

GAO

Report to the Chairman, Subcommittee  
on Health and the Environment,  
Committee on Energy and Commerce,  
House of Representatives

September 1994

# TOXIC SUBSTANCES

## EPA Needs More Reliable Source Reduction Data and Progress Measures



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United States  
General Accounting Office  
Washington, D.C. 20548

Resources, Community, and  
Economic Development Division

B-255921

September 23, 1994

The Honorable Henry A. Waxman  
Chairman, Subcommittee on Health  
and the Environment  
Committee on Energy and Commerce  
House of Representatives

Dear Mr. Chairman:

In response to your request, this report discusses the Environmental Protection Agency's (EPA) efforts to reduce toxic chemical pollution at its source and to assess source reduction progress. As agreed, we are providing you with information on EPA's implementation of source reduction reporting required by the Pollution Prevention Act of 1990, efforts to promote voluntary source reduction activities among industrial facilities, and dissemination of source reduction information to meet state and industrial needs.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies of the report to the appropriate congressional committees and subcommittees; the Administrator, EPA; the Director, Office of Management and Budget; and other interested parties. We will make copies available to others upon request.

This work was performed under the direction of Edward A. Kratzer, Assistant Director, Environmental Protection Issues, who can be contacted on (202) 512-6553 if you or your staff have any questions. Major contributors to this report are listed in appendix II.

Sincerely yours,

Peter F. Guerrero  
Director, Environmental Protection  
Issues

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# Executive Summary

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## Purpose

Stressing the importance of establishing a national environmental management strategy focusing on preventing pollution at its source, in 1990 the Congress enacted the Pollution Prevention Act. The act authorizes the Environmental Protection Agency (EPA) to assist companies in implementing source reduction techniques and requires companies to report their results to EPA's Toxic Release Inventory, which includes data on releases of over 300 toxic chemicals. The Chairman, Subcommittee on Health and the Environment, House Committee on Energy and Commerce, asked GAO to review EPA's (1) progress in implementing source reduction reporting requirements, (2) results under a voluntary program to reduce emissions of 17 highly toxic chemicals, and (3) activities to disseminate source reduction information to meet state and industrial needs.

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## Background

EPA has developed mandatory and voluntary approaches to implementing the Pollution Prevention Act. The agency requires companies to report their source reduction activities when submitting their annual reports to the Toxic Release Inventory and encourages them to participate in the voluntary Industrial Toxics Project, popularly known as the 33/50 Program. The companies participating in this program are encouraged to reduce emissions of 17 toxic chemicals by 33 percent by 1992 and 50 percent by 1995, preferably by source reduction but also by using more conventional methods, such as pollution control devices and recycling and reuse. The participating companies are encouraged to provide information on their source reduction plans, activities, and results to EPA so it can use successful efforts to promote widespread use of new preventive approaches or technologies. EPA also promotes pollution prevention by providing planning guidance and operating a source reduction information clearinghouse for the states and industry and other potential users.

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## Results in Brief

EPA has implemented the Pollution Prevention Act's reporting requirements by adding a source reduction and recycling report to the Toxic Release Inventory. This report, section 8 of EPA's Toxic Release Inventory Reporting Form R, obtains information on companies' source reduction activities but not on the quantities of waste prevented or reduced through such activities. Although EPA assesses progress in source reduction by comparing annual changes in the reported data on production and waste generated, GAO questions the reliability of such comparisons because of several problems with the data's accuracy, including annual changes in companies' methods of estimating waste.

EPA has made progress in implementing voluntary pollution-prevention activities, but the results of these activities are uncertain. For example, the companies that participate in the 33/50 Program collectively produce most of the wastes targeted by the program and have reported substantial reductions in their emissions; however, most of the reduced emissions cannot be readily attributed to the program because substantial reported reductions occurred before the program or were reported by nonparticipants. Nor can the reported reductions be attributed to source reduction methods, as opposed to less preferable methods such as improved pollution control devices, because participating companies are not required to link their reported reductions to the methods used and generally do not provide such information to EPA. The agency is evaluating the program's results and will assess companies' use of source reduction methods.

A key element in EPA's pollution-prevention strategy is providing states and industry with the technical information needed to implement source reduction programs. However, industry and states have expressed a need for additional information to better enable them to identify and make use of source reduction technology. EPA has initiated several actions to expand and improve its efforts to disseminate source reduction information.

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## Principal Findings

### Source Reduction Data Are Needed to Measure Progress

EPA proposed adding source reduction quantity information to the Toxic Release Inventory. However, in carrying out its review responsibilities under the Paperwork Reduction Act, the Office of Management and Budget (OMB) objected to EPA's requesting information on the quantities of waste prevented or reduced through source reduction because of the additional reporting burden this would impose on industry. OMB suggested that EPA might sample companies, rather than require all companies to report the data to the inventory. While OMB approved the interim use of the Toxic Release Inventory reporting form in May 1992, EPA was required to omit questions on the quantities of waste prevented or reduced.

Lacking such information, EPA gauges progress in source reduction by comparing annual changes that companies report on production and waste generated for Toxic Release Inventory chemicals. However, such comparisons are not reliable indicators of source reduction because EPA

cannot determine whether reported reductions in waste are due to improved environmental performance or to other factors, such as annual changes in companies' production or methods of estimating waste.

Before resubmitting the Toxic Release Inventory reporting form to OMB for final approval, EPA plans to redesign the form to improve the areas in which it believes the data obtained are incomplete, inaccurate, or unreliable. In redesigning the form, EPA also will consider obtaining additional data needed to measure progress in source reduction. An EPA official told GAO that if the agency does not request the source-reduction quantity data in the redesigned form, it will consider using a survey of industrial facilities. Whether obtained through the inventory or a survey, data on the quantities of waste prevented or reduced are needed for EPA to accurately measure progress in source reduction.

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### Results of Voluntary Efforts Are Uncertain

EPA's 33/50 Program is the agency's primary voluntary source reduction activity. Over 1,200 companies responsible for about 62 percent of the emissions targeted participate in the program, and EPA has reported more than 595 million pounds in toxic waste reductions from 1988 through 1992, which exceeds EPA's 1992 national goal for the 17 chemicals targeted by the program. However, not all of the reported reductions are readily attributable to the program. For example, about 40 percent of the reductions occurred before the program's initiation in February 1991, and about 26 percent were reported by the more than 6,800 companies not participating in the program, which account for about 38 percent of the total targeted emissions. Furthermore, substantial reductions were reported for Toxic Release Inventory chemicals not targeted by the 33/50 Program, suggesting that production changes or other factors unrelated to commitments made under the program may be largely responsible for the companies' reported reductions.

Moreover, although the 33/50 Program emphasizes the importance of source reduction, EPA did not require companies to report whether their reductions were achieved through source reduction or other methods because the agency wanted to impose on companies as little burden as possible as a way of encouraging participation. Consequently, EPA does not have the information needed to monitor and assess source reduction under the voluntary program and to share with industry and the states successful approaches that were used to prevent or reduce waste at its source. Recognizing the need for such information, EPA initiated a 33/50

Program evaluation that includes assessing factors influencing reported emissions reductions, including the effects of source reduction activities.

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### EPA Needs to Improve Dissemination of Source Reduction Information

The Pollution Prevention Act and EPA's implementation strategy recognize that the exchange of information is a key factor in promoting source reduction practices. To facilitate the adoption of such practices, EPA has developed and disseminated pollution prevention planning guidance to industry and established a clearinghouse for providing information on source reduction technology to the states, industry, and others.

However, states and industrial users want more comprehensive information on source reduction than is currently available, and EPA is taking appropriate steps to identify and address these concerns. For example, EPA is performing a needs assessment among its information clearinghouse users and is working with states to establish priorities among their needs for source reduction information.

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### Recommendation

To evaluate progress in preventing or reducing pollution at its source in accordance with the Pollution Prevention Act, GAO recommends that the Administrator, EPA, either through the Toxic Release Inventory or a survey of a sample of companies, obtain and analyze data on the quantities of waste prevented or reduced through source reduction activities.

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### Agency Comments

GAO discussed the facts in this report with EPA officials, including the Director of the Environmental Assistance Division, Office of Pollution Prevention and Toxics. While these officials generally agreed with the accuracy of the factual information in this report, they suggested changes to clarify and update information pertaining to the agency's pollution-prevention strategy and related activities. The officials also suggested that GAO provide additional information in order to more fully reflect the accomplishments of the 33/50 Program, especially during the last 2 years. GAO made such changes where appropriate. In addition, GAO made changes to improve the presentation of the issues discussed in this report. As requested, GAO did not obtain written agency comments on a draft of this report.

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**Abbreviations**

EPA	Environmental Protection Agency
GAO	General Accounting Office
OMB	Office of Management and Budget
TRI	Toxic Release Inventory

# Introduction

Despite American industry's extensive use of pollution control technology, millions of tons of toxic chemical waste continue to be released into the environment each year, posing risks to the environment and to the health of workers, consumers, and the public. According to the Environmental Protection Agency (EPA), in 1992 the manufacture or use of about 320 chemicals that are monitored by the agency generated over 37 billion pounds of toxic waste, and about 3.2 billion pounds were released into the environment.<sup>1</sup>

For many years, emphasis has been placed on "end-of-pipe" pollution controls to treat, store, and dispose of waste, with varying degrees of success. Recognizing the limitations of such controls to reduce releases of waste into the environment, in 1990 the Congress, stressing the importance of establishing a national environmental policy focused on preventing pollution, enacted the Pollution Prevention Act.

## The Pollution Prevention Act Focuses on Source Reduction

The Pollution Prevention Act established a national policy that pollution should be prevented or reduced at its source. Pollution that cannot be prevented should be recycled or treated in a safe manner, and disposal or other releases should be used only as a last resort. The act directed EPA to develop and implement a strategy to promote source reduction, which the act defined as any practice that (1) reduces the amount of any hazardous substance, pollutant, or contaminant from entering any waste stream or being released into the environment prior to recycling, treatment, or disposal and (2) reduces the hazards to public health and the environment associated with the release. Source reduction includes practices such as modifying equipment, technology, processes, or procedures; redesigning products; and substituting less-toxic raw materials.

The act further required EPA to (1) establish a computerized source reduction clearinghouse that contains information to help firms and other users to implement source reduction activities and (2) expand reporting under the Toxic Release Inventory (TRI) to include pollution prevention information. The inventory, which was created by the Congress in 1986 under the Emergency Planning and Community Right-to-Know Act, is a major information system to which industries report annually to EPA and the states on their facilities' estimated releases of hundreds of chemicals. The Pollution Prevention Act requires each facility that submits information to the inventory to report also on (1) the quantity of toxic chemicals entering any waste stream prior to recycling, treatment, or

<sup>1</sup>1992 Toxics Release Inventory, Public Data Release, EPA 745-R-94-001 (Apr. 1994).

disposal; (2) changes in a chemical's production or use from the facility's previous report; and (3) the source reduction practices used, if any, to reduce chemical waste. EPA compiles the data and makes them available to the public.

## EPA's Strategy Emphasizes Voluntary Actions

To carry out the national pollution prevention policy required by the 1990 act, in January 1991 EPA established a strategy based on promoting source reduction in industry, through regulatory and voluntary efforts and information sharing.<sup>2</sup> The strategy identified the TRI, as modified by the act, as the agency's principal source of data and the standard means for assessing and measuring progress in source reduction.

EPA's strategy reflects two major objectives. The first is to make pollution prevention a central part of the agency's mission of protecting human health and the environment. Accordingly, EPA is attempting to integrate pollution prevention initiatives into its activities, programs, and operations. EPA believes that its mainstream activities, such as regulatory development, permitting, inspections, and enforcement, must reflect a commitment to reduce pollution at the source and minimize the transfer of waste from one medium (air, land, or water) to another. (App. I summarizes examples of these initiatives.)

The second objective is to establish a pollution prevention ethic within American industry by encouraging companies to voluntarily plan and implement approaches to pollution prevention and to share their successes with others through a program of information sharing, public recognition, and awards. EPA's Industrial Toxics Project, also known as the 33/50 Program, is the agency's principal initiative directed at seeking industry's voluntary commitments to achieve specific goals in pollution prevention within a specified period. The 33/50 Program is intended to (1) encourage companies to take voluntary action to identify pollution prevention opportunities for 17 targeted chemicals; (2) measure success on the basis of reductions in toxic releases into the environment from 1988 through 1995, as reported to the TRI; and (3) obtain demonstrable results to promote the widespread use of new technologies and preventive approaches.

<sup>2</sup>U.S. Environmental Protection Agency Pollution Prevention Strategy, EPA (Washington, D.C.: Jan. 1991).

## Objectives, Scope, and Methodology

The Chairman, Subcommittee on Health and the Environment, House Committee on Energy and Commerce, asked us to review EPA's (1) progress in implementing source reduction reporting requirements, (2) results under the voluntary program to reduce the emissions of 17 highly toxic chemicals, and (3) activities to disseminate information on source reduction to meet the states' and industry's needs.

To determine EPA's progress in implementing source reduction reporting requirements, we interviewed EPA officials and reviewed the agency's documentation on its proposed source reduction and recycling report under the TRI (section 8 of EPA's Toxic Release Inventory Reporting Form R). We also reviewed the comments of state, industry, and public interest organizations on the proposed requirements and reviewed the Office of Management and Budget's (OMB) response to EPA's proposed report. In addition, we visited four states—Illinois, Massachusetts, Minnesota, and Oregon—that we had identified in our previous report<sup>3</sup> as having laws promoting the reduced use of toxic chemicals. We obtained the views of environmental agency officials in these states on state pollution prevention reporting and on information they need from EPA to meet their needs.

To assess EPA's efforts to promote voluntary pollution prevention by industry and to reduce emissions under the 33/50 Program, we interviewed officials of EPA's Office of Pollution Prevention and Toxics, who are responsible for administering pollution prevention activities. We also reviewed relevant reports and documents, including status reports for the 33/50 Program. We also compared information reported to the TRI by the companies in the 33/50 Program and other respondents.

To review EPA's activities to disseminate information, we reviewed EPA's guidance for performing pollution prevention assessments and EPA's evaluation of the information clearinghouse established by the Pollution Prevention Act of 1990. We also interviewed EPA officials responsible for developing and disseminating the guidance and for improving the effectiveness of the clearinghouse. In addition, we obtained state officials' views on the usefulness of EPA's pollution prevention clearinghouse and of the pollution prevention information in the TRI. We also relied on information provided in our report on EPA's use of pollution prevention grants, provided under the 1990 act, to encourage source reduction as part

<sup>3</sup>Toxic Substances: Advantages of and Barriers to Reducing the Use of Toxic Chemicals (GAO/RCED-92-212, June 17, 1992).

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of the states' programs.<sup>4</sup> In addition, we reviewed EPA documents on EPA-state information exchange issues and interviewed EPA officials responsible for coordinating with and monitoring of the states' programs.

We performed our work from August 1992 to June 1994, in accordance with generally accepted government auditing standards. We discussed the facts in this report with EPA officials, including the Director of the Environmental Assistance Division, Office of Pollution Prevention and Toxics. While these officials generally agreed with the accuracy of the factual information in this report, they suggested changes to clarify and update information pertaining to the agency's pollution prevention strategy and related program activities. The officials also suggested that we provide additional information in order to more fully reflect the accomplishments of the 33/50 Program, especially during the last 2 years. We have made such changes where appropriate. In addition, we made changes to improve the presentation of the issues discussed in this report. As requested, we did not obtain written agency comments on a draft of this report.

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<sup>4</sup>Pollution Prevention: EPA Should Reexamine the Objectives and Sustainability of State Programs (GAO/PEMD-94-8, Jan. 25, 1994).

# Source Reduction Data Are Needed to Evaluate Progress

Before the enactment of the Pollution Prevention Act, manufacturing facilities reported to EPA the quantity of chemicals released into the environment at the reporting facility and the quantity treated and disposed of off-site. With the passage of the act, EPA expanded the data that facilities are required to report to include additional waste management information, such as the quantity of chemicals recycled or burned for their energy value and the activities initiated to reduce pollution at its source. However, facilities do not report the quantity of reductions in toxic chemical emissions that have actually been achieved through source reduction methods.

Without information on source reduction quantities, it is not known whether reduced emissions are due to improved environmental performance or to other factors, such as changes in production levels or the use of alternative chemicals that may be as harmful as those for which reductions are reported. EPA is evaluating the need for additional source reduction data.

## EPA Is Obtaining Additional Information to Measure Progress in Preventing Pollution

The Pollution Prevention Act shifted policy emphasis by stressing methods for reducing waste at its source and otherwise preventing the creation of pollutants, rather than on controlling or treating releases of pollutants. To implement this policy, on September 25, 1991, EPA proposed in the Federal Register<sup>1</sup> a rule requiring that the companies reporting to the TRI provide information on their source reduction and recycling activities, uses of specific chemicals, amounts of on-site releases and off-site transfers, and methods of on-site waste treatment. In proposing the rule, EPA stated that the Pollution Prevention Act reporting requirements are intended to ensure that sufficient information is available to evaluate the progress made by EPA and others in implementing source reduction. EPA said that:

“The information will be used by EPA, the States, the public, and industry to track the results of the full hierarchy of environmental protection — source reduction, recycling, treatment, and disposal — and the progress due to source reduction. This will help the Agency to determine whether pollution prevention can succeed on a voluntary basis or whether a more enforcement-oriented approach will be more effective in reducing the use of toxic chemicals at the source. This will also be useful in evaluating the Agency’s progress in implementing its Pollution Prevention Strategy.”

To evaluate this progress, EPA believed that it was necessary to collect information on the quantities of chemicals that would have entered waste

<sup>1</sup>56 Federal Register 48475 (Sept. 25, 1991).

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**Chapter 2**  
**Source Reduction Data Are Needed to**  
**Evaluate Progress**

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streams if companies had not implemented source reduction. A number of states with their own source reduction programs supported this proposal, arguing that the public should have access to information on the quantities of waste prevented.

As required, EPA requested OMB approval to obtain the source reduction quantity and other information that EPA proposed adding to the TRI. However, in performing its responsibilities under the Paperwork Reduction Act, OMB pointed out that the Pollution Prevention Act required reporting only on the practices used to achieve source reduction, not on the quantities of waste resulting from the source reduction practices. OMB suggested that EPA might instead obtain the needed data from a sample of companies, noting that, in this way, EPA could obtain the data it needed in a less burdensome manner.

In May 1992, OMB approved a modification of EPA's proposed source reduction and recycling report for use on an interim basis while EPA completes its planned redesign of the TRI reporting form based on discussions with manufacturers, environmental groups, and other interested parties.<sup>2</sup> However, in using the OMB modified report EPA was required to omit questions on the quantities of waste prevented through source reduction methods.

In May 1993, EPA released its 1991 TRI data that included for the first time information based on the source reduction and recycling report. The data reflected substantial reductions in industrial releases into the nation's environment but showed that a considerable volume of toxic waste was still being generated. The data for 1991 showed that 38 billion pounds of waste were generated and managed by industry through activities such as recycling and energy recovery, an amount equal to more than 11 times the 3.4 billion pounds of these generated wastes that were reported as releases into the environment.<sup>3</sup> In announcing the inventory data, the EPA Administrator said that:

"Even though emissions of chemicals are decreasing, we don't see a similar downward trend in waste generation. The data projected for 1992 and 1993 suggest that generated waste will be flat or even increase slightly. The data also suggest that recycling will decline

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<sup>2</sup>On May 19, 1992, OMB approved the source reduction and recycling report form that EPA used to collect pollution prevention information for reporting years 1991, 1992, and 1993. EPA may continue to use this form until it promulgates revisions pursuant to law. A TRI official told us that EPA expects to complete such revisions by late 1996 or early 1997.

<sup>3</sup>EPA's 1991 TRI states that a release is an on-site discharge of a toxic chemical to the environment—air, land, or water—at a reporting facility.

while quantities of toxic chemicals being treated will rise. If these projections are true, this is a disturbing trend.”

In April 1994, EPA released the 1992 TRI results that indicated continued cause for concern. The 1992 data showed that industrial facilities had generated over 37 billion pounds of waste. The facilities also indicated that their 1993 and 1994 reports of total generated wastes may reflect increases.

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## **Data Are Not Reliable for Measuring Source Reduction Progress**

Lacking information from companies on the estimated quantities of waste prevented through the source reduction methods they reported using, to gauge progress in source reduction, EPA must rely on estimates of annual production and related toxic waste. For example, if a company's production is unchanged but its waste is reduced, a reported source reduction may have occurred. However, such comparisons may not be reliable for evaluating the progress of source reduction, for the reasons discussed below.

Even though approximately 70,000 chemicals are used commercially in the United States, companies report annually to the TRI on production and related waste for only about 320 of these chemicals. Consequently, the companies may maintain or even increase their usage of toxic chemicals while concurrently reducing the chemicals that are reported to EPA. For example, substituting for a chemical on the inventory by using another equally or more toxic chemical would reduce the quantity of toxic waste reported. However, the substitution would not reduce hazards to public health or the environment and would not be a source reduction.

Furthermore, the companies' TRI reports on waste generated do not include information on the amount of chemicals present in the products manufactured and sold, even though such chemicals become waste when products are used and discarded. Consequently, without information on the quantities of waste prevented or reduced, EPA has no way to determine the impact of the companies' actions to reduce the concentration of toxic chemicals present in their products.

Moreover, the companies often do not have data systems sophisticated enough to provide reliable estimates of production and related waste. Some manufacturers have over 100 different processes for a changing mix of products, each requiring different amounts of chemicals and producing different quantities of waste. These manufacturers often do not have data

systems to account for individual relationships among each product manufactured and the chemicals used, emitted into the environment, recycled, treated, and otherwise managed. For example, in commenting on EPA's source reduction and recycling report, the state of California pointed out that analyzing changes in annual production and chemical waste is not useful for its major aerospace and petrochemical industries, given their inability to account for the impacts of annual changes occurring among production units and chemical specifications for individual products.

Lacking such data, the companies use estimation techniques to calculate the interrelationships between production and waste. However, as state and other users of TRI data have pointed out, the companies often change their estimation techniques from one year to the next, preventing data users from accurately evaluating the progress of source reduction.

EPA acknowledges that its ability to measure source reduction is limited because the TRI does not provide information specific enough to explain reasons for changes in quantities of reported releases. In issuing its 1991 and 1992 inventory data, EPA noted that, while the data can give some indication of source reduction, changes in waste quantities also result from other causes. For example, in a recently completed survey, EPA contacted over 1,200 industrial facilities that had informed the agency of changes in generated waste between 1989 and 1990. On the basis of the facilities' survey responses, EPA found that nearly 70 percent attributed some portion of their emissions increases or decreases to production level changes.

## EPA Is Considering the Need for Additional Source Reduction Data

Before resubmitting its redesigned TRI reporting form to OMB for approval, EPA plans to analyze the areas in which it believes the data are incomplete, inaccurate, or otherwise not reliable. EPA will also consult with manufacturers, environmental groups, and other organizations, including the National Advisory Council for Environmental Policy and Technology.<sup>4</sup> An EPA official estimated that the revised reporting form will not be available for another 2 to 3 years, given the time that will be required to complete their deliberations and the regulatory review process.

<sup>4</sup>The Council is a federal advisory committee organized under the Federal Advisory Committee Act to provide information and advice to the EPA Administrator and other EPA officials on policies for managing the environment. The Council's members include senior-level representatives of a wide range of EPA's constituents, including business and industry; academic, educational, and training institutions; federal, state, and local government agencies and international organizations; environmental groups; and nonprofit entities.

EPA officials told us that they remain concerned about their ability to accurately measure progress in source reduction and recognize that information on the quantities of waste reduced or prevented through source reduction would enable the agency to more accurately measure such progress. According to these officials, in redesigning the TRI reporting form, the agency will consider changes in the data collection methodology needed to measure progress in source reduction, including the methods for obtaining data on the quantities of source reduction. However, since the Pollution Prevention Act does not require the agency to obtain such data, these officials are not certain that the data will be included in the redesigned reporting form, which will be largely based on consensus views obtained from OMB, industry, environmental groups, and others participating in the regulatory review process. In addition, as an option to obtaining the quantity information through the inventory reporting form, an EPA official told us that the agency will consider obtaining it by surveying industrial facilities.

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## Conclusions

While EPA has taken steps to make the TRI more comprehensive, the inventory does not collect data on quantities of waste prevented due to source reduction methods companies reported using. In the absence of such data, EPA assesses the extent of progress in source reduction by comparing changes in the companies' annual estimates of their production and waste generated. However, EPA itself acknowledges its limited ability to gauge progress in source reduction on the basis of such estimates, because annual variations in the companies' production and data on generated waste may likely reflect changes in the companies' methods of estimating waste or in economic conditions, rather than reflecting improved environmental performance.

Although EPA recognizes the limitations of the data in the inventory for measuring progress in source reduction, the agency has not committed itself to collecting additional data because the Pollution Prevention Act does not require it to do so. OMB has suggested that a less burdensome way to collect source reduction data might be through a survey of a sample of companies. Whether through a sample or through the inventory, given the inadequacies of source reduction data currently available through the inventory, in our opinion additional data are needed in order to provide a credible basis for evaluating progress in source reduction.

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**Recommendation**

To evaluate progress in preventing or reducing pollution at its source in accordance with the Pollution Prevention Act, we recommend that the Administrator, EPA, either through the Toxic Release Inventory or a survey of a sample of companies, obtain and analyze data on the quantities of waste prevented or reduced through source reduction activities.

# EPA's Voluntary Pollution Prevention Approach Has Produced Uncertain Results

EPA's strategy for implementing the Pollution Prevention Act consists largely of encouraging industrial polluters to voluntarily adopt pollution prevention practices. In carrying out this strategy, the agency has the Industrial Toxics Project, a voluntary waste reduction program known as the 33/50 Program, which EPA has described as its showcase for source reduction activities.

Over 1,200 companies have joined the 33/50 Program, which was initiated to reduce emissions of 17 highly toxic chemicals that are used extensively in commerce. The companies that have joined the program account for most of the 17 chemicals' emissions and have been encouraged by EPA to review their operations to identify source reduction opportunities. However, while industry reported that the targeted emissions have been reduced overall by about 40 percent from 1988 through 1992, an amount that exceeds the program's 1992 national reduction goal set by EPA, most of the reductions cannot be readily attributed to the program. Nor does EPA know the extent to which the reductions are attributable to source reduction, as opposed to other factors, such as pollution control devices, reduced production, or changes in reporting methods.

## Background on EPA's Voluntary Emissions Reduction Program

EPA initiated the 33/50 Program in February 1991, describing it as a key component in the agency's national pollution prevention strategy required by the Pollution Prevention Act of 1990. Since then, EPA has invited over 8,100 industrial companies to participate in the program by volunteering to reduce their emissions of the 17 targeted chemicals in the TRI. The goals for reduction were set by EPA at 33 percent, or 486 million pounds, by 1992 and 50 percent, or 737 million pounds, by 1995, as measured against a 1988 baseline. EPA encourages the companies to use source reduction methods, but other methods of reducing emissions, such as waste treatment, are acceptable under the program. EPA also encourages companies to report their source reduction plans, activities, and results to EPA in order that the agency can use their demonstrable efforts to promote the widespread use of new preventive approaches or technologies.

EPA's choice of the 17 chemicals covered by the program was based on several factors. For one thing, EPA chose contaminants that were to be regulated under the provisions of the Clean Air Act Amendments of 1990, to ensure that companies participating in the voluntary program would also be eligible for credit under the early emissions reduction provision of

the law.<sup>1</sup> Another reason was that the 17 chemicals are among the more than 300 high-priority toxic chemicals used extensively in commerce and reported annually to the TRI.

Once companies agree to participate, they are able to (1) set their own reduction goals, which can be higher or lower than EPA's overall national goals; (2) use end-of-the-pipe controls rather than source reduction activities to reduce releases (even though EPA encourages source reduction); and (3) choose 1988 or any subsequent year as a baseline. The only program commitment a participant must make is to reduce emissions of the chemicals: It does not have to specify how it will honor this commitment. Participants that reduce their emissions are publicly recognized.

EPA believed that the companies would be willing to participate in the 33/50 Program for a variety of reasons. Besides being able to use reductions under the 33/50 Program to qualify for the early reduction incentive of the Clean Air Act, EPA reasoned that the companies would be interested in the cost-savings that might result from the production efficiencies that are used to reduce emissions. Furthermore, the agency believed that the companies would see this participation as an opportunity to gain public recognition of their environmental awareness and commitment to environmental management. And finally, EPA provided the companies with great flexibility in reducing emissions and required few prerequisites for joining the program.

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## **Impact of the 33/50 Program Is Uncertain**

Many of the nation's largest chemical polluters have joined the 33/50 Program, and the TRI shows that substantial reductions have been reported in toxic emissions measured under the program. Nonetheless, most polluters do not participate in the program, and most of the emissions reductions that have been reported are not readily attributable to the program or to source reduction activities.

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## **Participation Is Limited and the Reasons for Reductions Are Unknown**

A priority for the 33/50 Program has been to obtain the participation of the companies producing the largest quantities of emissions of the 17 chemicals; thus far, 1,242 companies producing about 62 percent of the 1988 emissions have joined the program. While participation in the program is substantial, over 6,800 companies—or about 85 percent of

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<sup>1</sup>Under the Clean Air Act Amendments' early reduction provision, companies receive additional time to comply with applicable emissions standards if they significantly reduce their emissions before EPA proposes such standards.

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**Chapter 3**  
**EPA's Voluntary Pollution Prevention**  
**Approach Has Produced Uncertain Results**

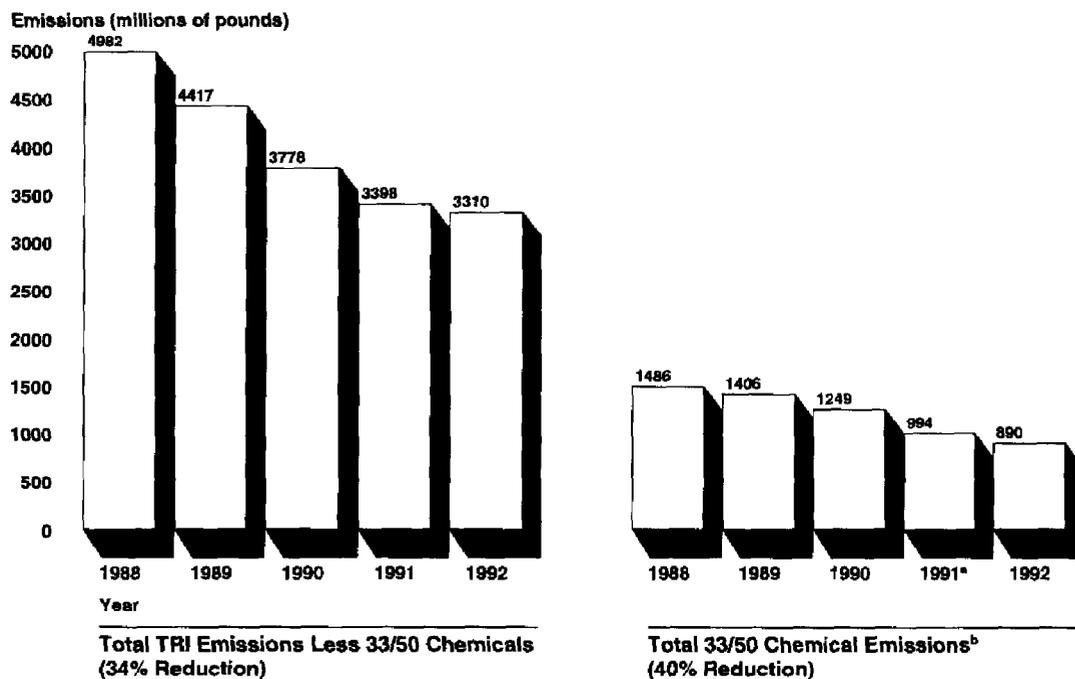
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those invited—have chosen not to join. Furthermore, while EPA continues to solicit companies to participate, a dwindling number have agreed to do so. During 1993, for example, EPA invited 902 companies but only 38—or about 4 percent—joined. The agency has not determined the companies' reasons for declining to participate in the program.

The emissions levels reported for the 17 chemicals covered by the 33/50 Program have fallen steadily from 1988 through 1992, the latest year for which complete information is available. As shown in figure 3.1, from 1988 through 1992, the 33/50 companies and other companies reporting to the TRI reduced their total emissions of the 17 chemicals from about 1,486 million pounds to about 890 million pounds, a 40 percent reduction. However, substantial reductions were also reported for other chemicals in the inventory that have not been targeted by the 33/50 Program. Figure 3.1 shows that such chemicals decreased from about 4,982 million pounds in 1988 to about 3,310 million pounds in 1992, nearly a 34-percent reduction.

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**Figure 3.1: Emissions of 33/50 Program Chemicals Compared to Total TRI Emissions, Less 33/50 Chemicals, 1988 Through 1992**



<sup>a</sup>First year of the 33/50 Program initiated by EPA in February 1991.

<sup>b</sup>Total emissions of 33/50 Program chemicals include those reported by companies not participating in the program.

Source: GAO's analysis of EPA data.

EPA points out, however, that the rate of reported reductions since the program was put in place in 1991 has been greater for 33/50 Program chemicals than for other inventory chemicals. EPA data show that in 1991 and 1992, overall chemical reductions totaled about 358 million pounds for the 33/50 chemicals and about 468 million pounds for other inventory chemicals—reductions of about 29 percent and 12 percent, respectively, from 1990 levels. While EPA recognizes that a considerable portion of the reductions were reported by nonparticipants, the agency points out that participating companies' rate of reported reductions after the program began in 1991 is larger than for nonparticipants. EPA data show that in 1991 and 1992, the reductions reported by participants totaled about 246 million

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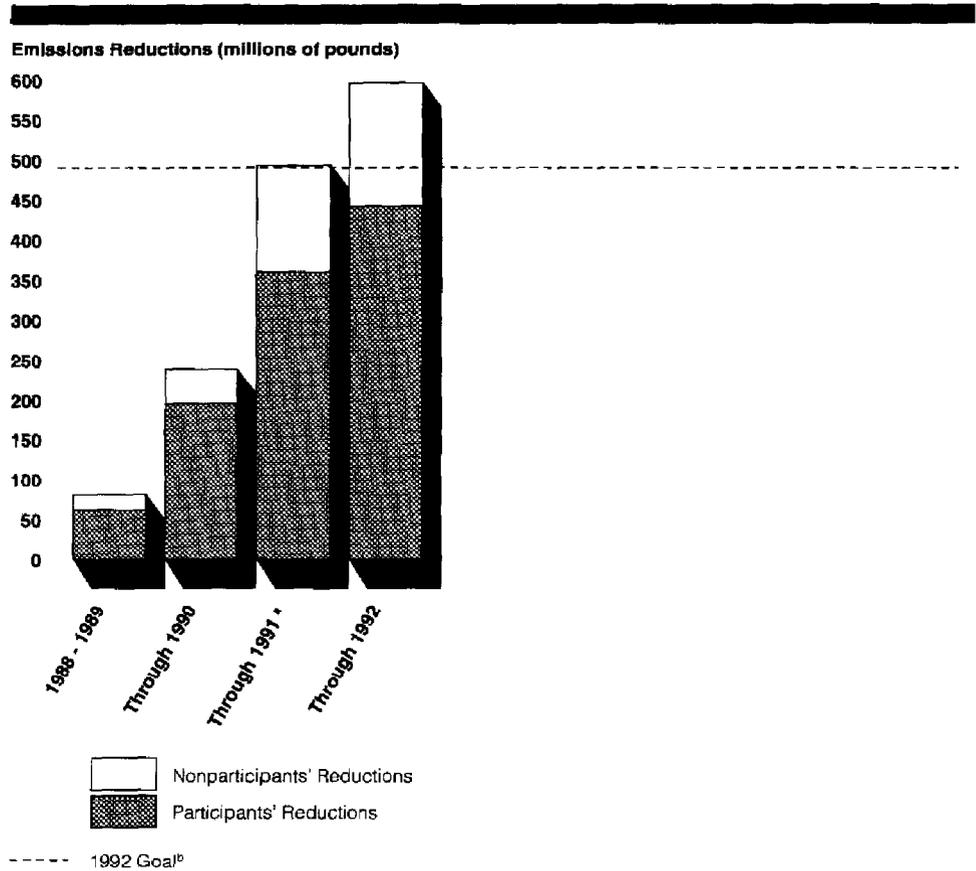
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pounds, or a reduction of about 34 percent from 1990 through 1992. For the same period, EPA data show that nonparticipants' reported reductions totaled about 112 million pounds, or a reduction of about 22 percent.

In addition, EPA has reported that waste from the 17 chemicals has been reduced by 596 million pounds, exceeding the 33/50 Program's interim national reduction goal of 490 million pounds by 1992, as shown in figure 3.2. However, not all of the reported reductions are readily attributable to the program. About 40 percent of the reductions occurred from 1988 through 1990, prior to the initiation of the program in 1991. Furthermore, about 155 million pounds, or about 26 percent of the reductions were reported by firms that do not participate in the program. In effect, without counting the reductions achieved by nonparticipating firms, the 33/50 Program would not have met its interim goal.

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**Figure 3.2: Cumulative Participant and Nonparticipant Reductions of 33/50 Program Chemical Emissions Compared to Program's National 33-Percent Goal, 1988 Through 1992**



\*First year of the 33/50 Program initiated by EPA in February 1991.

<sup>b</sup>The 33/50 Program's 33-percent national emissions reduction goal is 490 million pounds from 1988 through 1992.

Source: GAO's analysis of EPA data.

The substantial overall emissions reductions from 1988 through 1992 reported for both the 33/50 chemicals (40 percent) and other TRI chemicals (34 percent) suggest that factors other than commitments under the program may have been largely responsible for the companies' reductions. Furthermore, as discussed in chapter 2, an EPA sample of TRI reports for 1989 and 1990 found that nearly 70 percent of the surveyed facilities attributed some portion of their emissions increases or decreases to production level changes. The survey also found that while source reduction was a significant factor, other factors such as economic

conditions and measurement and reporting changes can also substantially affect the quantities of emissions reported.

### Reductions May Not Be Attributable to Source Reduction

A key objective of the 33/50 Program is to encourage companies to use pollution prevention practices, rather than end-of-the-pipe controls, to achieve the targeted emissions reductions. Likewise, EPA encourages the companies participating in the program to report their source reduction plans, activities, and results to EPA so that the information can be made available to other companies through the agency's information dissemination activities, such as its source reduction clearinghouse,<sup>2</sup> discussed in chapter 4. Nonetheless, the companies generally have not provided such information to EPA, and EPA has chosen not to require it because the agency did not want to discourage companies from participating in the program. Consequently, EPA does not know whether or the extent to which the 33/50 companies have achieved their emissions reductions through source reduction methods, as opposed to improved pollution control devices and other treatment methods.

EPA recognizes that better information is needed to determine the impact of the 33/50 Program and has initiated an evaluation of the program's results that is being conducted by INFORM, a nonprofit environmental research and education organization,<sup>3</sup> under a cooperative agreement with EPA. The evaluation is assessing the use of source reduction to meet the 33/50 Program's goals; the extent to which companies' participation in the program contributed to EPA's meeting its targeted reductions; and the effect of specific program features, such as flexibility in methods for reducing emissions, on companies' decisions to join the program and on their reduction activities.

INFORM's evaluation methodology will use statistical sampling to assess the factors influencing 33/50 chemical emissions reductions, including source reduction methods, and will compare and contrast TRI reports from participating and nonparticipating facilities. The methodology will also use supplementary survey and interview data from other research projects that INFORM is performing on pollution prevention. INFORM expects to issue a report on the evaluation's preliminary results in the fall of 1994,

<sup>2</sup>The clearinghouse established under the Pollution Prevention Act to make available to the public information on management, technical, and operational approaches to source reduction.

<sup>3</sup>INFORM conducts case study research of pollution prevention programs and practices at manufacturing facilities in the United States and has issued the following reports on source reduction: Cutting Chemical Wastes, INFORM, Inc. (New York, N.Y.: 1985) and Environmental Dividends: Cutting More Chemical Wastes, INFORM, Inc. (New York, N.Y.: 1992).

covering the 1991 and 1992 inventory reports, and to issue annual follow-up reports covering the 1993 through 1995 inventories.

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## **Conclusions**

The initiation of EPA's 33/50 Program was a significant step toward obtaining American industry's voluntary commitment to reduce toxic chemical emissions, and companies have reported substantial reductions in the 17 chemicals targeted by the program. Nonetheless, most companies invited have not joined the program, even though EPA has given them great flexibility and required few prerequisites for joining. Furthermore, while substantial reductions have been reported in the emissions of the 17 chemicals covered by the 33/50 Program, the program's impact is uncertain, given that (1) the reductions are partly attributable to companies that do not participate in the program; (2) much of the reductions reported occurred before the program was initiated; and (3) the program participants are not required to report on their source reduction approaches and results. We believe that the 33/50 Program evaluation EPA has initiated should provide a basis to more effectively gauge the program's impact by assessing the extent to which source reduction and other factors influence reported emissions reductions.

# EPA Needs to More Effectively Disseminate Information to Promote Source Reduction

EPA recognizes that a key factor in achieving industrial source reduction is the exchange of information between government and industry. Thus, among the key elements of EPA's pollution prevention strategy is the development of (1) guidance to help businesses assess their operations and develop plans for implementing source reduction techniques, (2) a computerized information clearinghouse for source reduction data and technologies, and (3) an effective partnership with the states in providing businesses with source reduction information and technical assistance. EPA has taken steps to implement each of these elements in its strategy, but an internal agency study and our review have found that the agency needs to improve the quantity and quality of its source reduction data.

## Extent of Pollution Prevention Planning Is Unknown

EPA has developed and disseminated pollution prevention planning guidance to industry to facilitate the adoption of source reduction practices. The development of pollution prevention plans is voluntary, and EPA does not know the extent to which industry has implemented the agency's planning guidance. Three of the four states we visited during our review require companies in the state to prepare pollution prevention plans. While no similar federal requirement exists, legislation has been proposed to require companies reporting to the TRI to prepare plans and establish goals for pollution prevention.

## Planning Guidance Has Been Developed and Disseminated

Reducing the use of toxic chemicals by changing production processes or operations, or by replacing such chemicals with nontoxic raw materials, clearly benefits the public and the environment, which otherwise would be exposed to higher levels of toxic releases. Reducing pollution can also benefit industry to the extent that it lowers the cost of waste disposal, pollution control, and future liabilities. Nevertheless, some companies will be reluctant to make capital investments, such as purchasing new equipment needed to reduce pollution, when the cost-effectiveness of such decisions is uncertain.

To encourage and assist companies to determine the cost-effectiveness of projects, in May 1992 EPA issued its Facility Pollution Prevention Guide,<sup>1</sup> designed to assist companies in developing pollution prevention programs. The guide provides a comprehensive approach for identifying pollution prevention opportunities and for developing a plan that describes the operations producing, using, or releasing hazardous or toxic materials; the

<sup>1</sup>Facility Pollution Prevention Guide, EPA 600-R-92-088, (May 1992).

types and amount of waste the firm is attempting to reduce; and pollution prevention activities.

EPA distributed about 20,000 copies of the guide to companies and various groups interested in pollution prevention, including state and local governments and trade and industrial associations. However, an EPA official told us that the agency does not know the extent to which companies, including those participating in the 33/50 Program, have used the guide.

### Proposed Federal Legislation Would Require Pollution Prevention Plans Similar to Some States' Requirements

Three of the four states we visited during our review require companies operating in the state to prepare pollution prevention plans. The state officials that we interviewed told us that their planning requirements were necessary to determine which companies need technical assistance in identifying and implementing source reduction activities. In our January 1994 report on state pollution prevention programs,<sup>2</sup> we pointed out that about one-third of the 88 state programs surveyed in our review require companies to submit documentation on pollution prevention planning activities and results.

Although the Pollution Prevention Act does not require industry to prepare pollution prevention plans, legislation has been introduced in the 103rd Congress to that effect. The Hazardous Pollution Prevention Planning Act of 1993 (S. 980) would require the businesses that report to the TRI to prepare plans that consider pollution prevention options and establish 5-year goals for pollution prevention. While the companies would not be required to implement source reductions, they would be required to report to EPA on the progress they are making toward such reductions and explain cases in which progress is less than expected. In addition, EPA would be required to identify industrial categories in which technical assistance is needed before additional progress can be made.

### Source Reduction Clearinghouse Is Not Meeting Needs

To foster the growth of pollution prevention programs in government and industry, EPA has established a clearinghouse that provides source reduction information and technology data. The Pollution Prevention Act directed EPA to establish the clearinghouse to (1) compile information, including a computerized data base that contains information on management, technical, and operational approaches to source reduction;

<sup>2</sup>Pollution Prevention: EPA Should Reexamine the Objectives and Sustainability of State Programs (GAO/PEMD-94-8, Jan. 25, 1994).

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**EPA Needs to More Effectively Disseminate**  
**Information to Promote Source Reduction**

(2) serve as a center for source reduction technology transfer; (3) provide outreach to further the adoption of source reduction technologies; (4) gather information on the operation and success of federally aided state source reduction programs; and (5) make all such data available to the public in a manner that permits any person to enter and retrieve the data.

In establishing the clearinghouse, EPA modified an existing clearinghouse that it had created in the late 1980s to encourage the minimization of waste. The clearinghouse consists of a repository for hard-copy documents and an electronic data base, initially established in 1988 to disseminate information on minimizing waste. EPA officials told us that the clearinghouse provides some information on source reduction activities that the companies have reported to the TRI or to the 33/50 Program but that few companies have provided such information.

In 1991, EPA performed an assessment of the clearinghouse's activities. The assessment identified a number of weaknesses, including the following:

- A needs assessment of the clearinghouse's users had not been performed since its inception in 1988 as a source of waste minimization information, and EPA did not know if companies were receiving adequate information to implement pollution prevention opportunities.
- EPA has been slow to add source reduction studies to the clearinghouse, and only a small portion of case studies and publications focus on source reduction approaches.

EPA's evaluation also showed that several state officials were not satisfied with the amount and quality of source reduction data in the automated data base. For example, some states believed that the case study abstracts were too general to be useful in responding to companies' requests for technical assistance in implementing source reduction in their operations.

Officials we contacted in three of the four states we visited also believe that EPA's clearinghouse is not adequate to meet their needs. One concern is that the clearinghouse's automated data base often lacks critical information on the costs and benefits of implementing source reduction technologies. Another concern is that source reduction technologies are changing rapidly, and some of the information in the clearinghouse is outdated. According to one state official, it is crucial that the clearinghouse contain the most up-to-date information in order for companies to achieve the greatest environmental impact. Officials told us

that, because of problems with EPA's clearinghouse, they rely on their own technical assistance programs to provide companies with information needed to carry out source reduction activities.

To address the weaknesses noted in its internal evaluation, EPA has (1) established an advisory committee to provide guidance and to establish priorities<sup>3</sup> and (2) reorganized clearinghouse responsibilities to more clearly assign the responsibilities for expanding and maintaining the automated and hard-copy components of the clearinghouse. In addition, EPA recently reported that the National Roundtable of State Pollution Prevention Programs<sup>4</sup> is working under a cooperative agreement with EPA to determine how the clearinghouse can meet the needs of its users. A Roundtable official told us that as part of its efforts, the Roundtable plans to complete pilot studies in the Northeast and the Midwest to create regional data base systems that maintain technical information on each region's industries. For example, the Northwest region could maintain information on the paper and pulp industry and the Midwest region on the foundry industry.

To ensure that the regional systems are complete, the Roundtable plans to use the information currently in the clearinghouse, as well as state and other data bases in the region. While developing the regional data bases, the Roundtable also plans to create cross-references that will link information for each industry included in the data bases.

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## **Better State-EPA Coordination Is Needed to Promote Source Reduction**

EPA views the states as being at the forefront of the pollution prevention movement and providing a direct link to industry to provide source reduction information. Accordingly, EPA's pollution prevention strategy recognizes that the states must play an important role and that closer coordination is needed, especially at a time of severely limited federal and state resources.

The states view EPA as the national manager of TRI data used in their pollution prevention programs and as a source of guidance. In the four states we visited, officials told us that they believe that EPA, through its routine participation at state organizations' national and regional meetings, is generally aware of the types of source reduction information

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<sup>3</sup>The committee is part of EPA's National Advisory Council for Environmental Policy and Technology; its members include representatives of state governments, industry, and public interest groups.

<sup>4</sup>A national forum to promote multimedia pollution prevention. The forum meets twice each year to exchange technical and program information.

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**EPA Needs to More Effectively Disseminate**  
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that their programs collect. Nonetheless, as discussed below, the officials said that more needs to be done to share and coordinate federal and state information.

The Pollution Prevention Act requires EPA to collect and compile information on the operation and success of federally aided state source reduction programs as part of EPA's source reduction clearinghouse activities. However, state officials generally told us that they have not coordinated their actions to implement pollution prevention programs with EPA and that they are not aware of any agency data analyses involving the use of the states' source reduction information.

The officials also said that they do not provide any planning or reporting information to EPA, except for progress reports that the states must complete as a result of receiving pollution prevention grants from EPA.<sup>5</sup> In a recent review of federally aided pollution prevention programs, we found that the data in the required progress reports were unsuitable for determining program progress and that many state programs do not sufficiently emphasize source reduction.<sup>6</sup> We recommended that EPA strengthen the requirements for the state grant program evaluations and establish criteria for measuring the success of businesses' source reduction efforts.

An EPA advisory council and an EPA task force also recently studied opportunities for improving federal and state program coordination to enhance the mutual benefits and importance of building effective state pollution prevention programs and to enhance the states' capacity to administer their programs. Both reports highlighted the importance of EPA and the states' taking steps to effectively integrate their programs and sharing information to fully meet the needs and concerns that were ranked at the federal and state levels.<sup>7</sup> The EPA Administrator has acknowledged such concerns and has committed the agency to increasing the dissemination of information to promote pollution prevention and track

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<sup>5</sup>The Pollution Prevention Act of 1990 authorizes EPA to provide matching grants to states for programs that promote source reduction techniques by businesses. The grantees are required to make information generated under the grants available to EPA for its use and for dissemination to others through the Pollution Prevention Information Clearinghouse EPA established under the 1990 act.

<sup>6</sup>Pollution Prevention: EPA Should Reexamine the Objectives and Sustainability of State Programs (GAO/PEMD-94-8, Jan. 25, 1994).

<sup>7</sup>Building State and Local Pollution Prevention Programs, State and Local Environment Committee, National Advisory Council for Environmental Policy and Technology, EPA 130-R-93-001 (Dec. 1992). Report of the Task Force to Enhance State Capacity, Strengthening Environmental Management in the United States, EPA (Washington, D.C.: Apr. 1993).

progress and to working with states to build a national network of prevention programs.

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## **Conclusions**

EPA has recognized that the exchange of information is a key element in promoting source reduction. Although EPA has developed guidance to help companies plan source reductions and a clearinghouse to help firms and states identify source reduction opportunities, the states and industrial information users said that they need more comprehensive information. We believe that EPA has made a conscientious effort to identify concerns about source reduction data and that the agency is taking appropriate corrective actions through various initiatives, such as performing a clearinghouse needs assessment and working with states to establish priorities for source reduction information. We believe that these actions, in conjunction with implementing the recommendations in our January 1994 report on corrective measures for state pollution prevention programs, would improve EPA's performance in carrying out its Pollution Prevention Act responsibilities.

# EPA's Efforts to Integrate Pollution Prevention Initiatives Into the Agency's Activities, Programs, and Operations

The Pollution Prevention Act of 1990 established a new national goal for environmental protection: to reduce or eliminate waste at its source, rather than trying to control it after the fact. To advance this goal, EPA has attempted to implement efforts designed to improve companies' understanding of the costs of pollution and the benefits of source reduction and to encourage them to voluntarily take source reduction actions. Following is information on several of the major initiatives that EPA has taken.

Enforcement Actions. EPA has used its enforcement program's settlement process to identify and implement pollution prevention activities. EPA has reduced penalties to companies that have violated environmental laws, in exchange for the companies' implementing pollution prevention projects that yield environmental benefits.

Source Reduction Review Project. Under this project, EPA is to consider source reduction measures during the development of air, water, and hazardous waste standards affecting certain industry categories. EPA is to focus its review efforts on a key list of regulations mandated by the Clean Air Act, Clean Water Act, and Resource Conservation and Recovery Act during the earliest stages of the regulation development and test different approaches to fostering source reduction.

Grant Programs and Demonstration Projects. EPA has used grants to encourage pollution prevention. For example, EPA has developed agencywide guidance that (1) provides states with the flexibility to use multimedia grants to support prevention projects and (2) requires accountability through annual accomplishment reports prepared by its regional offices. In addition, EPA earmarks 2 percent of its fiscal year contract dollars for innovative demonstration projects that have pollution prevention as their primary goal. All offices within EPA can compete for the funds, and many of the projects funded represent joint efforts between offices and/or regions.

Design For The Environment. Through this program, EPA can help industry design products and processes in ways that eliminate or minimize the creation of pollution. For example, EPA can provide information about chemical risks to businesses so that they can weigh the use of one chemical against another. EPA also can encourage companies to develop voluntary action plans to build environmental considerations into the design of safer chemicals, products, technologies, and processes by focusing on less toxic substitutes.

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**Appendix I**  
**EPA's Efforts to Integrate Pollution**  
**Prevention Initiatives Into the Agency's**  
**Activities, Programs, and Operations**

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**New Chemicals Program.** EPA incorporates pollution prevention in reviewing new chemicals under the authorities of the Toxic Substances Control Act. When manufacturers submit a new chemical for EPA's review, the agency can require pollution prevention plans for substances that involve an unreasonable risk concern, possible high exposures/releases, and pollution prevention potential. Such plans provide an opportunity for companies to reduce or eliminate toxic chemicals in manufacturing and commerce before the chemicals are used to create products and eventually become hazardous waste.

In addition, under EPA's Alternative Synthetic Pathways Project, the agency is to identify alternatives to the process used to synthesize certain new chemicals. EPA is to conduct pollution prevention reviews to assist in minimizing the generation of toxic chemicals and to identify specific opportunities for implementing pollution prevention methods to mitigate and control risks over the chemicals' life-cycles.

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