above example, we not only gave the facts but selected a juicy, eye-catching quotation from the letter itself. Note that the description was put inside quotation marks in the release. It *does not* say:

Opposition to the fascistic, unconstitutional stop-and-frisk bill was expressed today by . . .

Don't try any gimmicky writing in releases. Keep them short and simple, but factual. Be sure names, dates, places and quotes are accurate. Check them all twice before you send the release.

(Adapted from Publicity and the Press, *by Don Rose.)*

Talking to Reporters

- Reporters often will call to ask a question, verify a fact, clarify a position, get an opinion.
- Be sure your phone number, or that of someone reliable, is easily available to the press=included on every press release and offered every phone call.
- Be certain you are informed. Know the topics being dealt with. Make sure press calls are taken only by people who know what's happening and the organization or candidate's position.
- When you are called, give accurate answers even if this puts you in a bad light temporarily. Always be completely honest. Also, if you don't know the answer, don't fictionalize. Just say, "I don't know, but I'll find out for you. How soon do you need an answer?" That is vital, as different media have deadlines anywhere from five minutes to a day or two away. Always call back. This adds immeasurably to your reliability as a news source.
- If the reporter asks you something you don't want to answer, you can handle it truthfully: "We'll have something to say about that in a few days." Or simply, "I can't answer that right now." Don't say you'll get an answer if you won't or can't.
- Be wary of using "off the record." The more openly you treat reporters, the more they will respect you. Off-the-record stories should only be used by skilled press aides in the most touchy situations.
- In dealing with reporters, always remember 1) what the reporter needs, logistically and editorially; 2) what the reporter wants to know=the facts=as briefly and eloquently as possible. (If you are being recorded for radio or TV, speak in 20-second cuts.)

Staging an Event

Schedule

- A 10 a.m. event will get coverage in the afternoon newspapers, the 6 and 11 o'clock evening news and the next day's morning paper. An event that takes place between 10 and 1 is cutting it close, but can deliver all the above on a good story, except the afternoon papers.
- A 2 p.m. event can get you on the 6 p.m. evening news, most often without film; it can also be covered by the 11 p.m evening news and the next day's papers.
- A 6 p.m. story may get you on the 11 p.m. news, but unless it's more feature than event, it may cost you coverage for anything else the next day.

The Press Conference

- The press conference can be a useful tool if used wisely. Make sure your constituency is present in adequate numbers. Once again, one person should be in charge.
- The purpose of a conference can be to make announcements and statements, to introduce to the press personalities or specialists with a story, to call new facts and figures to the attention of the public, to launch campaigns and drives. Be sure that the purpose is important enough to bring out expensive television and radio equipment, as well as reporters.
- Remember, the name of the game is having a name. With a "name," you only need a couple of speakers.
- Without the "name" you need a package: a grassroots cross-section, specialists you have identified, a variety of points of view-any or all of these.
- The agenda should make the program clear. Lead into the name speaker with one or two minor speakers. Once the statement has been made, open the conference for questions.
- Start on time. If most of the media are there, start rolling, assuming anyone else who is interested will show by the time you get to your headliner. You'll earn a good reputation by keeping control of your schedule. Whenever possible, schedule conferences in the morning—the best time to meet deadlines.
- Send out advance notice, twenty-four to forty-eight hours if possible. The notice should be simple, written in release form and very short.
- Have a prepared statement, never more than two or three pages long, and have enough copies for all the reporters, probably about 30. The statement should be with the other items in a press kit (see above).
- It is helpful, but not vital, to have a brief release written in story form to pass out with the statement and to deliver to any media unable to attend the conference. It is also good to have a 200-word statement or summary to read for "bleeper" calls to radio stations that can't come.
- Don't give individual interviews to broadcast media or newspapers before you start. Give everyone the same chance.
- Have supporting documents, such as letters or reports, available for reporters.

Location

- Choose a place easily accessible to the press.
- Beg or borrow good rooms from other organizations or corporations. Hotels are in the business of renting rooms and won't lend them.
- Pick a room to go with the size of your crowd. Better too small than too big.
- Make sure the room can accommodate lighting and sound equipment.
- Set up the room so reporters can sit close and cameras can shoot over heads. The panel should sit together behind a long desk and face the audience (in this case, the reporters). Leave space for cameras and standing cameramen behind the desk.

From "Guide to Public Relations for Nonprofit Organizations and Public Agencies," by Barbara Fultz Martinez and Roberta Weiner, copyright 1979 the Grantsmanship Center, adapted and reprinted with permission. For a copy of the full document, about twice as long and with more subject headings, write the center at 1125 W. 6th St., Fifth Floor, P.O. Box 17220, Los Angeles, CA 90017, or call 213-482-9860.

Appendix 15

Organizing Is Doorknocking

> Three young organizers once made a long drive into rural California to meet famed farmworker organizer Cesar Chavez. After their long, dusty journey, the three sat with Chavez and asked, "Cesar, how do you organize?" Chavez replied, "Well, first you talk to one person, then you talk to another person, then you talk to another person, then you talk to another person..." "*But, how do you organize?*" they insisted.
>
> Chavez repeated, "First you talk to one person, then to another . . ."

There is no substitute for face-to-face contact for involving people and building membership. You can call people on the phone, send flyers in the mail, distribute leaflets and gets lots of media exposure. But to build the relationships that will hold an organization together, you must meet and talk to people, one by one.

So first you have to go and knock on someone's door. When you knock on a new person's door, there is usually an awkward moment when the person is trying to decide whether to close the door in your face. Your opening lines have to be clear, open, and appealing. The person is wondering "Who is this?" "What's this person selling?" "How do I get out of this?" Think about your own experiences with strangers coming to your door. What makes you decide to talk to them? What makes you decide to close the door?

One way around this is to "borrow credibility" by referencing people the person may know. If you can say, "I was just talking to your neighbor, Mrs. Jones, and she said you'd be a good person to talk to," or "Rev. Smith is letting us use the church basement for our meeting next week," you have borrowed credibility and have bought yourself a few more seconds to interest the person.

The person you're talking to knows you want something, so what is it? Are you passing around a petition? A petition is an excellent door-opener. Many organizations use petitions for just this purpose: to get people to open their doors and to collect names and addresses of concerned residents. The petition won't solve the problem (in case you have any illusions about their effectiveness), but they're great organizing tools.

The petition should be worded somewhat generally, but also to the point: "We, the citizens of Sludgetown, want the Chemikill Landfill investigated to determine if it is leaking and, if so, to determine the extent of the contamination. If contamination exists, we want to clean up the site to protect public health and our environment."

Along with your petition, bring a bound notebook (one where you don't tear out the pages) and copies of your fact sheet or flyer. Use the notebook to collect information from the people you meet, such as things they know about the site or facility. Also make notes about the people, such as what they've agreed to do and what you've promised to do for them. Keep all promises you make! If you say you'll get back to them tomorrow, *do it!*

Now that you've got all your equipment together you're ready to start knocking.

Rehearse your lines. What do you want to say? Here are four sure-fire questions you should be ready to answer in those thirty seconds when the door opens:

"*I am . . .*"

"*We are . . .*"—your group and what it's about in 25 words or less.

"*This is . . .*"—your petition to deal with the Chemikill Landfill problem.

"*We want . . .*"—the person's support, or name on the petition, or presence at the next meeting, or money to help the cause.

You can practice this "rap" in front of the mirror or with your spouse or children. Even better, if several of you are going door-to-door, roleplay your presentation with each other until you all feel comfortable doing it.

So now you're talking to somebody at their door. If you get through the first thirty seconds without any hosatility, proceed to try to get a commitment from the person.

Try to get invited in. Make personal connections—do you know this person, who do you know in common, what do you share in common? If the person is willing to sign the petition, Listen to *their* story, explore their reaction to your group's issue and how they tie it in to *their* own experiences and future plans. The more people talk to you and the more they realize that you are

genuinely listening, the stronger the bond between you will become. Ask if there are any questions you might ask the authorities the next time you speak to them and then encourage your new contact to ask the question themselves. Write the questions down along with each person's name and *be sure* to get back to them.

Whether you're selling brushes, vacuum cleaners or toxic waste solutions, the time comes when you have to close in for the sale. In organizing, the "sale" is the person's commitment to *do something.* Signing the petition is fine for most people, but you will meet new people who can and will do more, *but only if you ask them.*

Use your judgement to gauge what each person can "afford." Everyone can do something. Ask for concrete things, such as "Can you give me the names of some other people who might be interested?" "Will you contact them?" "Can you bring two other people to the next meeting?" "Can you give a ride to one other person?" "Could you pass out flyers on this block?" "Would you be willing to host a block meeting?" And so on.

While you're making concrete requests, ask for concrete commitments. Ask your new friend for a specific time when they will have done what was promised, or when you can check back. If you leave things vague, then you don't really have a "deal."

So what if the person you meet says "No," or worse, is obnoxious, hostile, or unfriendly? There's little to be gained by getting into an argument on the doorstep. Instead, kill them with kindness. Our experience is that in many cases, people who wouldn't support an organization at first later become some of the hardest workers. An easy way to end an ugly conversation is to say, "Everyone is entitled to their opinion and you certainly expressed yours. Thank You."

Adapted from Leadership Handbook on Hazardoius Waste, *published by the Citizen's Clearinghouse for Hazardous Wastes.*

Appendix 16

Priority 1 and 2 Toxic Pollutants of Concer And Their Sources

Priority 1

Cyanide—Electroplating (largest industrial source); paint sludges and residues; manufacture and disposal of inorganic cyanides; pyrolysis of certain synthetic and natural materials; chemical, biological and clinical laboratories; steel production; plastics manufacturing; synthetic fibers; chemical manufacturing.

Chromium—Metal finishing; textile industry (as a mordant); cooling water; leather tanning; catalyst manufacture; pigment and primer; fungicides and wood preservatives; street runoffs.

Cadmium—Electroplating; paint and pigment manufacture; stabilizer in plastics; street runoff.

Copper—Corrosion of brass and copper pipes; use of copper compounds in aquatic algicides; smelting and refining industry; copper wire mills; coal burning industries; iron and steel producing industries.

Mercury—As a cathode in the electrolytic preparation of chlorine and caustic soda (33 percent of U.S. use in 1968); electrical apparatae - lamps, arc rectifiers, battery cells (27 percent of U.S. use in 1968); industrial control instruments (switches, thermometers, barometers); general laboratory applications; antifouling and mildew-proofing paints; formulations to control fungal diseases of seeds, bulbs and plants.

Silver—Photographic materials; electroplating; dental alloys; solder and brazing alloys; paints; jewelry; silverware; coinage; mirror production; street runoff.

Zinc—Electroplating (galvanization); production of alloys.

Lead—Street runoff; manufacture of storage batteries; manufacture of gasoline additives; pigments and ceramics; manufacture of metallic lead products; manufacture of lead containing alloys; solder in pipe joints, lead water pipes.

Penanthrene—Incomplete combustion of organic compounds, particularly from power generation and refuse burning; limited use as a chemical intermediate.

Benzo(a)anthracene—Incomplete combustion of organic compounds, particularly from power generation and refuse burning; no commercial or industrial use.

Priority 2

Pyrene—Incomplete combustion of organic compounds (particularly from power generation or refuse burning); no commercial or industrial uses.

PCB—Plasticizers; heat transfer fluids; hydraulic fluids; fluids in vacuum pumps and compressors; lubricants; wax extenders.

Trichlorophenol—Germicide; bactericide; glue and wood preservative; antimildew treatment; formed as intermediate metabolites during the microbial degradation of herbicides 2,4-D and 2,4,5-T and pesticides Silvex, ronnel, lindane, and benzene hexachloride.

Bromoform (tribromomethane)—Combustion of waste materials.

Methylbromide—Used in soil, seed, feed and space fumigant agents; combustion of waste materials.

Methylchloride—Used as a chemical intermediate in the production of silicone, gasoline anti-knock, rubber, herbicides, plastic, and other materials; chlorination of drinking water and some industrial effluents; combustion of waste material.

Bromidechloromethane—Used as a reagent in research; chlorination of drinking water and some industrial effluents; combustion of waste materials.

Acrolein—Chlorination of waste water and drinking water; aquatic herbicide and algicide; slime control in paper industry; crosslinking protein collagen in leather tanning; tissue fixation in laboratory histological samples; intermediate for plasticizers humectants, crosslinking agents, copolymers, polymers and grease proof cotton; acrolein copolymers used in photography; textile treatment; the paper in-

dustry; as builders in laundry and dishwasher detergents; as coatings for aluminum and steel panels.

3,3 dichlorobenzidene—Production of dyes and pigments; curing agent for polyurethanes.

Fluoranthrene—Pyrolytic processing of coal and petroleum at high temperatures; no specific uses.

Hexachlorobenzene—Fungicide on seed grains; dye manufacturing; an intermediate in organic synthesis; porosity controller in the manufacturing of electrodes; wood preservative; addition in pyrotechnic composition for the military.

Pentachlorobenzene—Intermediate in the synthesis of specialty compounds.

1,2,4,5-tetrachlorobenzene—Production of defoliant 2,4,5-trichlorophenoxy acetic acid; synthesis of 2,4,5-trichlorophenol; fungicide.

BHC (hexachlorocyclohexane) (includes alpha, beta, gamma and technical grades)—Insecticides: animals, buildings, man for parasites, clothes water for mosquitoes, plants, and seed and soil.

Chlordane—Broad spectrum insecticide including termites and soil insects; banned in the United States.

Dieldrin—Banned in the United States (still made in Holland by Shell); insecticide used on corn and citrus fruits; mothproofing, termites, crops.

DDT—Public health and agricultural programs; broad-spectrum insecticide; banned in the United States in 1972.

Endosulfan—Broad spectrum insecticide; on EPA's restricted list, but still used on vegetables, fruit, and tobacco.

Endrin—Avicide, rodenticide, insecticide; largest use is on cotton crops in the southeast United States; increasingly restricted.

Heptachlor—Broad spectrum insecticide; most uses banned, except for termite control and nonfood plants.

Toxaphene—Broad spectrum pesticide agricultural use, mainly on cotton; in 1980, was the most heavily used pesticide in the United States.

Dioxin—No commercial or industrial use; byproduct of the manufacture of various organic substances; incomplete combustion of waste materials.

Appendix 17

Hazardous Substances Policies
Erie County, New York

Erie County includes the city of Buffalo and borders the eastern tip of Lake Erie.

General Hazardous Substances

1. County departments will use hazardous waste minimization techniques and reduce the use of hazardous substances. Minimization techniques will include prohibiting the use of oil-base paints and commercial pesticides where not absolutely necessary, and the recycling of hazardous waste.
2. Implementation of a "chemical exchange" program—County departments will exchange surplus chemicals to avoid buying new chemicals and disposing of old ones.
3. County departments will evaluate and purchase less-hazardous or nonhazardous products which can be substituted for hazardous materials currently being used. Substitute products that cost more than a product presently used will be evaluated on a case-by-case basis.
4. Implementation of a "disposal review" program which will allow for other, less costly, appropriate disposal options to be evaluated.
5. Only one kind of mechanical parts degreasing solvent will be purchased in order to maximize solvent recycling options.
6. The Erie County Department of Environment and Planning will develop a uniform compliance policy for environmental requirements where state and federal regulations are not specific.
7. County departments will implement a "materials identification" program to facilitate proper storage, handling, use, and disposal of all hazardous materials.
8. Erie County Division of Purchase will prequalify contractors to provide hazardous waste services in an expeditious and cost-effective manner.
9. County departments will be required to implement proper recordkeeping procedures for the generation of hazardous wastes.
10. County departments will implement an annual environmental compliance self-auditing program at each County facility. Audits will be monitored by the Environmental Compliance Division of the Department of Environment and Planning.

For more information on Erie County's pesticide management policy, contact Mike Raab at 716-858-6370.

Pesticides

1. Pesticides may only be used at Erie County facilities where application of those products is necessary. Facilities at which application is permitted are: [facilities listed]
2. Purchase of pesticides at facilities not listed above must be justified by the Erie County Division of Environmental Compliance.
3. *All departmental purchase requests for pesticides are to be sent to the Erie County Division of Environmental Compliance for* product evaluation. . . . [emphasis original]
4. No pesticides may be purchased by a department that does not employ a New York State Certified Pesticide Applicator. The applicator must be certified for the appropriate application category. [categories listed]
5. All County departments must send a list of names, work locations, and Certified Pesticide Applicator numbers and categories to the Erie County Division of Environmental Compliance. Information is to be updated each year.
6. Prior to purchase of pesticides, each department should determine if the product is registered with the New York State Department of Environmental Conservation. Since pesticides are registered for a two-year duration, ensure that the entire amount being purchased will be used up prior to the registra-

tion expiration.

7. Purchase only a one-year (maximum) supply of pesticides.
8. Should a pesticide become "banned," the Division of Environmental Compliance staff will request the vendor or manufacturer to accept the unused portion of the material at no cost to Erie County. [Responsibility for disposal becomes the manufacturer's.]
9. No County employee is to accept "samples" of pesticide products from salespersons.
10. Pesticides "banned" by the New York State Department of Environmental Conservation and presently stored at Erie County facilities must be disposed of in an environmentally sound manner.
11. Each County facility shall send a complete inventory of pesticide products stored at that location to the Division of Environmental Compliance annually. Completed forms are due [date]. [form attached.]
12. When application is necessary every effort should be made to use a nonhazardous or the least toxic pesticide available.
13. The Department of Environment and Planning, Division of Environmental Compliance, will provide technical assistance to all departments covered by this policy.

For more information contact Mike Raab at 716-858-6370.

Appendix 18

Comprehensive Pesticide Pollution Prevention
Thurston County, Washington

by Mark Swartout
Vegetation Management Coordinator
Thurston County Department of
Community and Environmental Programs

Thurston County government has taken the lead in Washington state in regulating its pesticide use. In 1985, the Environmental Health Department drafted and the County Commissioners adopted a first attempt at developing a pesticide use policy. This first policy targeted the the use of herbicides by the Public Works Department's Roads Division. It applied only to county operations, not to pesticide use by private or commercial users.

Citizens were concerned that this policy needed a broader approach. In 1987 the county commissioners appointed a citizen committee charged with studying pesticide use by county departments and making recommendations for a new pesticide use policy. The result of their work was a new policy adopted in 1989. The Pesticide Use Policy and Procedures have several goals:

- To ensure that all non-pesticide pest/vegetation control methods, such as biological and mechanical means, are given full consideration in accordance with classical integrated pest management principles wherever practical and economically feasible.
- To ensure that Thurston County provides full public accountability for any use of pesticide.
- To ensure that any use of pesticide will be done with no adverse impact on human health or the environment.
- To ensure the safety, operation, and maintenance of roadways and other public lands within Thurston County.

In order to achieve these goals, the Pesticide Use Policy and Procedures have several important components:

- All county departments and their contractors who use pesticides are covered.
- Pesticides used by the county must pass a review by the Environmental Health Department using the following criteria:
  - Low toxicity
  - Environmentally degradable
  - Not a developmental toxin
  - Not cancer-causing
  - Not mutation-causing
  - Not a cause of reproductive problems
- Departments must use an integrated pest/vegetation management approach to solving all pest problems.
- If a department wants to apply a pesticide to an environmentally sensitive area (such as aquifer-sensitive areas, wetlands, and lakes), it needs permission from the Board of Health.
- A citizen Pest and Vegetation Management Advisory Committee was established to oversee implementation of the policy.

A permanent staff position was created to oversee policy implementation and to be a resource for departments developing alternative methods of pest and vegetation control.

Since the adoption of the last policy the use of pesticides by the county has dropped dramatically.

Roads

At its peak in 1985, the county used more than 5,000 pounds of Cal 90 and more than 600 gallons of other pesticides to control vegetation on the shoulders, ditches and backslopes of county roads. In 1992, no herbicides were used on shoulders and to date none in ditches or backslopes.

The new methods of vegetation control are mechanical, requiring a change in maintenance standards. For a time the Roads Division had difficulty maintaining road vegetation at the previous "level of service." The ideal way to develop an IPM program is to have a "build down" approach: changing only a part of the program

first, creating a success, then adding another part. This method builds on the successes.

The sudden elimination of a tool (herbicides) required rapid addition of mechanical equipment and training for operators. The learning curve needed to properly apply the new techniques caused what was seen as a drop in the level of service to roadside vegetation, creating a backlash of concern from citizens.

The Roads Division is now writing an integrated vegetation management program. Its goals and objectives are:

Goal

To provide safe conditions for motorists, pedestrians, bicyclists, and county employees.

Objectives

1. Maintain proper sight distance (road visibility).
2. Maintain visibility of signs and other roadside fixtures (e.g., the guardrail).
3. Minimize standing water on the road surface.
4. Provide sunlight and air circulation to reduce ice and snow duration.
5. Promote a safe work environment.

Goal

To be a "good neighbor" to adjacent property owners of county rights of way and properties.

Objectives

1. Respond to public concerns in a timely and cooperative manner.
2. Manage county properties so the needs of adjoining property owners are considered.
3. Develop, promote, and encourage an "owner will maintain" program for citizens who want to maintain their own frontages.
4. Develop vegetation management plans for rights of way next to special-use lands such as agriculture that meet the needs of the property owner and comply with the Thurston County Pesticide Use Policy and Procedures.

Goal

To be good "environmental stewards" of the land.

Objectives

1. Develop an environmentally sound integrated vegetation management program. Any pesticides will be used in accordance with the county's pesticide use policy.
2. Encourage establishment of self-sustaining native plant material.
3. Protect and enhance wildlife, habitat, and endangered or threatened plants.
4. Maximize surface and groundwater quality to the extent possible, as we manage vegetation and stormwater within the needs of the roads system.
5. Reduce the opportunity for noxious weeds and other undesirable vegetation by enhancing the environment for the desired native vegetation and stressing undesired species.
6. Encourage vegetation management practices which safeguard environmentally sensitive areas.

Goal

To promote long-term, cost-effective management of public resources.

Objectives

1. Promote professionalism in the vegetation management staff of Public Works by providing educational and career opportunities that will enhance staff's knowledge of current vegetation practices and stewardship of the land.
2. Develop vegetation management strategies that promote stable plant communities.

Lakes

The county has a lake management program. Property owners around lakes in Thurston County can form lake management districts. The purpose of the districts can be various, including plant control, lake restoration, and addressing water quality problems. The county pesticide use policy helps develop guidelines for the districts to follow if they propose to use aquatic herbicides or aluminum sulfate (a lake restorative that is not technically an herbicide).

The policy requires Thurston County to discourage the use of pesticides by private application or by public agencies. This is the only time the pesticide use policy applies outside of county operations. All applications of this category require a permit from the Washington State Department of Ecology. During the permitting process local government is given an opportunity to provide

comments on the permit.

Thurston County requires applicators to develop integrated control methods, using pesticides as a last resort. This requires applicators to look at their problems more holistically, with an ecological perspective.

One of the positive outcomes of this program is that it gets residents and property owners to become involved with both the definitions of their problems and the solutions to them. Often their main problem is education and the realization that they may be contributing to the problem. This then allows them to solve the problem themselves.

Noxious Weeds

The noxious weeds program helps Thurston County property owners identify and eradicate noxious weeds identified through state law. Before adoption of the pesticide use policy the program would provide advice on the control of noxious weeds using various strategies, pesticide use being a significant one. The program even provided herbicide application equipment to property owners. An IPM approach to controlling noxious weeds was developed under the county's new IPM policy, and it received an award from the Washington State Department of Agriculture for its pioneering nature.

Parks

The Parks Department maintains the landscape and facilities in two county parks and the landscape at the County Courthouse Complex. Pesticide use in the facilities was minimal, but of a wide variety due to the various nature of the vegetation and insect pest problems in the facilities.

The difficulties in implementing the policy for the Parks Department include developing training for employees, changing attitudes, and developing a knowledge base of parks problems and solutions. These have been addressed by holding IPM classes, providing technical expertise when needed, and establishing program development timeline requirements. Developing IPM programs should improve the ability to identify: pests and infestation causes, the number of natural predators useful for pest control, the choice of plant material, and alternatives to the use of pesticides.

The Parks Department is increasing the amount of land it is responsible for. Keeping IPM programs in mind during design and acquisition of new parks can greatly increase the eventual effectiveness of such programs in those new areas.

The Pest and Vegetation Management Advisory Committee is currently developing a revised policy. It will broaden current policy by including all county operations that have pest and vegetation management programs, not just those that use pesticides. Chief among these is the county's stormwater utility, with its swales, retention/detention ponds, and infiltration basins. The concern is that some of these other pest management practices either do not solve the pest problem or use methods that have a negative environmental impact.

For more information, contact Mark Swartout at 206-754-4111.

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