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Report to the Chairman, Environment,  
Energy, and Natural Resources  
Subcommittee, Committee on  
Government Operations, House of  
Representatives

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September 1994

# TOXIC SUBSTANCES

## Status of EPA's Efforts to Reduce Toxic Releases



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**Resources, Community, and  
Economic Development Division**

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September 22, 1994

The Honorable Mike Synar  
Chairman, Environment, Energy,  
and Natural Resources Subcommittee  
Committee on Government Operations  
House of Representatives

Dear Mr. Chairman:

In efforts to get industry to identify and voluntarily reduce the amounts of toxic substances released into the air, ground, and water, the Environmental Protection Agency (EPA) has

- established a Toxic Release Inventory to record the releases of over 300 toxic chemicals reported to EPA and to the state in which a releasing facility is located;
- instituted a voluntary initiative called the 33/50 Program, in which EPA, beginning in 1991, encouraged industry to reduce releases of 17 toxic chemicals by 33 percent before the end of 1992 and 50 percent before the end of 1995; and
- established an Early Reductions Program, which encouraged industry to reduce emissions into the air before EPA proposes emission standards by giving industry a 6-year extension for meeting the standards as they are developed over a 10-year period.

Concerned about whether these efforts have been effective in reducing toxic releases, you requested that we determine (1) the validity of the reductions in releases of toxic substances reported in the Toxic Release Inventory, (2) the progress of the 33/50 Program in meeting its targets for reductions in toxic releases, and (3) the status of participation in the Early Reductions Program.

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## Results in Brief

While EPA's Toxic Release Inventory shows that the volume of toxic substances released into the environment has been reduced by 1.7 billion pounds since 1988, it is difficult to determine whether these reductions are valid and permanent. Neither EPA nor the states are required to determine the validity of the reductions reported by industry. Also, some of the reported reductions have been temporary reductions, caused by changes in production levels, or "paper" reductions, resulting from changes in the

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instructions and guidance on reporting on specific chemicals and changes in estimating methods.

According to EPA's data, the 33/50 Program has exceeded its interim target, having achieved a 40-percent reduction in toxic chemical releases and transfers<sup>1</sup> in 1992. Based on the progress reported thus far, EPA officials expect to realize a reduction of more than 50 percent by 1995. However, not all the reductions can be directly attributed to the program: 26 percent of these reductions were reported by companies not participating in the program, and 40 percent of the reductions took place before the program was established.

As of September 1994, EPA was reviewing and processing 40 applications for the Early Reductions Program—representing fewer than 10 percent of those facilities eligible to participate in the program—according to agency officials. Industry representatives say that participation has been limited because the 6-year grace period participants are given to comply with the emission standards is an insufficient incentive in view of (1) the cost and difficulty of documenting historical emissions data, (2) uncertainty about whether state and federal pollution control requirements will be consistent, (3) EPA's delays in promulgating the final emission standards, and (4) concern about making large outlays for pollution control equipment before the definitive requirements are known.

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## Background

In 1988, releases of toxic substances from chemical plants, refineries, and other manufacturing facilities amounted to over 4.8 billion pounds, according to EPA's Toxic Release Inventory (TRI). Under the 1986 Emergency Planning and Community Right-to-Know Act, these facilities were required to report releases of over 300 toxic chemicals to both EPA and the state in which a facility is located. With the passage of the Pollution Prevention Act of 1990, EPA expanded the data that facilities are required to report to include the quantity of chemicals recycled or burned for their energy value and the activities initiated to reduce pollution at its source.

In 1991, EPA established the 33/50 Program to encourage companies to reduce releases and transfers of 17 toxic chemicals that together accounted for 25 percent of the total toxic pollutants reported to have been released in 1990. (Releases of these 17 chemicals are predominately

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<sup>1</sup>The 33/50 Program measures both the amounts of toxic chemicals released on site into the air, water, and land and the amounts of toxic chemicals transferred off site for treatment and disposal.

into the air.) The program aims to reduce the amounts of these chemicals released by 33 percent from the 1988 level before the end of 1992 and by 50 percent before the end of 1995. Data from the TRI are used to measure the program's progress.

Under the Clean Air Act amendments of 1990, EPA is developing maximum achievable control technology (MACT) standards that specify the allowable emission levels for 189 toxic pollutants. After a MACT standard is promulgated, companies will generally have up to 3 years to bring their facilities into compliance. Recognizing that EPA would need up to 10 years to complete the development of the standards, the Congress established the Early Reductions Program to achieve reductions more quickly. According to EPA, the objective of this program is to reduce the toxic air emissions that will ultimately be regulated by the MACT standards earlier than the standards would require. Under the Early Reductions Program, facilities that voluntarily reduce their emissions<sup>2</sup> by 90 to 95 percent from 1987 levels before the MACT standard is proposed may be granted an additional 6 years to comply with the standard.

## Accuracy of Data in the TRI Is Uncertain

On the basis of data in the TRI, EPA reported that toxic releases were reduced by about 1.7 billion pounds, or 35 percent, from 1988 to 1992. Over 40 percent of the reductions reported were concentrated in three states—Louisiana, Texas and Virginia—and more than half of the net reduction involved four chemicals—acetone, ammonium sulfate, chlorine, and hydrochloric acid. The companies themselves report these reductions, which are not verified by EPA or the states.

Although the data in the TRI are not verified to determine the validity of the reported reductions, state officials responsible for the TRI and voluntary reduction programs in Texas, Louisiana, and Virginia told us that, according to follow-up inquiries, a number of facilities have made environmental improvements. State officials said, for example, that one facility indicated that it had decreased chlorine releases into the air by 27 million pounds by installing new reduction burners. In two other instances these officials said, one facility reported that it had reduced underground injections of hydrochloric acid by 152 million pounds, and another facility claimed to have decreased underground injections of hydrochloric acid by 10 million pounds by converting the acid to a nontoxic material.

<sup>2</sup>The Early Reductions Program targets the emissions of hazardous air pollutants.

According to EPA, however, a significant portion of the reported reductions were due not to environmental improvements but to (1) changes in the way the agency instructed facilities to report the releases of specific chemicals, (2) changes in the way the releases were estimated, or (3) decreases in production levels. For example, in 1989 the agency revised the instructions and guidance for reporting on ammonium sulfate to allow facilities to report it as ammonia. EPA officials told us that the instructions were changed because the ammonia, not the sulfate, is the substance of concern. This change resulted in a very large one-time reduction in reported releases of ammonium sulfate, from over 600 million pounds in 1988 to 17.7 million pounds in 1990. Over the same period, releases of ammonia were reported to increase by about 190 million pounds. This net "paper" reduction of about 400 million pounds represents over 27 percent of the total reduction in toxic releases reported for 1988-91.

According to EPA officials in the Office of Pollution Prevention and Toxics, changes in estimating methods have also affected the volume of releases reported because, while reporting facilities are instructed to use the best method available to estimate releases, they can change their estimating method from year to year at their discretion. An EPA-funded study of changes in reports to the TRI between 1989 and 1990 showed that 24 percent of the facilities in the sample had changed their estimating method. Some of the changes caused increases in reported releases, while others caused decreases. The net change appears to have been a 27-percent decrease in the releases.

In one such "paper" reduction, a Virginia facility reported a drop in releases of methanol from 6.1 million pounds in 1988 to 2.4 million pounds in 1989. However, the state officials who investigated the reduction said the reduction resulted from a change in estimating methods, rather than a change in the quantity of methanol released. State officials in Virginia also provided data on 23 facilities that reported significant reductions; 9 of these had changed their method of estimating releases. These nine facilities reported a total reduction of nearly 7.5 million pounds.

In a report analyzing the reasons for changes between 1990 and 1991 in the quantities of pollutants released into the air in Louisiana, the Louisiana Chemical Manufacturers Association identified 19 facilities that had based their reported changes solely or partly on changes in their estimating methods. Of these facilities, 11 reported decreases in releases and 8 reported increases. However, the association reported that for many

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facilities, only part of the change resulted from the change in estimating methods. We were not able to quantify the reductions associated solely with such changes.

Changes in facilities' production levels, rather than pollution controls or other strategies to reduce releases, also affect the amounts of toxic substances released. In a sample of reports to the TRI for 1989-90, EPA found that reporting facilities most frequently cited a change in production levels as the reason for the change in the amounts of releases they reported; nearly 70 percent of the facilities in the sample cited this as one of the factors influencing changes in reported releases. Decreases in production levels exceeded increases, resulting in a net decrease of 18 percent in reported releases.

In our review of data submitted to the TRI by 23 facilities reporting large volumes of toxic releases in Virginia, we found that 4 of the 23 facilities attributed some portion of their decrease in releases to a reduction in production levels. In fact, one facility stated that its 474,000-pound decrease in releases of acetone in 1989 was due solely to reduced production.

In addition, some reported decreases in releases resulted when facilities were closed. For example, in Virginia more than half of the 60-million-pound reduction in air releases reported for 1988-91 occurred when the state forced one facility to cease operation. This facility's releases of carbon disulfide went from 34 million pounds to zero.

In their reports to EPA, facilities are required to indicate changes in their production levels. However, EPA does not currently use these data to determine the overall impact of changes in production levels on the reported changes in releases.

According to EPA officials, the agency does not have adequate resources to analyze year-to-year changes in releases of toxic substances to determine how changes in the production levels or estimation methods have affected the reported reductions. EPA officials acknowledge that they need to do more to determine the validity of reported reductions, but they are constrained by limited resources. To help address concerns about the validity of data in the TRI, the agency plans to ask the states to validate large increases and decreases in reported releases and inform EPA of the results.

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## EPA Reports Achievements in the 33/50 Program

According to EPA, which reports the achievements of the 33/50 Program as part of its annual report on the TRI, the program exceeded its interim goal of a 33-percent reduction, achieving a 40-percent reduction, and is expected to exceed its goal of a 50-percent reduction by 1995. Reported releases and transfers dropped from about 1.49 billion pounds in 1988 to 890 million pounds in 1992.<sup>3</sup> However, as discussed earlier, these reductions are based on unverified data in the TRI. Furthermore, the reported achievements of this program need to be tempered by the information that (1) about 40 percent of the reductions claimed took place before the program was formally established and (2) 26 percent of the reductions can be attributed to companies not participating in the program.

EPA included reductions achieved before the 33/50 Program was established because it wanted to recognize accomplishments that companies had made on their own before the program's February 1991 inception. According to EPA officials, the agency used 1988 as the base year from which it measured reductions because at the time the program was established, the data for 1988 were the most accurate and current base-year data available. From 1988 to 1990, a 16-percent reduction was reported in releases and transfers of the 17 chemicals selected for the 33/50 Program. However, in its 1992 report on the TRI, the agency pointed out that in 1991 and 1992, after the program was in place, a 29-percent reduction in releases and transfers was reported for the 17 targeted chemicals.

EPA recognizes that a considerable portion of the reductions reported by the program were achieved by firms not formally participating in the program, but the agency believes the program's presence influenced some of these firms to reduce toxic releases. Of the reduction in releases of 596 million pounds of chemicals reported from 1988 to 1992, 26 percent was achieved by firms not participating in the program. Although the 1,200 firms participating in the program represent most of the largest facilities (responsible for over 60 percent of releases of the 17 targeted chemicals), over 6,800 firms, or about 85 percent of those contacted, chose not to join the program.

EPA has highlighted the 33/50 Program as its major voluntary effort for achieving pollution prevention through source reduction under the

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<sup>3</sup>1992 Toxic Release Inventory, Public Data Release, U.S. Environmental Protection Agency, Office of Pollution Prevention and Toxics (Washington, D.C.: Apr. 1994).



Pollution Prevention Act of 1990.<sup>4</sup> However, this act requires companies to report to the TRI only whether source reduction was used to achieve reductions in toxic releases; they do not have to report how much of the reduction was achieved through source reduction. Thus, while EPA promotes source reduction as the preferred means of reducing releases, it cannot determine the amount of the reduction that results from source reduction activities.

In 1991, EPA intended to request information on the extent to which facilities reporting to the TRI had used source reduction. However, under the Paperwork Reduction Act, the Office of Management and Budget was required to review EPA's proposal to request this information. The Office of Management and Budget would not allow EPA to do so, citing an absence of specific authority in the legislation and the burden such a request would impose on industry.

At our request, in December 1993 state officials in Texas surveyed a sample of facilities about how they had achieved their reductions in releases. Over 81 percent of the facilities responding said they had used source reduction or pollution prevention methods to achieve their reported reductions of over 20 million pounds. Among the 23 companies we reviewed in Virginia, we found 11 cases in which source reduction efforts reportedly resulted in significant decreases in releases. For example, one company in Virginia said it had reduced releases of dichloromethane from 646,000 pounds in 1988 to zero in 1990 by switching to a nontoxic substance. An EPA-funded survey of over 1,200 firms reporting to the TRI in 1989 and 1990 showed that 40 percent used source reduction measures to achieve reductions in toxic releases.

A public interest group recently issued a report critical of the 33/50 Program,<sup>5</sup> primarily for its failure to identify the extent to which reported reductions could be attributed to pollution prevention, or source reduction, measures. EPA responded by pointing out that the 33/50 Program encouraged but did not require pollution prevention. According to EPA, the program's goal was to reduce releases and transfers of high-priority toxic chemicals; while its preferred method was source reduction, recycling, energy recovery, treatment of toxic substances to remove or reduce toxicity, and disposal were also acceptable methods of reducing releases.

<sup>4</sup>Source reduction includes measures such as substituting a nontoxic chemical for a toxic chemical.

<sup>5</sup>Pollution Prevention or Public Relations?, Citizens Fund (Washington, D.C.: May 1994). Citizens Fund is the research and education affiliate of Citizen Action.

## Participation in EPA's Early Reductions Program Has Been Limited

While giving EPA 10 years to complete development of the MACT standards for all source categories, the Congress provided for the Early Reductions Program to stimulate reductions in toxic air emissions before the MACT standards are proposed. To qualify for the 6-year extension for complying with requirements under the program, a facility must first establish base-year emission levels and then demonstrate a 90- to 95-percent reduction from those levels.

Participation in the Early Reductions Program has been limited. As of September 1994, EPA had only 40 active applications from facilities and had approved 12 for the 6-year extension, provided the applicants are able to demonstrate achievement of the required reduction. EPA officials told us that the number of facilities that are eligible to participate in the program is unknown. As of June 1994, EPA had identified between 8,000 and 13,000 major sources of pollution that are subject to either a 1992 or a 1994 MACT standard, but officials recognize that the benefits of the program do not apply for all of the identified major sources. Thus, taking into account that the Early Reductions Program may have no practical application for some major sources, EPA officials estimate that fewer than 10 percent of the eligible facilities are participating in the program.

Of the 40 active applications, 20 came from the synthetic organic chemical manufacturers that will have to comply with the Hazardous Organic NESHAP (National Emission Standards for Hazardous Air Pollutants), the first major MACT standard issued by EPA. This standard is intended to limit the emissions of 149 hazardous air pollutants used in this manufacturing industry's production process. EPA estimates that there are about 370 facilities subject to the Hazardous Organic NESHAP. Although 53 applications were submitted, 33 were subsequently withdrawn. Thus, the 20 active applications represent about 5 percent of the facilities subject to this standard. As of September 1994, EPA had approved the base-year emissions data of six of the applicants subject to the standard. These applicants will receive a 6-year extension on compliance requirements if they can demonstrate the required reduction from their base-year emission levels.

Officials from industry, the states, and EPA told us that the requirement for developing historical emissions data has been a major reason for the limited participation. The compilation of base-year data is a difficult process, requiring a significant investment of time and personnel. Several facilities indicated that their decision to withdraw their application to participate in the program was due at least in part to the difficulty of

finding the resources and personnel needed to provide the required historical emissions data. One facility, which has used a computer system to track emissions since before 1987, stated that over 900 staff hours would be needed to present base-year data in the form EPA requires.

EPA and state officials acknowledge that developing accurate base-year emissions data may present an even greater problem for facilities that lack adequate records. EPA cited some alternatives to requiring facilities to provide these data, such as requiring them to (1) demonstrate a specified percentage reduction from current levels rather than base-year levels, which would be easier for companies to do, or (2) have a specified technology in place. According to EPA officials, the agency has used one of these alternatives in proposing the MACT standard for chromium electroplating, which specified the use of a technology, thereby eliminating the need for historical data.

Uncertainty about how the states' standards will relate to the federal MACT standards has also been cited as an impediment to participation in the Early Reductions Program. According to a representative from the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), some states may require controls that go beyond the requirements in the federal MACT standard. If a state's limits exceed those of the MACT standard, industry will be forced to meet the tougher standard. According to some industry representatives, there is little incentive to apply for the program as long as a state's regulations could potentially require controls in addition to those already required.

According to state officials, delays in the promulgation of the MACT standards have also contributed to the reluctance of facilities to participate in the Early Reductions Program. EPA's failure to propose the MACT standards by the statutory deadlines added to the uncertainty about what benefits facilities would derive from making a 90- or 95-percent reduction before the MACT standards are proposed, according to state officials. EPA officials acknowledge that a delay in proposing a MACT standard lengthens the time facilities have before they must comply with the standard. For some facilities, a 6-year extension in exchange for making early reductions offers little benefit if a delay in the promulgation of the MACT standard provides the facility with adequate time to comply.

Industry officials we contacted also cited the cost of pollution control equipment, given the uncertainty of control requirements, as another

factor limiting participation in the Early Reductions Program. Representatives of the chemical industry indicated that until the state and federal control requirements are definitive, facilities will be reluctant to invest significant sums in equipment only to discover that a different technology is needed and more capital investment is required.

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## Conclusions

Substantial reductions in releases of toxic substances have been reported in EPA's Toxic Release Inventory. However, there is little or no review by EPA or the states of the validity of year-to-year changes in the reported releases. Furthermore, EPA's not adjusting for reductions in toxic releases that result from changes in the instructions and guidance, method of estimating releases, and production levels limits the usefulness of data in the TRI and tends to result in an overstatement of the program's accomplishments. EPA recognizes the shortcomings in the data in the TRI and plans to ask the states to validate large increases and decreases in their reported releases.

The reported reductions in releases of the chemicals targeted by the 33/50 Program have led EPA to conclude that the program has exceeded its interim goal of a 33-percent reduction and will meet or exceed its goal of a 50-percent reduction. However, a significant proportion of these reductions occurred before the program was established or were made by companies that are not participating in the program. Therefore, reductions in releases of the 17 chemicals cannot be attributed solely to the program. Also, because the 33/50 Program's progress is being measured by data in the TRI, the volume of the overall reductions resulting from source reduction techniques is not known. In another report to be issued this month,<sup>6</sup> we are recommending that to evaluate progress in preventing or reducing pollution at its source, EPA obtain and analyze data on the quantities of waste that were prevented or reduced through source reduction activities.

The Early Reductions Program thus far has had limited success in attracting participants. As a result, the environmental benefits of reducing toxic emissions earlier than required by regulation are not being realized. While EPA may consider alternatives to the requirement that facilities provide historical base-year emissions data, it is too early to determine whether such alternatives would promote more interest in the program, given the current uncertainty about whether federal and state regulations

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<sup>6</sup>Toxics Substances: EPA Needs More Reliable Source Reduction Data and Progress Measures (GAO/RCED-94-93).

will differ, delays in the promulgation of the MACT standards, and the size of the capital investments required.

## Scope and Methodology

We conducted our review from February 1993 through May 1994 in accordance with generally accepted government auditing standards.

To determine whether the emission reductions reported were valid, we selected a judgmental sample of facilities that reported the largest reductions of specific chemicals to Texas, Louisiana, and Virginia and asked state officials to document the way these reductions were achieved. We also interviewed officials in EPA's Office of Pollution Prevention and Toxics and state officials to determine what policies and procedures were implemented to ensure the quality of the data. In addition, we reviewed studies initiated by EPA to determine the validity of the data submitted to the TRI in 1987, 1988, 1989, and 1990 and examined EPA's annual reports on the TRI.

To determine the progress of the 33/50 Program in meeting its goals for reducing releases and transfers, we interviewed officials responsible for the program in EPA's Office of Pollution Prevention and Toxics. We also examined and analyzed status reports prepared by EPA on the 33/50 Program.

To determine the status of the Early Reductions Program, we interviewed officials responsible for the program in the Office of Air Quality Planning and Standards. We analyzed documents maintained by EPA on participation. We also interviewed officials representing the Chemical Manufacturers Association, the Synthetic Organic Chemical Manufacturers Association, and the State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) to determine reasons that facilities do not participate. In addition, we interviewed EPA, regional, and state officials for their opinions on the reasons for nonparticipation. We also reviewed the formal withdrawal letters submitted by former applicants to determine their reasons for withdrawing. We contacted some of these companies for additional information.

## Agency Comments

We discussed the information in this report with the responsible EPA officials, including the Director of the Environmental Assistance Division, Office of Pollution Prevention and Toxics, and the Director of the

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Emission Standards Division, Office of Air Quality Planning and Standards; we incorporated their comments where appropriate. These agency officials generally agreed with the information in this report but believed that the agency deserved more credit for achieving reductions under its voluntary 33/50 Program. As requested, we did not obtain written agency comments on a draft of this report.

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As arranged 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 to the Administrator of EPA. We will also make copies available to others on request.

This work was performed under the direction of William McGee, Assistant Director, Air Quality Issues, who can be reached at (919) 829-3500 if you or your staff have any questions. Major contributors to this report are listed in appendix I.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Peter F. Guerrero', written over a faint rectangular box.

Peter F. Guerrero  
Director, Environmental  
Protection Issues



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# Major Contributors to This Report

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