



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

Resources, Community, and
Economic Development Division

B-271712

April 25, 1996

The Honorable Sam Brownback
House of Representatives

Dear Mr. Brownback:

Although protecting the environment is a national priority, there is widespread concern about the attendant costs. The costs to society of pollution abatement and control increased, in constant dollars, from \$64 billion in 1973 to \$119 billion in 1993.¹ Moreover, federal agencies alone expect to spend about \$8.9 billion in fiscal year 1996 for the costs of compliance and cleanups at federal hazardous waste sites. Because of your concern about the cost of complying with federal environmental laws and regulations, you asked us to provide you with some examples of (1) those laws and regulations that have rigid requirements for pollution abatement and control and (2) those that allow flexible regulatory approaches. You also asked us to compile information on the current status of the efforts to clean up federal hazardous waste sites. As you requested, this report summarizes the information presented to you in a March 29 briefing.

RIGID REQUIREMENTS IN LAWS AND REGULATIONS

Two examples of rigid requirements in environmental laws and regulations are those mandating that the Environmental Protection Agency (EPA) set standards for drinking water quality and for toxic air pollutants. In both cases, the laws imposed ambitious requirements that specified the agency's approach to dealing with health and environmental risks. Such rigidity has potential adverse effects in both cases.

¹These most recent data, in constant 1995 dollars, are based on information from Gary L. Rutledge and Christine R. Vogan. See "Pollution Abatement and Control Expenditures, 1993," *Survey of Current Business*, May 1995.

Drinking Water Standards

In amending the Safe Drinking Water Act in 1986, the Congress specified 83 contaminants for which EPA was to promulgate standards within 3 years. The Congress also required EPA to publish a list of other candidates for regulation and to promulgate standards for at least 25 of the contaminants on the list every 3 years thereafter, beginning in 1991. By specifying certain contaminants for regulation and establishing a tight schedule for promulgating standards, the requirement limited EPA's flexibility to identify and regulate the contaminants that pose the highest-priority risks to public health.

Radon was one of the 83 contaminants specified by the act. EPA's proposed standard for radon in drinking water is far more restrictive than the voluntary guideline that EPA established for radon in indoor air, even though nearly all fatalities from radon are attributed to exposures from air.² The reason is that the act required EPA to regulate drinking water contaminants to be as close as technically feasible to a level at which no known or anticipated health effects occur. However, in developing its voluntary guideline for radon in indoor air, EPA was not bound by any such requirement.

Standards for Toxic Air Pollutants

The Clean Air Act Amendments of 1990 required EPA to establish standards for numerous toxic air pollutants and prescribed milestones for doing so. Specifically, the law required EPA to establish standards for major sources of 189 of the most prevalent and hazardous toxic air pollutants.³ Furthermore, the law established three interim milestones and a final milestone for setting the standards.¹ These standards, which were to be based on the best existing pollution control technologies, are commonly referred to as Maximum Achievable Control Technology (MACT) standards.

Not only did the act prescribe an ambitious schedule for promulgating numerous standards, but it also specified certain consequences, with potential

²EPA estimated that the capital costs of complying with the proposed drinking water standard would exceed \$1.6 billion.

³EPA later determined that there were 174 source categories of air toxics and published this list in 1992.

¹See *Air Pollution: EPA's Strategy and Resources May Be Inadequate to Control Air Toxics* (GAO/RCED-91-143, June 26, 1991).

adverse effects, if EPA misses a milestone for any source category. This "hammer" provision would require affected industries to apply for permits to emit pollutants and would require state air agencies nationwide to determine, on a case-by-case basis, certain emissions limits that these permits would be required to contain. These are the limits that, in the state agencies' estimation, would apply to the pollution source if EPA had promulgated standards in a timely manner. The affected industries in these jurisdictions would be required to comply with the state-determined limits. The state limits could be superseded later by issuance of the EPA standards.

The triggering of the "hammer" provision could have adverse effects. First, there could be regulatory uncertainty because the state agencies would be trying to anticipate EPA's eventual standards. Also, the affected industries would be required to install pollution controls and change processes to comply with the state limits, even though the eventual EPA standards might not require such controls. This could result in unnecessary compliance expenditures.

In terms of timing, the act provided that if EPA fails to meet any of the MACT milestones, the "hammer" provision would be triggered 18 months after EPA misses the milestone. Although this has not happened yet, the "hammer" provision would be triggered on May 15, 1996, (as provided in the act, 18 months after EPA missed the MACT milestone for November 1994) for any of the 44 source categories for which EPA has not promulgated a standard. As of January 25, 1996, according to an EPA listing, the agency had promulgated standards for 27 of the 44 source categories.⁵

EPA has attempted to administratively postpone the effect of the "hammer" provision. In January 1996, EPA's air quality office notified regional air officials that states should not require affected industries to submit permit applications until November 1996 because EPA expected to have set standards for all 44 source categories on or before the May 15 deadline.⁶ Furthermore, EPA is processing a rulemaking to codify the intent of the January 1996 memorandum.

⁵In addition, the act required EPA to promulgate standards for coke ovens and marine vessels. EPA estimates that the standards already promulgated will, when fully implemented by 2000 or before, achieve annual reductions of nearly 800,000 tons of hazardous air pollution emissions from chemical plants, petroleum refiners, and other industries. In addition, the standards will achieve annual reductions of about 1.6 million tons of volatile organic compounds.

⁶We have not reviewed the legal basis for this memorandum.

Also, to mitigate the possible adverse effects of a triggering of the "hammer" provision, EPA officials told us that they have been working informally with state agencies, environmental groups, and affected industries to share data, focus resources, and provide them with guidance on the level of reductions expected. While this effort and others that EPA has undertaken can help to mitigate the possible adverse effects, the provision could still be triggered and adverse effects could still occur if EPA does not meet either or both of the next two MACT milestones. According to the schedule in the law, the provision could be triggered in 1999 and 2002. (See enc. I for more details on these provisions of the Safe Drinking Water and Clean Air Acts.)

FLEXIBLE APPROACHES TO REDUCING POLLUTION

Three examples of flexible environmental approaches that we identified are (1) sulfur dioxide (SO₂) emissions trading; (2) company-designed pollution prevention strategies, including an EPA project with the Amoco Oil Company; and (3) faster cleanup of some Superfund sites.

SO₂ Emissions Trading

The Congress authorized the emissions trading approach to help reduce SO₂ emissions by about 3.5 million tons a year at the 110 utilities with the highest levels of emissions. Under this program, utilities receive emissions "allowances" from EPA that allow them to emit certain levels of SO₂ during or after a specified year. Each utility is allotted a specific number of allowances annually; at year's end, each must have one allowance for each ton of SO₂ emitted. In total, the allowances add up to a reduced level of SO₂ emissions than previously permitted.

To help utilities reduce their costs of complying with lower SO₂ limits, they are given flexibility to choose how they will meet the overall reduction requirements. For example, they can switch to fuel with a lower sulfur content or install pollution control devices. Alternatively, they can buy and sell SO₂ allowances. That is, if a utility's cost to reduce SO₂ emissions is higher than the market price of allowances, the utility can save money for itself and its customers by purchasing the necessary number of allowances to comply with the requirements, instead of fully reducing its own emissions. For these extra allowances to be available, however, another utility generally must reduce its emissions below its requirement. This utility can sell its surplus allowances to utilities with higher costs at a likely profit for it and its customers.

In a 1994 report, we estimated that SO₂ emissions trading could result in substantial benefits to the economy.⁷ For example, we estimated that relative to traditional regulation, emissions trading could save up to \$3.1 billion a year nationwide. Also, we estimated savings for certain states, such as Pennsylvania, which could save \$135 million a year. Finally, we estimated savings for certain utility companies, such as Duke Power, which could save \$300 million over time.

Company-Designed Pollution
Reduction Strategies

To provide companies with an opportunity to design their own pollution prevention strategies, EPA has begun Project XL.⁸ Under this project, companies that volunteer to participate can test flexible and innovative strategies for implementing environmental regulatory requirements in exchange for a commitment to achieve greater environmental quality than would have been realized under traditional approaches. The first companies were selected in late 1995; EPA hopes to involve 50 companies by the end of 1996.

Project XL builds on a pollution prevention project conducted by EPA and Amoco at the company's refinery in Yorktown, Virginia, between 1989 and 1991.⁹ That project's goals included identifying the most cost-effective ways to reduce the emissions generated by the refinery. To reduce overall air pollution emissions, the company studied ways to seek reductions from the entire facility—not just from those portions then subject to regulations. For example, refineries were required to control benzene emissions from their water treatment systems. The study found that such systems were a relatively small source of benzene emissions. By looking at the entire facility, the study identified both the most significant sources of benzene and more cost-effective ways to manage them.

⁷*Air Pollution: Allowance Trading Offers an Opportunity to Reduce Emissions at Less Cost* (GAO/RCED-95-30, Dec. 15, 1994).

⁸Project XL (which stands for excellence and leadership) is one aspect of EPA's wide-ranging Common Sense Initiative. Other aspects relate to reducing paperwork, increasing community participation, and providing incentives for companies to monitor themselves.

⁹According to an EPA official, the project was begun before pollution control requirements were extended to additional areas of the refinery. This discussion relates to the situation that existed when the project began.

The study results suggested that significant savings were possible by allowing companies more flexibility in designing pollution prevention strategies. For example, volatile organic compound emissions at the Yorktown refinery could be reduced fivefold by achieving reductions in areas of the refinery that were not then required to control pollution. Significant savings could also be realized in both capital and annual costs, and the overall cost of reducing emissions could be reduced from \$2,100 to \$500 per ton.

Superfund Cleanups

Under the Comprehensive Environmental Response, Compensation, and Liability Act, EPA has two types of authority for cleaning up hazardous waste sites under the Superfund program. These are (1) remedial authority to conduct long-term cleanup actions at sites on the National Priorities List (NPL)—EPA's list of the nation's worst hazardous waste sites—and (2) removal authority to mitigate immediate threats at both NPL and non-NPL sites.

In 1992, EPA introduced its Superfund Accelerated Cleanup Model, under which the agency would begin to use its removal authority to conduct substantial nonemergency cleanup actions. As of March 1995, according to an EPA survey, about 80 of these cleanups had been started; about one-half had moved beyond the study phase. EPA's experience in using this model showed that on average, removal cleanups are completed 2 years earlier and cost \$500,000 less than remedial actions because certain planning steps can be shortened or eliminated.

About 1,000 NPL sites await cleanup, and about 2,000 sites are estimated to be contaminated enough to be listed in the future. Although the use of removal actions in nonemergency situations shows significant potential to help address the sites awaiting cleanup, wider use is constrained by current statutory limits on the time and costs that can be spent on these actions. Under the act, removal actions financed by the Superfund trust fund are limited to no more than 12 months and \$2 million. EPA can obtain an exemption from this provision if it demonstrates that the action is consistent with the remedial action to be taken. However, EPA regional offices have varying interpretations concerning how to apply the provision limiting the use of these removals. Also, the wider use of removal actions is constrained by the difficulty that EPA regional offices encounter in funding these actions.¹⁰ (See enc. II for more details on these more flexible approaches.)

¹⁰See *A Superfund Tool for More Efficient Cleanups* (GAO/RCED-96-134R, Apr. 15, 1996)

STATUS OF EFFORTS TO CLEAN UP
FEDERAL HAZARDOUS WASTE SITES

Hundreds of billions of dollars and many decades will be required to clean up federal hazardous waste sites. Federal agencies, principally the Departments of Defense and Energy, expect to spend \$54 billion through fiscal year 1996 to clean up their own facilities. The Office of Management and Budget estimates that as much as \$389 billion in additional funds may be needed through 2070. In addition, tens of thousands of other potentially contaminated sites owned by the Departments of Agriculture and the Interior and other agencies still need to be inventoried.

As of April 1996, EPA was required to evaluate the 2,070 federal facilities that have been identified as possibly being contaminated.¹¹ Evaluations or cleanups were in process for 1,194 of these facilities, including 162 that were included on the NPL. Another 868 facilities were determined not to need cleanup activities. Only eight facilities have been fully cleaned up.

Agencies have encountered various problems in identifying contaminated sites and setting priorities for cleanup. First, agencies have not completed a comprehensive inventory of potential sites. Second, agencies have been slow to assess the risk at these sites. Finally, there is no effective process for setting priorities within or among agencies.

As we have recommended in the past, several measures would improve this major cleanup effort. Principally, agencies should (1) develop better information on cleanup costs and use risk as part of a system for allocating cleanup resources across agency lines,¹² (2) introduce more cost-effective methods relying, where applicable, on more advanced technology,¹³ and (3) use

¹¹The list of such facilities is called the Federal Agency Hazardous Waste Compliance Docket.

¹²See *Superfund Program Management* (GAO/HR-95-12, Feb. 1995).

¹³See *Federal Hazardous Waste Sites: Opportunities for More Cost-Effective Cleanups* (GAO/T-RCED-95-188, May 18, 1995) and *Department of Energy: Management Changes Needed to Expand Use of Innovative Cleanup Technologies* (GAO/RCED-94-205, Aug. 10, 1994).

B-271712

environmental auditing¹¹ to prevent further expensive problems. (See enc. III for more details on the status of federal facility cleanups.)

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 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 upon request.

Please call me at (202) 512-6511 if you or your staff have any questions. Major contributors to this report were Charles W. Bausell, James R. Beusse, Ellen M. Crocker, Karen Keegan, Patricia J. Manthe, David Marwick, Raymond H. Smith, Jr., and John D. Yakaitis.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Peter F. Guerrero", with a long horizontal flourish extending to the right.

Peter F. Guerrero
Director, Environmental
Protection Issues

Enclosures - 3

¹¹During a typical environmental audit, qualified inspectors comprehensively examine a facility to determine whether it complies with environmental laws and regulations. For more information, see *Environmental Auditing: A Useful Tool That Can Improve Environmental Performance and Reduce Costs* (GAO/RCED-95-37, Apr. 3, 1995).

EXAMPLES OF RIGID ENVIRONMENTAL REGULATIONS

GAO Rigid Environmental Regulation: Drinking Water

- Comparative regulation of radon in indoor air and radon in drinking water

Criterion	Radon in indoor air	Radon in drinking water
Basis	Voluntary guideline	Safe Drinking Water Act (a)
Equivalent threshold	4 picocuries per liter	0.03 picocuries per liter (b)
Potential danger	Estimated 7,100 to 32,700 lung cancer deaths annually as a result of radon exposure, of which 1 percent is attributed to radon in water	

(a) The proposed standard has been subject to a congressionally imposed deferral.

(b) The proposed drinking water standard is 300 picocuries per liter of water. According to EPA's Science Advisory Board, this is equivalent to 0.03 picocuries per liter of air at the same risk level.

**GAO Rigid Environmental Regulation:
Air Pollution**

- The Clean Air Act Amendments established an ambitious timetable for EPA to set MACT standards.

Milestone	Number of source categories requiring MACT standards
Nov. 1992	40
Nov. 1994	44
Nov. 1997	87
Nov. 2000	174

**GAO Rigid Environmental Regulation:
Air Pollution**

- Possible adverse effects of EPA's missing a legislated milestone:
 - Regulatory uncertainty--state air agencies must develop case-by-case emissions limits for pollution sources.
 - State limits and industry controls may be superseded by EPA standards.
 - Possible excess costs--industry may install controls and change processes that may be abandoned.

Note: EPA did not meet the act's Nov. 1994 milestone for promulgating standards for 44 source categories. The "hammer" provision would be expected to be triggered on May 15, 1996, for any of the 44 categories for which EPA has not promulgated a standard by that date. However, EPA has attempted to administratively postpone the effective date of the provision until Nov. 1996. We have not reviewed the legal basis for EPA's attempt.

EXAMPLES OF FLEXIBLE REGULATORY APPROACHES

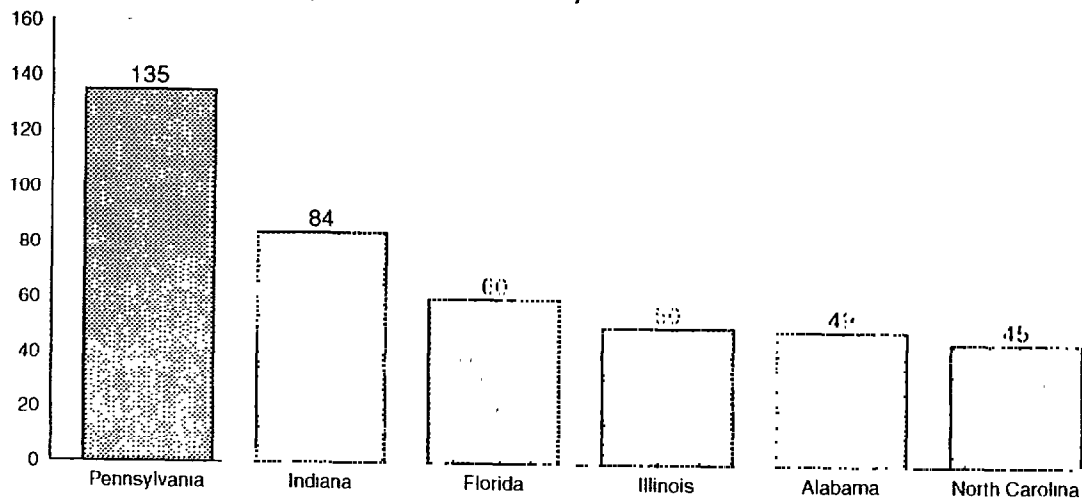
GAO Flexible Environmental Regulation: Trading SO₂ Allowances

- Benefits of trading SO₂ emissions allowances:
 1. Cost savings of up to \$3.1 billion per year, compared with command-and-control (traditional) approach
 2. Cost-saving innovations in scrubbers
 3. Larger market and lower prices for low-sulfur coal
-

GAO Flexible Environmental Regulation:
Trading SO₂ Allowances

- Utility companies in selected states could save millions of dollars a year by trading SO₂ emissions allowances with each other

Potential savings by state (1992 dollars in millions)

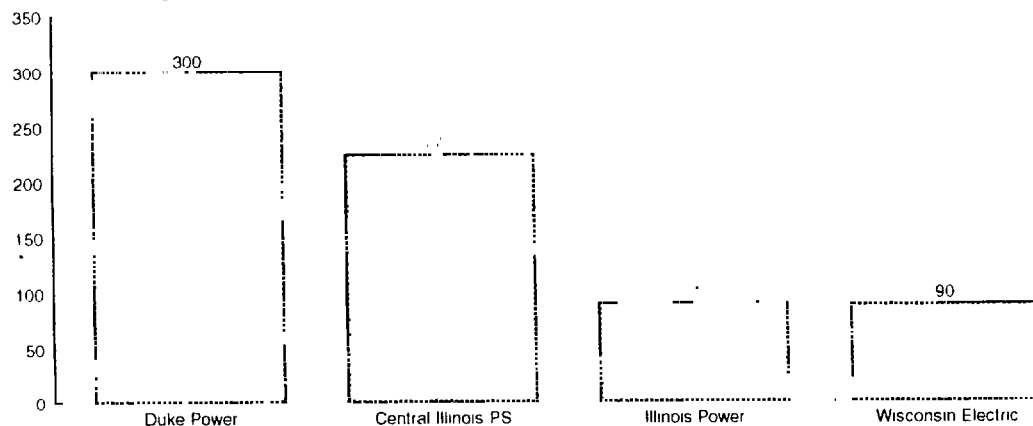


Source: 1994 GAO Report on Emissions Trading.

GAO Flexible Environmental Regulation: Trading SO₂ Allowances

- Selected utility companies could save tens of millions of dollars over time through trading.
 - Illinois Power canceled scrubbers.
 - Duke Power postponed need for scrubbers.

Potential savings by company (1992 dollars in millions)



Note: Reflects savings through 2010.

Source: 1994 GAO Report on Emissions Trading.

GAO Flexible Environmental Regulation:
Amoco's Yorktown Refinery Study

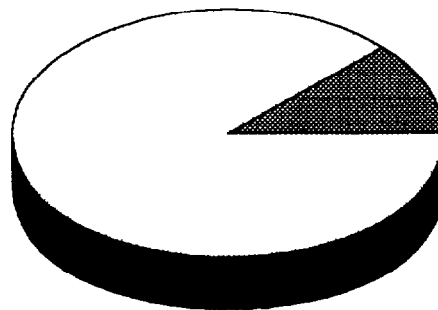
- Flexibility could yield substantial cost savings compared with the traditional command-and-control approach.

Costs	Under required strategy	Under alternative strategy
Capital costs	\$53.6 million	\$12.3 million
Annual costs	\$14.9 million	\$3.5 million
Cost per ton of emissions	\$2,100	\$500

STATUS AND COSTS OF COMPLIANCE AND CLEANUP
AT FEDERAL HAZARDOUS WASTE SITES

GAO Federal Facility Compliance and
Cleanup: Annual and Total Costs

- FY 1996 costs are nearly \$9 billion.
- Total costs, through 2070, could reach \$443 billion.



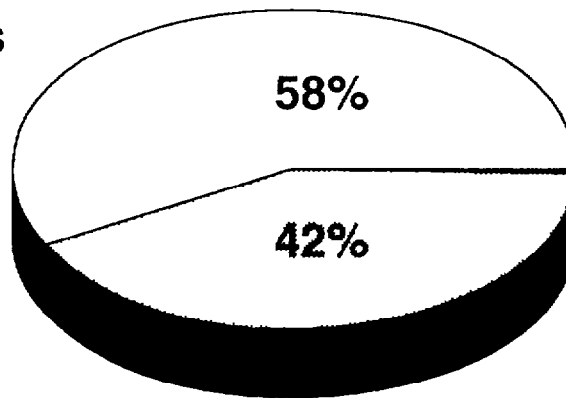
Costs through
FY 1996:
\$54 billion

Estimated costs
to complete cleanup:
Up to \$389 billion

**GAO Federal Facility Cleanup:
Current Status**

- Status of 2,070 federal facilities

Cleanups or
evaluations
in process:
1,194



Cleaned up: 8
(0.4%)

No federal cleanup needed:
868

(160351)

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. VISA and MasterCard credit cards are accepted, also. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20884-6015

or visit:

Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000 or by using fax number (301) 258-4066, or TDD (301) 413-0006.

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

For information on how to access GAO reports on the INTERNET, send an e-mail message with "info" in the body to:

info@www.gao.gov

**United States
General Accounting Office
Washington, D.C. 20548-0001**

**Bulk Rate
Postage & Fees Paid
GAO
Permit No. G100**

**Official Business
Penalty for Private Use \$300**

Address Correction Requested
