

# **Report to the General Assembly:**

## **Pollution Prevention**

January 1994

**Vermont Agency of Natural Resources  
Department of Environmental Conservation**

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## **SUMMARY**

This report is the first biennial report of the Agency of Natural Resources' Toxics Use Reduction and Hazardous Waste Reduction program. The program, established in 1991 with the passage of Act 100, requires certain industrial facilities to develop a Toxics Use Reduction and Hazardous Waste Reduction Plan every three years and to report progress yearly in implementing technically and economically feasible methods for reducing toxic substance use and hazardous waste generation. The Act established the Pollution Prevention Division as a non-regulatory Division within the Department of Environmental Conservation (DEC) to oversee the plan requirement and to provide technical assistance to business and industry to prevent waste generation and reduce toxics use. This report details the program's efforts during the first two years in implementing the planning requirement, developing and implementing technical assistance programs, and in integrating the concept of pollution prevention into the Agency of Natural Resources and other state agency functions.

The Pollution Prevention Division has identified 245 facilities that were required to submit plans in 1992 and 1993. Of these facilities, 55 are large quantity generators of hazardous waste (Class A) and 190 are small quantity generators (Class B). Plan summaries have been submitted by 95 percent of Class A generators and by 60 percent of Class B generators. Additional toxics use reduction planning requirements for large users of toxic substances take effect in 1995.

Technical assistance programs have been developed, including an on-site assistance program which utilizes retired engineers and business professionals, seminars, workshops and conferences on pollution prevention, a newsletter, Governor's Award program, and small grants program. These programs have enlisted the support and participation of trade and business associations and private industry, and government entities in a collaborative effort to achieve economic and environmental efficiencies.

Although it is too early to quantify program successes and effectiveness, this report describes the early indications of reductions that are already occurring in hazardous waste and toxics releases by Vermont facilities and the planned reductions that are reported in plan summaries. Early indications verify findings by other states that voluntary planning with a strong technical assistance component can be very effective in achieving results and reversing previous trends of ever-increasing toxics use, hazardous waste generation, and toxics emissions. Significant and sustained technical assistance efforts are necessary to effect change in smaller businesses, a finding that has also been made by other states.

This report identifies future funding shortfalls that will impact on the implementation of plan review and assistance programs and maintenance of current levels of assistance. It recommends legislature changes to enhance program funding and effectiveness.

## **BACKGROUND**

The 1991 Vermont Legislature addressed growing concerns regarding hazardous waste generation and toxic substance use and release to the environment with passage of Act 100, a hazardous waste reduction and toxics use reduction planning law. A coalition of groups - including the Vermont Public Interest Research Group, Associated Industries of Vermont, large manufacturers, small business, legislators, and local and state government-recommended an approach of facility planning for toxics use and hazardous waste reduction, accompanied by a technical assistance program to business and industry, as the best means to bring about reductions in toxic substance use, waste generation, and releases of toxic and hazardous materials to the environment.

Act 100 passed with broad support and established a program that closely followed the facility planning laws of Massachusetts, Oregon, California, New York and Minnesota. Since passage of Act 100, about one-third of the states have planning laws, and now every state has a pollution prevention technical assistance program. Pollution prevention - that is, source reduction and toxics use reduction - has become the top priority of the EPA in addressing all forms of pollution. The emphasis on prevention supplants pollution control as the primary means to achieve environmental goals.

The Pollution Prevention Division was staffed in January 1992 to begin addressing the following goals of Act 100:

- 1) *Eliminate or reduce the use of hazardous - particularly toxic - materials wherever feasible;*
- 2) *Reduce the generation of hazardous waste;*
- 3) *Reduce the release into the environment of chemical contaminants which have adverse and serious health or environmental impacts;*
- 4) *Document hazardous waste and toxics use reduction information and make it available to state and local government and the public; and*
- 5) *Encourage reduction of toxic substances and generation of hazardous waste whenever possible without simply shifting pollutants or risks elsewhere in the environment. Give priority to methods that reduce the amount of toxics used.*

Under statute, the Pollution Prevention Division was established as a **non-regulatory** division within the Department of Environmental Conservation to implement the facility planning requirement, provide pollution prevention technical assistance to small and large businesses, develop tools for measuring progress in toxics use and hazardous waste reduction, and promote pollution prevention strategies within state government operations and programs.

## **SUMMARY OF THE LAW**

Act 100 requires that hazardous waste reduction and toxics use reduction plans be developed by many businesses that generate hazardous waste or use toxic substances. The law is designed to achieve voluntary in-plant changes through mandatory facility planning. The preferred options for achieving these reductions include input substitutions, product reformulation, process redesign and modernization, improved operations and maintenance, and in-process recycling and reuse. All of these methods avoid the generation of the waste in the first place.

### **POLLUTION PREVENTION DIVISION: STATUTORY MANDATES**

- Plan review,
- Plan assistance,
- On-site Assistance,
- Toxics Technical Advisory Board,
- Workshops, conferences, seminars,
- Information clearinghouse,
- Newsletter and other informational materials,
- Maintain data and information systems on toxics use reduction and hazardous waste reduction for measuring progress and program effectiveness,
- Coordinate pollution prevention technical assistance within the agency and throughout state government,
- Work with other state agencies to evaluate, develop, and promote pollution prevention strategies,
- Work with other state agencies to improve data and reporting systems with respect to toxic releases,
- Work with other state agencies to develop pilot programs that encourage toxics use reduction, multimedia source reduction, and hazardous waste reduction,
- Review and comment on environmental regulatory programs and proposed rules to encourage a pollution prevention approach.

## APPLICABILITY OF ACT 100 PLAN REQUIREMENTS

Act 100 requires toxics use reduction and hazardous waste reduction plans every three years of all generators who **routinely** generate more than 100 kilograms (2640 lbs) of hazardous waste per year.

The law defines those subject to plan requirements as Class A generators, Class B generators, and large users:

**Class A generator** - more than 1000 kg (2200 lbs) per month of hazardous waste

**Class B generator** - more than 100 kilograms (220 lbs) but less than 1000 kg (2200 lb) per month of hazardous waste

**Large User** - a facility with ten or more full-time employees in the manufacturing SIC 20-39 that manufactures, processes or otherwise uses 10,000 lbs of a toxic substance per year; or manufactures, processes or otherwise uses between 1,000 and 10,000 lbs of a toxic substance if that substance accounts for 10 percent or more of the total toxic substance used at the facility during the year. (Note: the list of SIC categories affected may be expanded by rule)

Plans and plan summaries are to be completed according to the following schedule:

Class A generators - October 1, 1992

Class B generators - July 1, 1993

Large Users - July 1, 1995

Act 100 requires toxics use reduction and hazardous waste reduction plans every three years for all hazardous waste generators of more than 1200 kilograms (2640 lbs) per year. In general, this includes all businesses that are small or large quantity generators of hazardous waste. Plans are also required of large users of toxic substances. Plans for hazardous waste generators were due in 1992 and 1993. Plans for large users are due in 1995.

Plans require:

- A written policy statement
- A description of pollution prevention measures taken prior to the plan
- Identification of all hazardous wastes and toxics used that account for more than 5 percent of total generation
- Process flow diagrams
- An accounting of costs associated with toxics use and waste handling and disposal
- Identification of technically and economically feasible pollution prevention opportunities
- Goals for reduction and an implementation strategy
- A description of employee awareness and training programs

If a facility has either no plan or an incomplete plan, it will receive a notice, and will then have 90-180 days to complete a modified plan. The Pollution Prevention Division can offer technical assistance. Plans are not a public record, but the required plan summaries are.

## NGA REPORT: MAKING POLLUTION PREVENTION WORK

In a recent report on pollution prevention, the National Governors' Association examined developing state programs and made recommendations, which the Pollution Prevention Division emulates in its program development:

- *Establish and maintain high-level pollution prevention support through the Governor's office, legislature, and the agency head.*
- *Create a multimedia focus.* Concentrate on multimedia pollution reduction rather than single-medium pollution control. Government must overcome regulatory and institutional barriers for industry and state agencies.
- *Accommodate and reward private sector initiatives.* State governments must change their business practices to facilitate pollution prevention (e.g. through regulatory flexibility, improved and expedited permitting, or negotiating consent decrees that incorporate pollution prevention). States should reward pollution prevention efforts through tax breaks, grants, and loans that spur businesses to make capital and personnel investments that pay for themselves over time.
- *Provide technical assistance.* State technical assistance, outreach, and clearinghouse services can create the impetus for industry to undertake pollution prevention projects. They can alert businesses to pollution prevention opportunities they may have overlooked and educate them about emerging source reduction technologies. Beyond offering on-site technical assistance, states can foster awareness of pollution prevention by integrating it into academic disciplines such as chemical engineering. States can also encourage businesses to exchange pollution prevention information.
- *Forge public-private cooperation.* Prevention efforts will be successful if states involve business leaders, environmental groups, and the public in developing strategies.
- *Participate in interstate organizations.* Interstate organizations provide a forum for pollution prevention education, discussion, and even policy development and can be instrumental in shaping state policies by forging interstate agreements and recommending actions to prevent regional pollution problems.
- *Collect reliable pollution prevention data.* Measuring pollution prevention is difficult for states. Existing databases (from regulatory programs and Toxics Release Inventory) do not necessarily provide a complete or accurate picture. Better integrated databases and new approaches are needed.

## IMPLEMENTATION

There are 245 facilities in Vermont that must develop hazardous waste reduction plans. (The toxics use reduction plan component does not begin until July 1, 1995.) There would be 270, but the Division decided to allow companies with multiple locations to comply by developing a single plan where waste generating processes and opportunities for reduction are the same.

Fifty-five of these facilities routinely generate more than 2,200 lbs of hazardous waste per month and are Class A generators. They were to have developed plans and submitted plan summaries and fees by October 1, 1992. The other 190 facilities routinely generate between 220 and 2,200 lbs of hazardous waste per month and are Class B generators. They are typically smaller and have fewer resources; plan summaries and fees were due July 1, 1993. As of November 1, 1993, 52 of 55 plan summaries were received from Class A companies; and 114 of 190 summaries were received from Class B companies.

## Type of Businesses Required to Plan

Businesses are categorized by Standard Industrial Classification (SIC) code. Vermont companies required to plan fall into one of five sectors (Figure 1). The “Manufacturing” sector is further segregated by group (Figure 2).

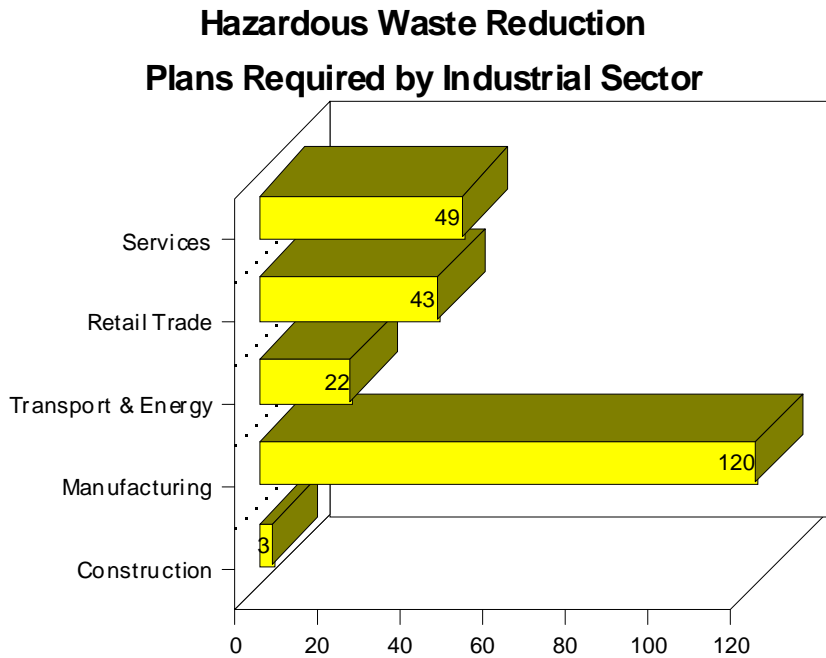


Figure 1.

All 43 businesses in “Retail Trade” are Class B generators doing vehicle service and maintenance work. Groupings in the “Services” sector include drycleaners (spent perchloroethylene), ski areas (vehicle service and equipment maintenance) and hospitals (infectious wastes). SIC codes are not necessarily indicative of the kind of hazardous waste that a given company might generate.

## Plan Review

A total of 93 plans have been submitted, 17 from Class A companies and 76 from Class B. Forty-two of the Class B companies perform vehicle service and maintenance work and are using the plan format developed by the Pollution Prevention Division. Specifically for this

industry all plans are submitted voluntarily and are maintained as confidential documents not available to regulatory programs within the Agency or to the public (under Section 6628(a)). Plans may remain on-site, but they are not a public record even when submitted to the Division. The Division encourages companies to submit them, because they facilitate plan review in the office, rather than necessitating a site visit. Act 100 requires submittal of plan summaries and annual performance reports only, which are a public record.

DEC staff have formally reviewed seven plans from Class A generators and nine from Class B. For Class A companies, approvals have been given to an electronics firm, a hospital and a fabricated metals company. The remaining four Class A plans are from hospitals and are in the process of being revised by those facilities for approval.

Of the Class B companies, plans have been reviewed and approvals given for two vehicle service and maintenance businesses, a drycleaner, three printing firms, a manufacturer of analytical instruments, and a metal fabrication company. The remaining plan, from another metal fabrication company, is currently being revised.

## Manufacturing Companies Required to Plan by SIC Major Group

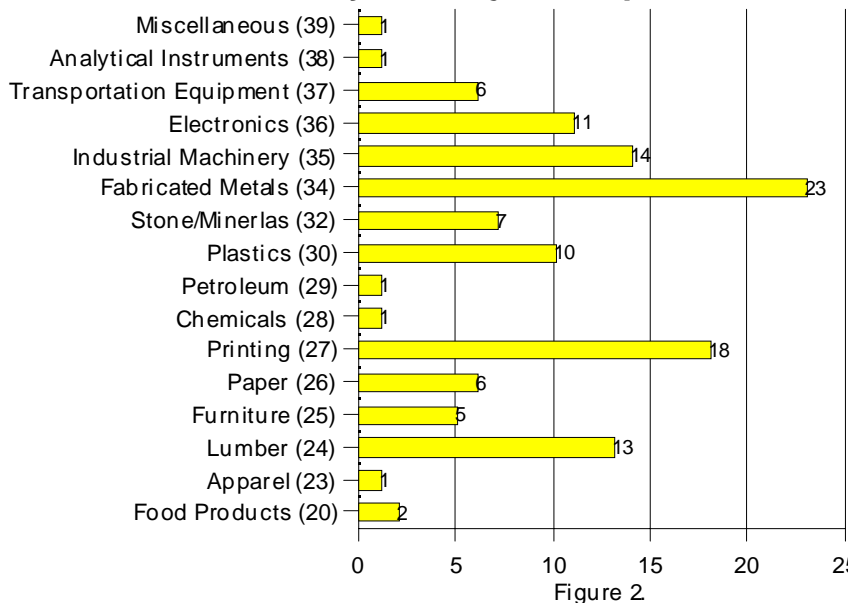


Figure 2

All plans reviewed to-date have been from companies that have voluntarily submitted them to the Agency, with the exception of one plan that was reviewed on-site. Several of the approved plans were “model industry plans,” developed with assistance from DEC staff or contractors, which the industries have agreed to share with other industries (see further discussion under “Technical Assistance”).

Emphasis in the first year has been on plan review for the printing industry (SIC group 27) and hospitals (SIC group 80). Their reviews will be completed this year. Plan reviews for SIC groups 34 (metal fabricated products), 55 (automotive dealers and service stations) and 72 (personal services, such as drycleaners) will follow thereafter. The Department is committed to meeting or exceeding the requirement of Section 6628(f) [plans for all businesses in at least two SIC categories must be reviewed every two years.] In fact, all facility plans will likely receive some level of review by early 1995, since they are required to be updated every three years and the Department wants to identify existing deficiencies before the next review. This is an aggressive goal, since most plans will have to be formally reviewed at the facility.

### Preliminary Results

#### Class A Generators

Class A companies reported 175 hazardous wastestreams in their plans and plan summaries. Toxics use and hazardous waste reduction measures that were determined to be technically and economically feasible were identified in the following categories (also see Figure 3):

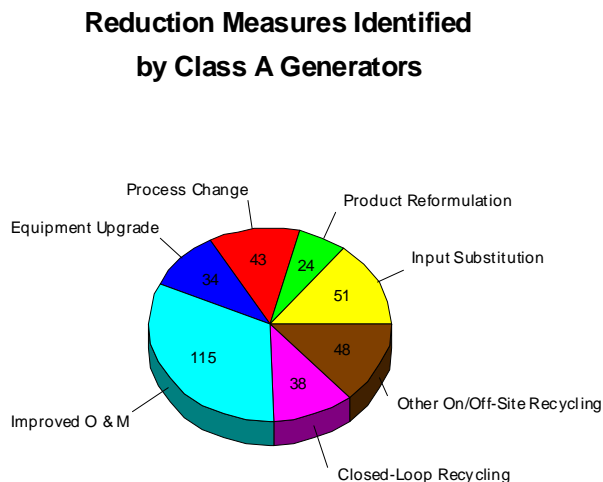


Figure 3.

<u>Method</u>	<u>Number of Wastestreams</u>
Input Substitution	51
Product Reformulation	24
Process Change	43
Equipment Upgrade	34
Improved Operation and Maintenance	115
Closed-loop Recycling	38
Other On-or Off-Site Recycling	48

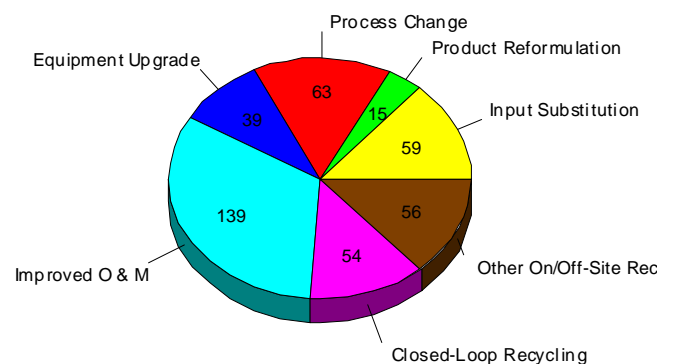
#### Class B Generators

Class B companies reported 287 hazardous wastestreams in their plans and plan summaries. Toxics use and hazardous waste reduction measures that were determined to be technically and economically feasible were identified in the following categories (also see Figure 4):

<u>Method</u>	<u>Number of Wastestreams</u>
Input Substitution	59
Product Reformulation	15
Process Change	63
Equipment Upgrade	39
Improved Operation and Maintenance	139
Closed-loop Recycling	54
Other On-or Off-Site Recycling	56

It is premature to develop meaningful estimates of toxics use and hazardous waste reduction from plans submitted to date - plan summary information does not quantify. A limited review indicates that some companies do not or cannot show anticipated reduction; in other cases it is simply not clear what they hope to accomplish. Formal review of these plans and annual performance reports due in 1994 will better define anticipated reductions. If necessary, plans will be returned to companies for additional information. In any event, plans seen so far adequately establish current generation, which will serve as baseline information for measuring progress in updated plans and annual performance reports. Future reports to the General Assembly will estimate toxics use and hazardous waste reductions from available plan information.

**Reduction Measures Identified  
by Class B Generators**



**Figure 4.**

### Vehicle Service Industry

Because of extensive outreach (conferences, seminars, model plan development) with the vehicle service and repair industry, 42 plans were received, and it is more feasible to quantify the impact of the planning requirement in achieving reductions using this industry as an example. Planned reduction for the three most common hazardous wastes are shown below.

	COMPANIES AFFECTED	REPRESENTATIVE REDUCTION	TOTAL ESTIMATED REDUCTION (lbs/yr)
<b>a) Parts Cleaning Solvents</b>			
Switch to Aqueous Cleaning	22	80%	30,000
Filtration	7	50%	12,000
Fewer Change-outs	4	50%	12,000

Eliminate a Station	1	25%	400
Switch to Semi-Aqueous Cleaning	1	90%	1,500
<b>Total</b>			<b>55,900</b>

**b)Spent Antifreeze**

On-site Recycling	11	70%	16,000
Give Away or Reuse	4	70%	5,500
Filter	1	25%	500
Monitor to Obtain Longer Life	1	5%	100
<b>Total</b>			<b>22,100</b>

**c)Spent Absorbents**

Improved Housekeeping (inc. change absorbent materials, employee training, use wet-vac and launder/reuse rags)	27	50%	12,000
<b>Total</b>			<b>12,000</b>

A total of 90,000 pounds (45 tons) of wastes, representing more than one-half of the hazardous wastes generated by these 42 facilities, is anticipated to be reduced in the next one to two years. In many cases, this will put many of these facilities below waste generation thresholds that require plans in the future. These reductions will also classify most of these facilities as small quantity generators, likewise subject to less regulation. We believe that the plan requirements and technical assistance and education functions of the Division are largely responsible for this waste reduction activity, since no other factors have been identified as providing this incentive.

**Fees**

Act 100 charges planning companies annual fees to help support the technical assistance efforts of the Pollution Prevention Division. Fees are deposited in the Hazardous Waste Management Fund (section 6628(j)). Class A generators pay \$300 per wastestream, not to exceed \$1500/yr/facility. Class B companies are assessed a flat fee of \$300/yr/facility. All companies were required to submit the annual fee with the initial plan summary, and then every July 1 thereafter. Class A companies have been asked to make fee payments due October 1, 1992 and July 1, 1993. As of October 31, 1993, fee receipts are as follows:

	CLASS A COMPANIES	CLASS B COMPANIES
Number	55	190
Paid (10/1/92)/Total Receipts	50/\$39600	Not Applicable
Paid (7/1/93)/Total Receipts	32/\$26400	109/\$32700

Total fees collected as of 10/31/93 (inc '92 receipts) = \$98,700.

The Department estimates that 1993 annual fee receipts will total \$101,000, with 100% compliance. In  
*1994 Legislative Report on Pollution Prevention*

1994, they will be about \$100,000, and will increase to \$150,000 to \$175,000 in 1995, when large users of toxic substances are subject to planning requirements. However, fee receipts may decline thereafter as pollution prevention measures are implemented and Class B generators fall below the threshold of 2,640 lbs per year. For example, may drycleaners and smaller vehicle service businesses are now barely above the threshold. The plan and fee requirement is an incentive to get below the threshold if possible.

## **Compliance Tracking**

An information management system has been developed for companies required to plan, which tracks submittal of fees and summaries as well as the status of plan review and whether the plan has been submitted or is kept at the facility. Information on initial annual waste generation, contact person and phone number, mailing address and facility location were all taken from existing databases maintained by the DEC's Hazardous Materials Management Division.

Any company that has not paid a required fee and/or submitted a plan summary has received at least one letter and probably a phone call. Emphasis is clearly placed on providing technical assistance to plan development rather than the traditional compliance and enforcement approach typical of regulatory programs. Act 100 prescribes this non-regulatory approach, which has the added benefit of allowing the program to use its limited resources most efficiently. Late-filers say that progress is being made on developing a plan, and required submittals continue to arrive at the rate of three of four per week. Appendix A contains a list of all facilities required to plan and their compliance status.

## **TECHNICAL ASSISTANCE**

Since January 1992, the Pollution Prevention Division has initiated and implemented a number of technical assistance programs. National, state and interstate organizations, as well as the EPA and Congress recognize that technical assistance is the cornerstone for effective statewide pollution prevention implementation. It is true that many companies lack the resources to devote adequate attention to pollution prevention. One the barriers of process or product changes are identified and their cost effectiveness are determined, there may be regulatory, financial or institutional hurdles to overcome even though pollution prevention makes sense, not every one is doing it.

### **Plan Assistance**

In the spring of 1992, the Division produced a Guidance Manual and Supplement for the development of Hazardous Waste Reduction and Toxics Use Reduction Plans. A half dozen meetings were held around the state to introduce Vermont business and industry to the planning requirements. Talks were also given to various trade associations and business groups to further discuss the plan requirements.

In the fall of 1992, the Division held highly successful industry-specific focus group meetings to further familiarize Vermont business and industry with the planning requirements and to provide industry-specific technical information on pollution prevention technologies to companies. These were informal meetings with similar companies (such as printers, drycleaners, automotive service and repair) in which we shared information on pollution prevention and planning. We often used Vermont companies in the vanguard of pollution prevention to make presentations. In a spirit of cooperation, companies freely exchanged information on their successes and failures. Some industry groups met twice or three times to continue the dialogue. Focus group meetings of 1992 and 1993 include the following industries:

- automotive service and repair
- plastic and fiberglass
- electrical utilities
- electronics
- ski areas
- printers

- metal-intensive industries
- wood and furniture finishers
- hospitals
- drycleaners

The Division also intends to use interactive television to work with small businesses. The latter need only travel as far as the nearest regional TV studio, and the Division can receive widespread coverage in one meeting rather than conducting several meetings around the state.

### **On-site Assistance**

The cornerstone of the Division's on-site assistance program is the Retired Engineers and Professionals (R.E.A.P.) Program, which is modeled after similar programs in Alabama and Tennessee. We use the expertise of retired engineers, business executives and other professionals to conduct pollution prevention opportunity assessments for volunteering companies that help them identify technically and economically feasible options for pollution prevention. After an extensive training and orientation period that starts in August 1992, the R.E.A.P. Program has conducted approximately 40 on-site assessments for volunteer companies. More than 20 R.E.A.P. associates perform assessments in teams of two to three. They are reimbursed for travel and receive nominal compensation, which allows us to operate a relatively low-cost program. It also vastly increases the expertise, breadth of experience and workforce of the Division. The R.E.A.P. Program was originally administered through Associated Industries of Vermont's Waste Cap Program and has recently moved to the Small Business Development Center. The Division has worked with these business organizations to administer the program. In addition, the Division is more readily able to tap into the business membership and participants of these groups to market its assistance program.

The R.E.A.P. Program costs \$60,000 to \$70,000 per year to operate, and is currently funded with an EPA grant. The Program is beginning follow-ups for companies where assessments were performed, in order to gauge progress associated with implementation of recommendations and to quantify results.

### **Toxics Technical Advisory Board**

A Governor-appointed Toxics Technical Advisory Board was established in 1992 to assist the Division to develop technical assistance programs, including a Governor's Award Program for pollution prevention. To date, the Board has assisted the Division in the establishment of a Governor's Award program and a small grants program to businesses as is discussed below. At present, the board consists of representatives from the following businesses and institutions:

*Ethan Allen*

*University of Vermont*

*IBM*

*The Fonda Group*

*Bijur Lubricating*

*General Electric - Rutland*

### **Governor's Award Program**

In 1993, the Division made awards to 19 businesses and individuals to recognize efforts in pollution prevention.

tion and resource conservation. Large and small businesses, municipalities, non-profit organizations, individuals, and public agencies were recognized, including:

***New York Cleaners*** - for its waste and emission reductions and commitment to resource conservation and recycling.

***IBM*** - for its sustained efforts at toxics use and hazardous waste reduction as well as emission reductions, and its leading role in pollution prevention for the semiconductor industry.

***Nexus Electronics*** - for its complete elimination of ozone-depleting chemicals and substantial hazardous waste reduction achievements.

***Simmonds Precision*** - for its recent efforts to reduce hazardous waste by nearly two-thirds.

***Agency of Transportation (Central Garage)*** - for its efforts to substantially reduce hazardous waste generation, reduce toxics use in painting operations, serve as a model of pollution prevention for vehicle service and repair facilities, and its use of retreaded tires and re-refined oils.

### THREE SUCCESS STORIES

**NEXUS CUSTOM ELECTRONICS** - Nexus is located in Brandon and manufactures custom printed circuit boards. Since September 1992, Nexus has reduced hazardous waste generation by more than 30,000 lbs/yr. and reduced toxic air emissions by an estimated 15,000 lbs/yr. The company's outstanding success has resulted in their dropping from Class A generator status to one that likely will fall below the 2,640 lbs/yr. planning threshold for Class B generators. Nexus completely eliminated the use of freon (an ozone depleting solvent) for cleaning flux residues from PC board assemblies. The company also drastically reduced the amount of waste methanol it generated by installing a closed-loop recycling process to clean plastic chip carriers.

**VERMONT AGENCY OF TRANSPORTATION - CENTRAL GARAGE** - Located in Berlin, the Central Garage complex is the main site for service and repair of AOT vehicles, the traffic shop which houses painting and other equipment used for highway markings, and the materials research lab which tests road construction materials. The Agency has implemented pollution prevention measures and is continually evaluating others in all of these areas. Hazardous wastes have recently been reduced by nearly 50 percent. Vehicle maintenance wastes have been drastically reduced by replacing cleaning solvents and caustic dip tanks with an aqueous jet spray parts washer using soap and hot water. AOT also has a model program for minimizing spills and managing floor drains. A major initiative to convert from liquid paint to non-hazardous thermoplastic highway markings began in 1992 and is currently under evaluation for the state highway system. Finally, AOT is the leader in state government for using rebuilt parts, retreaded tires, re-refined engine oils and a non-toxic lead-free orange paint on vehicles.

**B.F. GOODRICH/SIMMONDS PRECISION** - Located in Vergennes, Simmonds manufactures aerospace components, including fuel system components for the space shuttle. The use of toxic substances and generation of hazardous wastes at Simmonds occurs in metal plating and finishing operations, machining, and printed circuit board assembly. Since 1990, the company has reduced the amount of hazardous wastes generated and shipped off-site by more than two-thirds while production has remained constant. The greatest reductions have been accomplished through construction of a new plating facility and much improved process changes including careful monitoring of plating solutions, use of countercurrent rinses, and new filtration systems to remove contaminants and extend the life of plating baths. Simmonds has also completely eliminated the use of ozone depleting chemicals such as cleaning solvents in machining and printed circuit board assemblies. Finally, machine coolants are recycled and metals recovered on-site to drastically reduce wastes as well as purchases of raw materials.

**Holly Shaner, Glenn MacRae, Connie Leach Bisson** - for their development of the MedCycle Program and pollution prevention manual for hospitals that serves as a model for infectious and hazardous waste reduction by hospitals.

### **Matching Grants Program**

In 1992, the Division initiated a limited matching grants program for Vermont business and industry investigating new and innovative pollution prevention approaches and technologies. The Division will provide up to \$5,000, with an equivalent industry match, to investigate technical feasibility and implementation of pollution prevention technologies and approaches. To date, the Division has awarded two grants: one to Printing Industries of New England, the printing trade association, to conduct pollution prevention audits of 35 Vermont printers; and Mad River Canoe, to investigate the use of pre-impregnated composites in its manufacture of fiberglass canoes.

### **Workshops and Conferences**

In addition to the focus group meetings, the Division has sponsored workshops and conferences. In June 1993, a solvent alternatives technology exhibition was held in Barre to educate Vermont businesses on alternatives to chlorinated, ozone-depleting and other toxic solvents. Solvent alternative equipment and technology was on display and companies were asked to bring their dirty or soiled parts, which vendors attempted to clean. Featured technologies included aqueous ultrasonic cleaning, aqueous jet spray cleaning, aqueous and semi-aqueous cleaning products, and low toxicity hydrocarbon cleaners. A second conference was held in November 1993 on pollution prevention opportunities in the coatings industry and was geared toward wood finishing, autobody, and metal intensive industries.

The Division has emphasized automotive service and repair facilities in targeting its technical assistance activities. There are over 2,500 such facilities in the state. Most of them are not subject to facility planning requirements, but are nevertheless significant users and generators of toxics and wastes. Five day-long statewide workshops were held in August and September, 1992 for this industry, attended by the 275 industry representatives. In April and May, 1993, 13 breakfast seminars were held around the state to provide similar information in less formal settings. A similar number of industry representatives attended.

In addition, the Division recently received an EPA grant to conduct on-site pollution prevention assistance at 30 automotive service and repair facilities, using the Retired Engineers and Professionals Program. Participating R.E.A.P. members will be trained to perform additional assessments at these facilities. The Division will also sponsor a statewide interactive TV seminar in April 1994 for this industry. The Division is working with the Vermont Automobile Dealers Association on these projects.

### **Information Clearinghouse/Newsletter**

The Division has an information clearinghouse on industrial pollution prevention with over 1,000 documents. It is used by the staff, retired engineers, business and industry, and other governmental programs. The Division is collaborating with seven other northeastern states on a regional computerized information clearinghouse. During its first year of operation, a toll-free telephone hot line has received about 500 requests for technical information, on-site assistance, regulatory information, conference and workshop information.

The Division publishes a quarterly newsletter that is mailed to Vermont business and industry and others interested in pollution prevention activities. In the coming year, we hope to add industry-specific newsletters or bulletins to report on activities, events, and new technologies, and to foster informal communication among Vermont business and industries.

## Collaborative Efforts and Technical Assistance

By working with industry trade associations such as AIV, PINE (printers), VADA, and Northeast Fabricare (drycleaners), the Small Business Development Center, the University of Vermont, and Vermont businesses and industries, the Pollution Prevention Division has been able to stretch its technical assistance dollars. The R.E.A.P. Program has, in essence, increased the Division staff by 20. We have also contracted with consulting firms for special technical assistance. Since pollution prevention has many other side benefits - such as reducing business cost and liability, improving worker health and safety, and improved public relations - it is possible to draw on these benefits to enlist the support of other groups in this effort. The potential of collaborative efforts has only begun to be tapped.

The non-regulatory approach to reducing toxics use and releases has significant potential when these other benefits can be practiced. Some of Vermont's largest industries have signed on to EPA's 33-50 program, a voluntary program to reduce toxic emissions of 17 priority chemicals by 33% in 1992 and 50% by the end of 1995. Due to future bans on the production of ozone-depleting chemicals and the requirement to label products manufactured using these chemicals, many companies have adopted safer alternatives ahead of any regulatory mandate to do so. In fact, these requirements have provided a great incentive for companies to seek our technical assistance services. The public attention received by federal Toxics Release Inventory data has prompted many companies to begin voluntary reduction of toxics use and release by implementing pollution prevention measures. To coin an EPA phrase, "Pollution Prevention: It's a whole new way of doing business. . ."

## POLLUTION PREVENTION INTEGRATION INTO STATE GOVERNMENT

There are a number of statutory mandates of the Pollution Prevention Division that relate to integrating pollution prevention strategies into agency operations and government operations.

*Coordinate ongoing technical assistance on these matters within the agency and throughout state government.*

*Work with other state agencies to evaluate, develop, and promote pollution prevention strategies.*

*Work with other state agencies to improve data and reporting systems with respect to toxics releases.*

*Work with other state agencies to develop pilot programs that encourage toxics use reduction, multimedia source reduction, and reduction in the generation of hazardous waste.*

*Review and comment on environmental regulatory programs and proposed rules, to assure that these provide incentives, rather than disincentives to pollution prevention.*

Although much work remains to be done, various projects and activities related to these mandates have been initiated, and will be discussed below.

The Pollution Prevention Division routinely involves the regulatory divisions of the DEC (air, waste and water programs) in pollution prevention workshops and conferences. The recent paint and coatings workshop was a joint effort of pollution prevention, air and hazardous materials programs. The drycleaners workshop was a joint effort with the air program. The Pollution Prevention Division coordinated a Small Business Development Center seminar on environmental regulations affecting small businesses that was carried on interactive television. VOSHA programs have been involved in many of the Division's workshops and conferences, such as automotive and paint and coatings. The Agency of Transportation, the major user of toxics and generator of wastes in state government,

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has participated in many conferences and workshops.

The Division plans to conduct pollution prevention awareness training of many DEC regulatory staff to assure that pollution prevention is considered as a primary means of achieving compliance.

The Division coordinates a Pollution Prevention Task Force within the Agency of Natural Resources that has developed pilot programs and strategies for integrating pollution prevention into agency functions. An environmental leadership subcommittee sponsored a rideshare/carpool awareness week in May 1993 for the Agency. It will expand this effort to the entire Waterbury complex in 1994 in collaboration with CVTA. The subcommittee has developed the framework for an environmental audit of agency operations and pollution prevention and resource conservation plan that addresses issues such as purchasing, procurement and contracting, environmental compliance of agency facilities and operations, office recycling, toxics use reduction, vehicle and energy use, and water conservation. A Task Force subcommittee on multimedia pollution prevention has worked to develop pilot programs that will encourage pollution prevention in compliance, enforcement and inspection programs.

The Pollution Prevention Division has actively participated in the reorganization of DEC to assure that multimedia pollution prevention is a priority in the way the organization carries out its functions in regulatory, enforcement, assistance and education programs. Under the reorganization, the Division will expand to become the Pollution Prevention and Education Division, incorporation recycling and resource conservation programs from the Solid Waste Management Division, permit specialist in the Agency's regional offices, and the wastewater treatment plant operator training program. The Division's expansion will augment the Department's presence in technical assistance and information and education. The Division is currently in a strategic planning process to define its purpose and to develop strategies for program implementation.

The Division has also participated on a rules committee that clarified Agency rule writing. The Division worked to insure that pollution prevention approaches are incorporated into Agency rule where appropriate.

## **MEASUREMENT OF REDUCTIONS / PROGRAM EFFECTIVENESS**

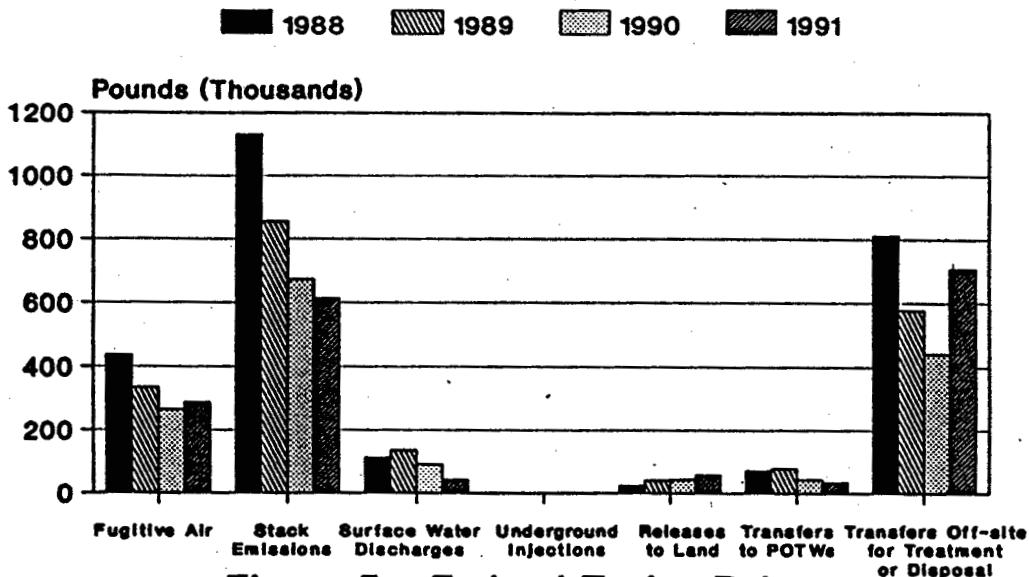
Like other states with pollution prevention planning laws, Vermont is just beginning to grapple with how to measure toxics use and hazardous waste reduction progress, and how much of the success can be attributed to pollution prevention programs.

At present, it is too early to quantify successes. The toxics use portion of the plan requirements does not take effect until 1995. The hazardous waste reduction plans have only recently become due, and annual performance reports are not due until 1994. Many of the projected reductions reported in plans will be implemented over the next few years.

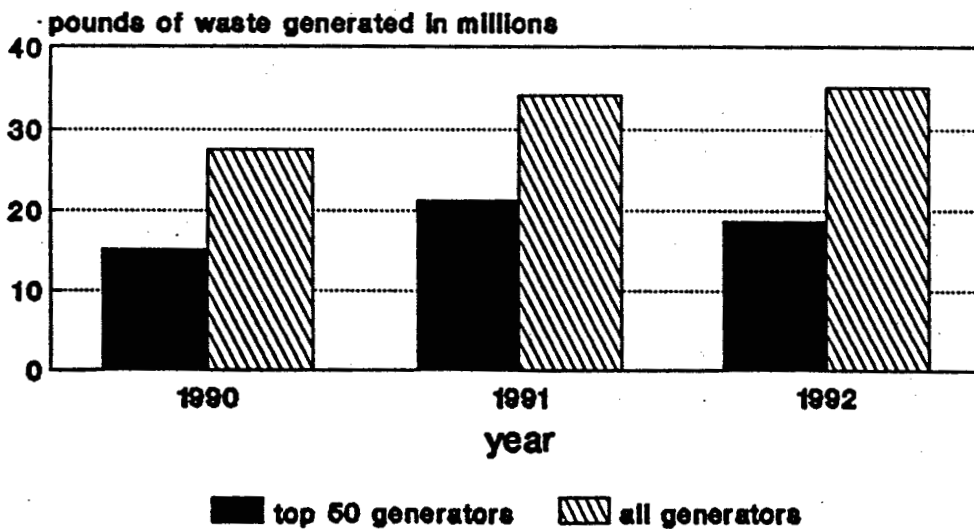
It is very important at this stage of implementation to establish a baseline for toxics use and hazardous waste generation, upon which to measure future progress and establish goals. A baseline of hazardous waste generation has been established through the computerized hazardous waste manifest tracking system. A number of years of data are available. A toxics use baseline will be enacted in 1995 when the 1995 requirements for toxics use reduction planning take effect. The Division is currently working with an environmental engineering consulting firm to finalize reporting and planning requirements that will be used to accomplish this.

### **Early Trends**

From 1988 to 1991, hazardous waste and toxic emissions both decreased. Toxics Release Inventory (TRI) data on the 50 largest users of toxic substances show trends of decreasing stack and fugitive emissions, Surface



**Figure 5 - Federal Toxics Release Inventory Data, Vermont Releases and Transfers 1988-1991**



**Figure 6 - Hazardous waste generation in Vermont: 1990-1992 by all generators and by the 50 largest generators**

water discharges and off-site transfers (largely hazardous waste with some solid and other wastes included). The reductions generally range from 10-40% (see Figure 5). Although factors other than toxics use and hazardous waste reduction - such as elimination of some chemicals from reporting, and industry no longer overestimating releases - led to some of these decreases, it is nevertheless believed that these are significant trends.

Similar, hazardous waste generation by the largest generators in the state is beginning to decrease. From 1991 to 1992, there was a 15 percent decrease in generation by the 50 largest generators.

These trends, coupled with the fact that 250 of the largest users of toxic substances and generators of hazardous waste have identified reduction goals for more than 450 waste streams, is significant and will be measurable over the next few years. The success stories in many different sectors, as exemplified by some of the Governor's Award winners, is more evidence that these trends are significant and will continue.

There are now many incentives for pollution prevention that did not exist or were not as significant Act 100 passed. These incentives will continue along with the mandate created by the planning requirement. The ban on production of ozone-depleting chemicals in 1996 as well as the CFC labeling law has had a dramatic effect on solvent reduction and elimination. The move to aqueous, semi-aqueous and no-clean systems is dramatic. Metal-intensive industries, electronics firms, and vehicle service and repair facilities have all been adopting these pollution prevention measures. The Clean Air Act is having major impacts on reducing solvent and VOC content of paints and coatings and moving the industry to water-based coatings for wood, metal, printing and plastic applications. These changes will continue to decrease toxics use and hazardous waste by these industries.

EPA programs such as Toxics Release Inventory reporting and the 33-50 voluntary emissions reduction program have utilized the public image factor as an incentive for reduction by some of the larger facilities in state. Green marketing and product stewardship, along with public perception and consumer demand, are other non-quantifiable factors.

An example of how Act 100 planning requirements have provided the incentive for toxics use and hazardous waste reduction can be seen in attendance at workshops, seminars, and focus group meetings. Most companies that participate in outreach activities must plan. It has been very difficult to attract those not subject to the requirements.

The Division has just begun the plan review phase. Annual performance reports, with more quantitative data on reduction, will be submitted in 1994. A priority of the program will be plan review and tracking over the next two years, assuring compliance and progress in toxics use and hazardous waste reduction. Toxics use reduction plan implementation will also be a major effort, along with establishing a baseline for toxics use.

## **PROGRAM STAFFING AND FUNDING**

The program staff remains small, with 3.5 permanent FTE. One temporary position has been used during the past year. The establishment of the retired engineers program for on-site assistance has given the program access to 15-20 engineers and business professionals. The program has contracted out for some industry-specific technical assistance and plan review activities to supplement efforts in these areas.

Program funding and budget expenditures for the first full fiscal year of operation (FY 1993) were as follows:

FY 1993	
Personnel	\$174,350
Operating	\$17,617

Other(contractual,grants retired engineers)	<u>\$78,638</u>
<b>Total</b>	<b>\$270,605</b>
<u>Funding Source</u>	
Federal grants	\$110,630
H.W. Management Assistance	\$159,975
FY 1994(Estimated)	
Personnel	\$182,000
Operating	\$20,000
Other	<u>\$110,000</u>
<b>Total</b>	<b>\$312,000</b>
<u>Funding Source</u>	
Federal grants	\$180,000
H.W. Mgmt. Assistance	\$110,000
Plan Fees	\$22,000
FY 1995(Estimated)	
Personnel	\$197,000
Operating	\$20,000
Other	<u>\$80,000</u>
<b>Total</b>	<b>\$297,000</b>
<u>Funding Source</u>	
Federal Grants	\$40,000
Plan fees	\$125,000

*Projected deficit for FY 1995: \$132,000*

*Note: This deficit could be reduced to \$25,000 if the program obtains the maximum amount of federal funding. However, federal funding of pollution prevention programs is currently uncertain, as there are no base program grants. Funding is year-to-year competitive grants, with one-to-one match of federal dollars.*

Funding sources for the program have included the hazardous waste manifest tax (deposited in the Hazardous Waste Management Assistance Fund), fee receipts, and federal grants. The manifest tax, which contributed \$150,000 to the program in its first full year of operation, has now been phased out. It was anticipated that the fee receipts would take the place of this funding source. To date, fee receipts are only averaging \$100,000 per year.

To sustain current levels of program spending for plan review and assistance activities, the program has relied on year-to-year federal grants. Fortunately, during the current fiscal year, the program has three separate federal grants totaling \$220,000. However, all of these grants expire on September 30, 1994. Future federal funding, although anticipated to continue, is on a year-to-year basis, with no certainty of amount. In addition, with the loss of program funding through the Hazardous Waste Management Assistance Fund, less federal monies can be matched. Given the high federal match requirement for EPA pollution prevention monies (one-to-one) and the loss of the Hazardous Waste Management Assistance Funds used in part as match money, the program must utilize plan

fee money as match and will receive a maximum of \$100,000 to \$150,000 in federal funds in the future.

The program anticipates that it will not be able to sustain current levels of activity in FY 1995. It is likely that the retired engineers program and the one temporary position will be eliminated. Additional sources of federal and private funding will be sought to continue the retired engineers program, however the continuation of the program is uncertain. If realized, these cuts will very significantly curtail technical assistance efforts, on-site assistance, and seminars and workshops.

## RECOMMENDATIONS FOR PROGRAM CHANGES AND LEGISLATION

There are a number of recommended changes to Act 100 that address both implementation and funding.

1. Change the due date for payment of the annual plan fee, every July 1, to coincide with the submittal of the annual progress report, due every March 31. These are the only submittals required annually by the statute and will make compliance easier for companies and simplify administration for the Division. To accomplish, amend section 6628 (j): .....Fees shall be submitted annually on March 31st [July 1st], after initial fees have become due . . .

2. Require that plans be submitted to the secretary while still maintaining the confidential nature of the plans. At present, the plans are not required to be submitted and are retained on-site. Nevertheless, many companies have agreed to voluntarily submit plans to the agency. By not requiring plans to be submitted, the agency must go to the site and review the plan. Given the small staff, this is inefficient. To accomplish this, amend 6628 (a) as follows: Except as provided for in this section, a toxics use reduction and hazardous waste reduction plan developed under this subchapter shall be submitted to the secretary [retained at the facility] and is not a public record under 1 V.S.A. Section 317. [If a person developing a toxics use reduction and hazardous waste reduction plan under this chapter chooses to send all or a portion of the plan to the secretary for review, it still shall not be a public record under 1 V.S.A. Section 317.] A plan summary and annual performance report submitted pursuant to section 6629 of this title shall be submitted to the secretary and shall be a public record.

3. In order to encourage businesses to use technical assistance services of the Division, such as on-site assistance, some in the business community have suggested that there be stronger provision for protection of documents from scrutiny by regulatory divisions of the agency and the public. Currently, the plans developed by facilities are not a public record. However, it is unclear whether any other notes or records maintained in the Division are protected. Since we believe it was the intent of the Legislature to maintain the confidentiality of technical assistance records, except in the case of imminent threat to human health and the environment, the following amendment is recommended: Add a new paragraph to 3 V.S.A. Section 2873 which establishes the Pollution Prevention Division and its function. Existing paragraph (f) becomes (g):

(f) (1) The Pollution Prevention Division shall not make available to other divisions of the department or other agencies any information which it obtains or maintains in the course of providing technical assistance or plan review unless the information pertains to an imminent threat to human health or the environment.

(2) Information obtained and maintained by the Pollution Prevention Division in the course of providing technical assistance and conducting plan review is not a public record under 1 V.S.A. Section 317, except for information that is made available to the department or other agencies relating to imminent threat to human health or the environment.

4. In order to sustain current level of activities in the Division, it is recommended that the recently sunsetted hazardous waste manifest tax surcharge of approximately 57 percent be reinstated. The hazardous waste tax established pursuant to 32 V.S.A. Chapter 237 and deposited in the Hazardous Waste Management Assistance Fund was

increased 1990 to 1993, in part, to fund the Pollution Prevention Division. It was assumed that annual plan fees that were collected starting in 1991 and 1992 would adequately support the Division. This is not the case. Federal grants to support the programs are uncertain and the state match requirements are much higher than the other existing federal environmental grant programs that generally range from 5 to 25 percent. Pollution prevention grants have required 100 percent match. Receipts to the Hazardous Waste Management Assistance Fund totalled \$224,017.048 in 1992. Some of these monies were dedicated to host community assistance for hazardous waste facility siting; about two-thirds was available for pollution prevention activities.

Raising additional revenues to support pollution prevention programs through the manifest tax is a more equitable means than increasing plan fees. Since assistance programs are also developed for small businesses not subject to the plan requirements and plan fees, these smaller businesses would be paying into the system. An industry example is automotive service and repair, in which the Division has provided educational workshops to the industry at large, whereas only a small percentage (less than 5 percent) of the 2,000 facilities statewide submit plan fees.

5. Although it may not require statutory change, it is recommended that the SARA Title 3, Section 313, toxics release inventory reporting program for industry be transferred from the Health Department to the Agency of Natural Resources. As a part of federal Community Right-To-Know legislation, the program for reporting of toxic releases to air, land and water by industries using large quantities of toxic substances was assumed by the Health Department. This program has no federal funds attached and the Health Department serves primarily as a repository for the data which is reported. On the other hand, the Department of Environmental Conservation deals directly with the regulation of toxic emissions to air, land and water, and has more contact and familiarity with the facilities required to file annual reports. It is recommended that this program be transferred to the Pollution Prevention and Education Division. It also oversees numerous other reporting requirements on releases to air, land and water, and could coordinate this reporting requirement with existing requirements, and use the data in measuring statewide reductions in toxics releases over time.

## **FINANCIAL INCENTIVES FOR POLLUTION PREVENTION**

Pollution prevention opportunities for businesses may involve equipment modification or modernization and process changes that are capital-intensive. Unlike pollution control equipment investments, a pollution prevention investment has the longer term benefit of eliminating the pollution rather than managing it. More and more states are developing innovative tax credits and loan programs to encourage pollution prevention.

For example, Delaware has initiated a Green Industries Initiative that promotes waste reduction and use of recycled materials. The program will reward companies that have demonstrated success in pollution prevention by providing special tax credits, financial aid, and technical assistance. The state developed the program through a memorandum of understanding between the economic development and environmental agencies. Corporate income tax credits and gross receipts tax reductions for Delaware firms have been made available through legislation. Financing assistance for fixed assets and working capital can be provided through the Small Business Revolving Line of Credit and Enhancement Fund. Technical assistance from the state agencies helps companies select sites and determine regulatory requirements; provide tools for employee education, recruitment and training; expedite environmental permits; perform an environmental audit; and assist in locating markets for recycled materials.

The Division will contact the Economic Development Agency to further explore opportunities and incentives that may be possible in Vermont.

## **CONCLUSIONS**

In the first two years of the program a number of activities have been initiated in regard to plan implementa-

tion, technical assistance and integration of pollution prevention into certain governmental activities.

(1) Plans from Class A and Class B generators were due in 1992 and 1993, respectively. The compliance rate on plan summary submittals from Class A generators is over 90 percent and for Class B generators is 60 percent. Significant technical assistance efforts have been made and will need to continue, to assist smaller businesses in complying with the plan requirements. This finding corresponds to the State of Oregon on implementation of its similar law. Comparable compliance rates were reported in Oregon in after its initial plan filing date.

(2) Review of 245 plans is underway and will be a major activity of the Division in the next two years. Technical assistance and plan assistance to Class B generators will be a priority to increase the rate of compliance and quality of plans. It is expected that many of the plans will be deficient, especially in the areas of identification of technically feasible pollution prevention options, conducting analyses of economic feasibility, and in establishing goals for reduction.

(3) Implementation of the toxics use reduction planning element for large users of toxic substances is in the planning stages. Work is progressing on developing guidance for and identifying facilities subject to the planning requirements.

(4) A technical assistance and education program has been developed, including on-site assistance, workshops and conferences, information clearinghouse, Governor's Award, newsletter, and small grants program. The assistance programs not only serve the larger businesses that must plan, but also smaller businesses. The need for technical assistance in pollution prevention and regulatory compliance by small business is great.

(5) Although it is too early to quantify reductions in toxics use and hazardous waste and overall program effectiveness, early indications show the program is contributing to actions on the part of business and industry that will lead to significant reductions in the future. Significant efforts are underway by facilities to reduce or eliminate use of certain toxics and hazardous wastes, as seen in review of plan summaries. Individual efforts to drastically reduce use of toxics and generation of hazardous wastes and emissions have been documented in several industries; They offer encouraging signs that downward trends will continue. Statewide numbers show that hazardous waste generation and toxics emissions by the largest facilities are decreasing. Smaller businesses, such as vehicle service and repair and printing; are also reducing wastes and toxics use through the planning requirement.

(6) The Division has undertaken a number of projects to integrate pollution prevention into state government, the Agency of Natural Resources, and the Department of Environmental Conservation; The Division has participated in reorganization of the DEC with an emphasis on multimedia or cross-program coordination and pollution prevention.

(7) Further quantitative and qualitative measures of program success and effectiveness will be developed over the next two years, as annual performance reports are submitted from planning industries in 1994 with quantitative results, and as the toxic use reduction planning element for large users of toxics takes effect. Also, a baseline of toxics use by facilities in state will be established through this process.

(8) Although program implementation has proceeded with documented results, there are a number of legislative recommendations made through this report to improve the program in areas such as confidentiality of the program's files, required plan submittal rather than retention only on-site, and coordination of annual fee and annual report submittal due dates.

Recommendations are also made in shifting a program on (TRI) reporting from the Health Department to the DEC.

(9) In the area of program funding, revenues generated by plan fees are less than anticipated to maintain the current level of activity established over the first two years of the program. Plan review and assistance activity will increase now that plans are due, and small businesses, in particular, will still require assistance to achieve compliance. Plan

review and assistance for large users of toxics will place an additional burden on existing resources during the implementation phase in 1994 and 1995 and afterward. This report recommends that additional funding sources be established, such as reinstating the surcharge on the hazardous waste manifest tax. State dollars are necessary in order to match federal funding sources for pollution prevention, especially in light of the high match requirement (100 percent).

# **APPENDIX**

## **STATUS OF COMPANIES SUBJECT TO PLANNING**

# Annual Report 1993

## Plan Review

s = submitted to PPD  
f = maintained at facility

1 = approved  
2 = conditionally approved  
3 = deficient  
4 = review pending

## Summary Plan

c = complete  
i = incomplete  
x = not submitted

Generator Status	Site Name	Plan Review	Plan Summary
A	BERTEK, INC.	f4	c
A	BIJUR.LUBRICATING CORP.	f4	c
A	BLODGETT OVEN Co.	f4	c
A	BRYANT GRINDER CORPORATION	f4	c
A	C.E. BRADLEY LABORATORIES, INC	f4	c
A	CENTRAL VERMONT HOSPITAL	s1	c
A	CENTRAL VERMONT PUBLIC SERVICE-ASC		i
A	CENTRAL VERMONT PUBLIC SERVICE-RUT		i
A	CENTRAL VERMONT RAILWAY, INC.		x
A	CHAMPLAIN CABLE CORPORATION	f4	c
A	CHESAPEAKE HARDWOOD PRODUCTS		i
A	CONE-BLANCHARD MACHINE COMPANY	f4	c
A	EHV WEIDMANN INDUSTRIES, INC.	f4	c
A	ETHAN ALLEN - BEECHER FALLS	f4	c
A	ETHAN ALLEN - RANDOLPH DIV	f4	c
A	ETHAN ALLEN, INC. - ORLEANS	s4	c
A	EVEREADY BATTERY CO. —Bennington	f4	c
A	EVEREADY BATTERY CO.-St Albans	f4	c
A	FANNY ALLEN HOSPITAL	s3	c
A	FELLOWS CORPORATION	s4	c
A	G.S. PRECISION, INC.	f4	c
A	GENERAL ELECTRIC CO. PLANT #1-Col	f4	c
A	GENERAL ELECTRIC CO. PLANT #2-Wind	f4	c
A	GREEN MOUNTAIN POWER CORP-Colcheste	f4	c
A	GREEN MOUNTAIN POWER CORP-Montpelie	f4	c
A	GW PLASTICS, INC-Bethel		x
A	IBM CORP.	f4	c
A	IBM CORP.	f4	
A	JOHNSON CONTROLS BATTERY GROUP INC	f4	c
A	LAVALLEE & ROY, INC.	f4	c
A	MACK MOLDING CO.		x
A	MARTIN MARIETTA - BLDG 41	s2	c
A	MARTIN MARIETTA - LAKESIDE	s2	c
A	MASKA US, INC.	f4	c
A	MEDICAL CENTER HOSPITAL OF VT	s3	c
A	MOBIL OIL BURLINGTON TERMINAL	f4	c
A	NEXUS CUSTOM ELECTRONICS, INC	s1	c
A	NORTHEAST TOOL DIVISION	s4	c
A	POLLUTION SOLUTIONS OF VERMONT	s4	c
A	PORTER MEDICAL CENTER	s3	c
A	RUTLAND REGIONAL MEDICAL CTR	s3	
A	SAFETY-KLEEN CORP.		i
A	SHELBURNE CORPORATION, THE	f4	c
A	SIMMONDS PRECISION PRODUCTS-Panton	s4	c
A	SPECIALTY PAPERBOARD, INC.		i
A	STANLEY TOOLS -EAGLE SQUARE	f4	c

A	TANSITOR ELECTRONICS, INC.	s4	c
A	TIVOLY, U.S.A.	s2	c
A	UNIVERSITY OF VERMONT	f4	c
A	UPPER VALLEY PRESS	s2	c
A	US SAMICA CORPORATION	f4	c
A	VERMONT CASTINGS, INC.	f4	c
A	VERMONT CIRCUITS	f4	c
A	VERMONT PRECISION TOOLS, INC.	f4	c
A	VERMONT TAP & DIE CO.	s1	c
A	VILLAGE OF LYNDONVILLE/LYN ELEC DEP	f4	c
B	158TH COM SQD		i
B	AL MARTIN VOLVO	s4	c
B	ALCO EQUIPMENT, INC	s4	c
B	ALDERMAN'S CHEVROLET		x
B	AMERICAN STRATFORD		x
B	AQUATEC INC		i
B	ARROWSMITH INDUSTRIES, INC.		x
B	AUTO MALL	s4	c
B	BAYVIEW OLDS~CADILLAC	s4	c
B	BD PRESS, INC. (BUYERS DIGEST)		x
B	BELDEN WIRE AND CABLE CO.		x
B	BERTEK, INC.		x
B	BIO-TEK INSTRUMENTS	s1	c
B	BOMBARDIER CORPORATION	s4	c
B	BOOK PRESS, INC.		x
B	BRATTLEBORO FORD	s4	c
B	BRATTLEBORO HOSPITAL	s4	c
B	BURLINGTON FREE PRESS		x
B	BURLINGTON INTERNATIONAL AIRPORT	s4	c
B	BURLINGTON PUBLIC WORKS		x
B	C & S WHOLESALE GROCERS, INC		x
B	CAMEO CRAFTS GRAPHIC INDUSTRIES		x
B	CANADIAN PACIFIC RAILWAY		x
B	CAPITAL CITY PRESS, INC.	s2	c
B	CARRIS REELS, INC.		i
B	CENTRAL VERMONT PUBLIC SERVICE		i
B	CENTRAL VERMONT RAILWAY, INC.		x
B	CENTRAL VT PUBLIC SERVICE CORP		x
B	CHAMBERLIN MACHINE, INC.		x
B	CHATHAM PRECISION, INC.		x
B	CHITTENDEN COUNTY TRANS	s4	c
B	CITIZENS UTILITY CO		x
B	CODY CHEVROLET, INC.	s4	c
B	COLUMBIA FOREST PRODUCTS, INC.		i
B	COPELY HOSPITAL	s4	c
B	COURTAULDS AEROSPACE	s4	c
B	CPM, INC.		c
B	DYNAPOWER CORPORATION	s4	c
B	EB & AC WHITING COMPANY	s4	c
B	EDLUND CO., INC.	s4	c
B	ENDICOTT CONTRACT MANUFACTURING		x
B	ETHAN ALLEN, INC.f ISLAND POND	f4	c
B	F.W. WHITCOMB CONSTRUCTION		x
B	FAIRBANKS SCALE OF FAIRBANKS	s4	c
B	FALL MOUNTAIN MOTORS	s4	c
B	FONDA GROUP (THE), INC.	s4	c
B	FOSTER MOTORS INC	f4	c
B	FULFLEX OF VERMONT	s4	c
B	G.S.. PRECISION, INC.		x

B	GADUES DRY CLEANING	sl	c
B	GATEWAY MOTORS	s4	c
B	GEORGIA-PACIFIC CORPORATION	s2	c
B	GOSS DODGE, INC.	s4	c
B	GRAPPONE INDUSTRIAL - WHITE RIVER	s4	c
B	GRAPPONE INDUSTRIAL - WILLISTON	s4	c
B	GREEN MOUNTAIN KEN WORTH	s4	c
B	GREER'S HOUSE OF DRY CLEANING		x
B	GW PLASTICS		x
B	HAYES FORD, INC.		x
B	HAYSTACK SKI AREA		x
B	HAYWARD TYLER, INC.	f4	c
B	HAZELETT STRIP CASTING CORP.	s1	c
B	HEB MANUFACTURING	s2	c
B	HERTZ PENSKE TRUCK RENTAL	s4	c
B	J AND B INTERNATIONAL	s1	c
B	J K ADAMS COMPANY	f4	c
B	JASMIN AUTO SALES, INC.		x
B	JASONS DRY CLEANERS V		x
B	JASONS DRY CLEANING #10		x
B	JASONS DRY CLEANING #8		x
B	JASONS DRY CLEANING I		x
B	JASONS DRY CLEANING II		x
B	JASONS DRY CLEANING III		x
B	JERICHO FOREST RESEARCH FACILITY		x
B	JETLINE SERVICES INC		x
B	JONES & LAMSON	s4	c
B	KELLEY SALES & SERVICE	s4	c
B	KILLINGTON LTD	s4	c
B	KINNEY MOTORS	s4	c
B	KINNEY SUBARU	s4	c
B	LAIDLAW ENVIRONMENTAL		x
B	LAKE BUICK, INC.	s4	c
B	LAKE CHAMPLAIN FERRY		x
B	LAKE CHAMPLAIN SUBARU		x
B	LANE PRESS, INC. (THE)	si	c
B	LEWIS MOTORS, INC.	s4	c
B	LILY TRUCK LEASING CORPORATION	s4	c
B	LOVEJOY TOOL CO., INC.	s1	c
B	LUZENAC AMERICA		i
B	LUZENAC AMERICA		i
B	LUZENAC AMERICA		i
B	LUZENAC AMERICA		i
B	MAD RIVER CANOE	s4	c
B	MERIDEN-STINEHOUR PRESS		x
B	MILLER AUTOMOBILE CO.	s4	c
B	MODERN CLEANERS AND TAILORS		x
B	MOORE BUSINESS FORMS, INC.	s1	c
B	MORRISON SALES AND SERVICES	s4	c
B	MOUNT MANSFIELD CO MAIN MT GARAGE		x
B	MOUNTAIN AIR CLEANERS	s4	c
B	MT MANSFIELD COMPANY, INC..		x
B	MT SNOW RESORT		x
B	NETAM CORPORATION	f4	c
B	NEW ENGLAND EQUIPMENT CO., INC		x
B	NEW ENGLAND EQUIPMENT COMPANY, INC.		x
B	NEW ENGLAND POWER	f4	c
B	NEW ENGLAND POWER	f4	c
B	NEW ENGLAND POWER	f4	c

B	NEW ENGLAND POWER	f4	c
B	NEW ENGLAND TELEPHONE		x
B	NEW ENGLAND TELEPHONE		x
B	NEW ENGLAND TELEPHONE		x
B	NEW ENGLAND TELEPHONE		x
B	NEWPORT PLASTICS CORP		x
B	NORDIC COLLISION CENTER	s4	x
B	NORDIC FORD INC	s4	c.
B	NORDIC TOYOTA, INC	s4	c
B	NORTH COUNTRY CLEANERS		x
B	NORTHWESTERN MEDICAL CENTER	s3	c
B	OFFSET HOUSE	f4	
B	OKEMO MOUNTAIN, INC.		
B	OMYA, INC.	f4	c
B	PAGESETTERS	f4	c
B	PALMER BROS LAUNDRY		x
B	PICO SKI AREA		x
B	PIZZAGALLI CONSTRUCTION		x
B	PJ'S AUTO VILLAGE		x
B	POLYMERS, INC.	f4	c
B	PRECI MANUFACTURING, INC.		x
B	QUEEN CITY PRINTERS	s4	c
B	RICK JONES CHEVROLET		x
B	ROBERTS CAD CHEV		x
B	ROCK OF AGES CORPORATION	f4	c
B	ROCK-TENN COMPANY	s4	c
B	SAFETY-CLEAN CAR WASH&LAUNDRY		x
B	SCOT SPORT MOTORS	s4	c
B	SEWARD CORP		x
B	SEWARD SALES & SERVICE	s4	c
B	SHEA MOTOR COMPANY	s4	i
B	SHEARER CHEVROLET CO., INC.	s4	c
B	SHELBURNE SHIPYARD	s4	c
B	SIMMONDS PRECISION PRODUCTS-Meigs		x
B	SIMPSON PAPER PRODUCTS	s4	c
B	SMOKESHIRE WOODWORKS, LTD		x
B	SMUGGLERS NOTCH SKI AREA	f4	c
B	SOUTH BURLINGTON CHYRSLER-PLYMOUTH	s4	c
B	SOUTHWESTERN VT MEDICAL CENTER	s4	c
B	SOUTHWORTH-MILTON	s4	c
B	SPEEDEE OIL CHANGE & TUNE UP	s4	c
B	SPRINGFIELD ELECTROPLATING CO.		x
B	ST MICHAELS COLLEGE	s4	c
B	STANLEY TOOLS—PITTSFIELD	f4	c
B	STRATTON CORPORATION		i
B	SUGARBUSH VALLEY	s4	c
B	THE AUTOMASTER	s4	c
B	THE CAR STORE	s4	c
B	THE CLEANERS OF 5 TERRILL		x
B	THE STANDARD REGISTER COMPANY	f4	c
B	TIMOTHY COPELAND & SONS		x
B	TRINORDIC TOYOTA	s4	c
B	TRIANGLE METAL FABRICATORS		x
B	TUTTLE LAW PRINT, INC.		x
B	U.S.T., INC.	s1	c
B	VELAN VALVE CORP	s1	c
B	VERMONT AOT, MAINTENANCE DIV	s4	c
B	VERMONT CASTINGS FOUNDRY DIVISION		i
B	VERMONT DIAMOND INSTRUMENTS		x

B	VERMONT ELECTRIC CO-OP, INC.	s4	i
B	VERMONT FLEXIBLE TUBING CO INC	s1	c
B	VERMONT MARBLE COMPANY	s4	c
B	VERMONT MILITARY DEPARTMENT		x
B	VERMONT PLASTICS, INC.	s4	c
B	VERMONT TRANSIT COMPANY, INC.	s4	c
B	VERMONT TUBBS INC	s4	c
B	VERMONT WHEY COMPANY	f4	c
B	VILLANTI & SONS PRINTERS, INC.	s4	
B	VT ELECTRIC POWER COMPANY (VELCO)		i
B	VT MACK	s4	c
B	WALKER MOTORS, INC.	s4	c
B	WALLACE COMPUTER SERVICES	s1	c
B	WHITCRAFT NORTH	s4	c
B	WHITNEY BLAKE CO OF VT, INC	s4	c
B	WYETH NUTRITIONALS, INC.	f4	c
B	YANKEE CORPORATION	f4	c
B	YORK CAPACITOR CORP	f4	i