ENVIRONMENTAL LAW INSTITUTE
RESEARCH REPORT

THE TOOLS OF PREVENTION

Opportunities for Promoting Pollution Prevention Under Federal Environmental Legislation

September 1991

The Tools of Prevention

Opportunities for Promoting Pollution Prevention Under Federal Environmental Legislation

September 1991

A report of the Environmental Law Institute
to the Industrial Pollution Prevention Project
U.S. Environmental Protection Agency

Table of Contents

INTRODUCTION

The Pollution Prevention Act of 1990 established a clear national policy that pollution should be prevented or reduced at the source whenever possible.[1] In recent months, the U.S. Environmental Protection Agency has shown increasing interest in implementing this policy through a pollution prevention program that moves beyond the agency's initial attempts to encourage voluntary actions by industry.[2] As part of its new emphasis on pollution prevention, EPA has set aside two per cent of its fiscal 1991 and 1992 budgets for pollution prevention initiatives. The agency is using this money to fund a number of projects, including the Industrial Pollution Prevention (IPP) project, a two-year $1.7 million effort to promote pollution prevention in the industrial sector. To assist the IPP project in this important endeavor, the Environmental Law Institute has undertaken a fresh consideration of EPA's statutory authority, and identified numerous opportunities for promoting industrial pollution prevention.

This report focuses principally on the Clean Water Act and RCRA, the two statutes currently under consideration for congressional reauthorization.[3] Our analysis

---

1. Pollution Prevention Act of 1990, § 2(b).

2. For example, the agency has included a requirement for mandatory pollution prevention plans in a proposed regulation for storm water permits, *see* EPA, Proposed Rule, National Pollutant Discharge Elimination System General Permits and Reporting Requirements for Storm Water Discharges Associated With Industrial Activity, 56 Fed. Reg. 40948 (Aug. 16, 1991), and has sought comments on the use of incentives under the Resource Conservation and Recovery Act (RCRA) to reduce or eliminate the generation of hazardous waste, *see* EPA, Waste Minimization Incentives: Notice and Request for Comment on Desirable and Feasible Incentives to Reduce or Eliminate the Generation of Hazardous Waste, 55 Fed. Reg. 40881 (Oct. 5, 1990).

3. Other environmental statutes, notably the Toxic Substances Control Act (TSCA), the Clean Air Act, and the National Environmental Policy Act (NEPA), also provide important opportunities for promoting pollution prevention. Analysis of these statutes, and their possible cross-media implications, will be included in a forthcoming supplement to this report.

of these laws reveals that the major barriers to pollution prevention are *not* statutory in origin. Both the Clean Water Act and RCRA -- without significant revision -- provide substantial authority for promoting pollution prevention using a variety of regulatory approaches.

In the pages that follow, this report explores opportunities for promoting industrial pollution prevention in four categories of government action. Chapter 1 discusses **direct regulatory action**, such as banning the discharge of highly toxic pollutants or requiring firms to implement pollution prevention plans or best management practices as conditions of permits. Chapter 2 discusses **standard setting**, such as developing technology-based performance standards based on preventive technologies and practices. Chapter 3 discusses the use of **incentives**, including direct economic incentives such as discharge fees and allowance trading, as well as government purchasing policies and regulatory incentives. And Chapter 4 discusses **information management and outreach**, such as measuring progress in pollution prevention, publicizing performance, and providing technical assistance.[4]

---

4. A note on terminology: As used in this report, the term "pollution prevention" means any practice which eliminates or reduces the generation of any pollutant before treatment, storage, disposal, or recycling. This definition is consistent with the definition of "source reduction" in the Pollution Prevention Act:

> "(A) The term 'source reduction' means any practice which--
>
> (i) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and
>
> (ii) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.
>
> The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control.
>
> (B) The term "source reduction" does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a hazardous substance, pollutant, or contaminant through a process or activity which itself is not a product or the providing of a service."

Pollution Prevention Act, § 3(5).

(continued...)

CHAPTER 1

DIRECT REGULATORY ACTION

A. Clean Water Act[5]

1. *The Zero Discharge Goal*

Immersed in the complexities of clean water regulation, one can too easily forget a simple fact: the Clean Water Act demands nothing short of *eliminating* the discharge of pollutants into the nation's waters. Implementing this goal has given rise to a massive and complex body of regulations, delineating, among other things, allowable discharge levels based on the capabilities of available control technologies. Setting and wrestling with these standards absorbs much of the time and energy of regulators, environmentalists, and industry. While this endeavor is critical, it can never be an end in itself but only a means for moving closer to the ultimate goal of the act -- zero discharge.

4.(...continued)
As the statute suggests, industrial pollution prevention can be achieved through a number of methods, including *input substitution*, such as the substitution of water-based for solvent-based surface coatings, *product reformulation*, such as changing the way a product is packaged, *process changes*, such as pre-sensitizing surfaces with an electrostatic agent to cut down on paint oversprays and the need for cleaning solvents, *closed-loop recycling*, such as recirculating cooling water in a closed system or recapturing feedstock, and *improved maintenance and housekeeping*, such as instituting a program of regular inspection and maintenance of critical equipment.

5. Technically, the "Federal Water Pollution Control Act," 33 U.S.C. §§ 1251-1387. Unless otherwise noted, all references to the "Clean Water Act" will be to this law.
This "act" is in reality an agglomeration of several pieces of legislation, dating back to the Rivers and Harbors Act of 1899. The defining episode in the statute's history was the enactment of the Federal Water Pollution Control Act Amendments of 1972. These and other amendments to the act did not so much *revise* the law as they did *add* new requirements and programs. For a brief but informative description of the history of this fascinating law, see Fogarty, *A Short History of Federal Water Pollution Control Law* in Environmental Law Institute, *Clean Water Deskbook* 5 (2d ed. 1991).

The policy declarations of the Clean Water Act establish the statute's zero discharge goal unmistakably.[6] Section 101 states that "it is the national goal that the discharge of pollutants into the navigable waters be *eliminated* by 1985"[7] and that "it is the national policy that a major research and demonstration effort be made to develop technology necessary to *eliminate* the discharge of pollutants . . . ."[8] Other subsections express the zero-discharge goal in terms of "prevention, reduction, and elimination" of pollution.[9] Even the statutory presumption that all discharges are illegal, except where permitted, embodies a preventive approach to regulation.

2. *Discharge Bans*

The most direct way to implement the act's zero-discharge goal would be to ban the discharge of specified pollutants. Proposals for banning or phasing out the use of certain chemicals, often called "sunset" proposals, are at the forefront of environmental policy debates worldwide.[10] Recent experience with bans, such as the phasedown of lead

---

6. While rarely containing anything enforceable, the "goals and policy" section of a statute provides vital guidance about what the agency *can* prescribe and enforce. This section is important not only "for the clarification of ambiguous provisions of the statute," *Sutherland Statutory Construction* § 20.12, but also for expressing the act's underlying purposes and providing direction to the implementing agency. The Clean Water Act, like many other statutes, leaves substantial room for gap-filling by EPA. How the agency exercises its discretion, and whether its decisions will survive legal challenge, can depend on the goals and policy expressions of the act.

7. § 101(a)(1) (emphasis added).

8. § 101(a)(6) (emphasis added).

9. *See* §§ 101(b)-(c).

10. For example, at the thirteenth joint meeting of the Chemicals Group and Management Committee of the Organization for Economic Cooperation and Development, held in Paris in November 1989, the Swedish delegation introduced a comprehensive "sunset proposal" for phasing out particularly hazardous chemicals.

Sunsetting provisions have also been advocated as a means for achieving the goal of "virtual elimination" of toxic discharges set by the U.S.-Canada Great Lakes Water Quality Agreement of 1978. *See* Muldoon & Mausberg, *Developing a Sunset Chemicals Protocol for the Great Lakes Basin: Its Basis, Scope and Analysis of* (continued...)

in gasoline, suggests that the social and economic consequences of the decision may not be as harsh as originally believed. Bans, as blunt as they may be, have the virtues of simplicity, efficiency, and predictability. Affected firms can immediately turn their ingenuity to finding alternative ways of producing their products or services. Indeed, experience suggests that an outright ban of a substance can be preferable -- from a social, economic, and environmental perspective -- to a gradual ratcheting down of allowable discharge levels.

The Clean Water Act authorizes EPA to ban the discharge of toxic water pollutants. The act states that it is the national policy "that the discharge of toxic pollutants in toxic amounts be prohibited."[11] The specific authority for imposing such a ban is set forth in section 307(a)(2), which empowers the agency to impose an effluent standard, "which may include a prohibition," for the discharge of toxic pollutants based solely on health and environmental concerns. The definition of "toxic pollutant" is a broad one, and includes "combinations" of pollutants.[12] In regulating toxics under section 307(a)(2), the agency must allow "an ample margin of safety," and may consider "the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of

---

10.(...continued)
Implementation Issues in *Proceedings of the International Conference & Exhibition on Global Pollution Prevention - '91* (April 3-5, 1991); National Wildlife Federation, Canadian Institute for Environmental Law and Policy, *A Prescription for Healthy Great Lakes: Report of the Program for Zero Discharge* (Feb. 1991).

11. § 101(a)(3).

12. Toxic pollutants are defined by section 501(13) as
"those pollutants, or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring."

the affected organisms and the nature and extent of the effect of the toxic pollutant on such organisms, and the extent to which effective control is being or may be achieved under other regulatory authority."[13]

The 1972 act established an unrealistic schedule for implementing section 307.[14] Failures to meet statutory deadlines and disputes over procedure and methodology led to a series of lawsuits, settled by a 1976 consent decree. The decree (subsequently ratified by the 1977 amendments to the act) established a list of 126 toxic "priority pollutants" for which EPA was required to set technology-based discharge standards.[15] Since then, the technology-based approach has become the primary tool for regulating toxics under the Clean Water Act, and no new health-based standards or prohibitions have been promulgated under section 307 for fifteen years.

Section 307(a)(2), though seldom invoked, nonetheless remains a viable option for banning the discharge of toxic water pollutants. The absolutist language of this provision is still valid law,[16] and the courts have broadly endorsed the agency's power

---

13. § 307(a)(2).

14. The agency was to list toxics for regulation within ninety days of enactment, publish proposed effluent standards 180 days after such listing, and then conduct a public hearing "on the record." Final standards were supposed to have been promulgated within six months after issuance of the proposed standards.

15. For background and discussion of the *Flannery* consent decree, see Hall, *The Evolution and Implementation of EPA's Regulatory Program to Control the Discharge of Toxic Pollutants To the Nation's Waters*, 10 Natural Res. Law. 507 (1977).

The *Flannery* decree did require heath-based regulation of a few pollutants, including aldrin/dieldrin, DDT, DDD, DDE, endrin, toxaphene, benzidine, and PCBs. *See* 40 C.F.R. § 129.

16. *See* 2 W. Rodgers, *Environmental Law* § 4.33.

to use it.[17] Section 307(a)(2) was abandoned in the 1970s because it could not shoulder the entire burden of regulating toxics in the short period of time required by the 1972 legislation, not because its health-based approach was inherently flawed.[18] The unrealistic regulatory schedule of the original law was modified and improved by the 1977 amendments. With the benefit of more time and better information, EPA has the opportunity to use section 307(a)(2) to ban the discharge of one or a select group of highly toxic pollutants, such as mercury, while maintaining the technology-based approach for others.[19]

3. *Permitting*

Effective permitting is critical to promoting pollution prevention under the Clean Water Act. Permitting under the National Pollutant Discharge Elimination System (NPDES) is the central mechanism for implementing the substantive requirements of the act, and it is the point at which site-specific requirements are imposed. Since the most

---

17. *See* Environmental Defense Fund v. EPA, 598 F.2d 62 (D.C. Cir. 1978); Hercules, Inc. v. EPA, 598 F.2d 91 (D.C. Cir. 1978).

18. As a federal court of appeals noted:

> "Congress's strong support for continuing health-based regulation is shown not only by its impatience with EPA's pace, but also by the great emphasis placed in the 1977 Amendments on making it *easier* for EPA to promulgate health-based regulations as a supplement to feasibility-based regulation.
>
> . . . .
>
> . . . [W]e conclude that the 1977 Amendments were intended to aid, not to impede, EPA's health-based regulation."

Hercules, Inc. v. EPA, 598 F.2d 91, 102 (D.C. Cir. 1978) (emphasis in original).

19. S. 1081, the main Clean Water Act reauthorization bill introduced this year in the Senate, would reinforce the agency's authority to prohibit the discharge of toxic water pollutants. The bill would specifically require the prohibition of seven toxic pollutants: aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, PCBs, 2,3,7,8, TCDD, and mercury. S. 1081, § 11(a)(5). The bill would also establish new procedures for prohibiting highly toxic, bioaccumulative pollutants, *Id.* § 11(a)(6), and for petitioning the agency to add new prohibitions to the regulations. *Id.* § 11(a)(8).

appropriate method of preventing pollution can depend on site-specific considerations, permitting can serve as a flexible tool for tailoring source reduction obligations to the needs and capabilities of each facility.

The Clean Water Act gives EPA broad authority to regulate NPDES permitting. Section 402 states that EPA may issue a discharge permit "upon condition that such discharge will meet either all applicable requirements" which govern that discharge, or, if the agency has not yet promulgated the necessary effluent limitations, "such conditions as the Administrator determines are necessary to carry out the provisions of this Act."[20] Section 402 also directs EPA to prescribe additional conditions on permits, including conditions on reporting and data collection, "and such other requirements as [the Administrator] deems appropriate."[21]

This grant of authority is a very generous one. It empowers EPA to impose conditions on NPDES permits that the Administrator deems to be "appropriate," a very elastic standard of discretion.[22] Since pollution prevention is clearly an "appropriate" goal of the Clean Water Act, there is nothing to prevent the agency from creating new conditions on NPDES permits that would directly promote industrial pollution prevention.

---

20. § 402(a)(1).

21. § 402(a)(2). In addition, section 308 authorizes EPA to impose information, monitoring, and recordkeeping requirements "[w]henever necessary to carry out the objectives" of the act.

22. The courts have recognized the agency's flexibility in imposing permit conditions. *See* NRDC v. Costle, 568 F.2d 1369 (D.C. Cir. 1977).

For example, EPA and NPDES-authorized states could require preventive "best management practices" (BMPs) as a condition of NPDES permits.[23] BMPs could be imposed on a permit-by-permit basis to require specific pollution prevention techniques at particular facilities, as appropriate. EPA could develop guidance documents to advise permit writers in this enterprise. In addition, the agency could promulgate standard BMPs applicable to all permitted sources in an industrial category. These generic BMPs could require pollution prevention practices that would be reasonable to expect of all sources in a category. The generic standards could then be augmented, on a case-by-case basis, by more stringent pollution prevention BMPs. Imposing preventive best management practices would "carry out the purposes and intent" of the act, the regulatory language intended to guide permit writers' discretion.[24]

Existing law also provides an opportunity to require pollution prevention plans as part of the NPDES permitting process. Facility planning can be an excellent means for promoting pollution prevention.[25] As a condition of issuing a NPDES permit, firms

---

23. Section 122.44(k) of the Clean Water Act regulations authorizes the imposition of BMPs in NPDES permits. 40 C.F.R. § 122.44(k).

24. *See id.*

25. Several states have enacted facility planning laws in the past two years, and additional states appear to be following suit. Of these laws, the Massachusetts Toxics Use Reduction Act of 1989 is seen by many observers as being the most effective. *See, e.g.*, Ryan & Schrader, *An Ounce of Toxic Pollution Prevention: Rating States' Toxics Use Reduction Laws* (Jan. 1991).

In addition, several proposals for facility planning are currently under consideration by Congress. For example, the Senate RCRA bill, S. 976, would direct the agency to survey industrial facilities and establish toxics use and source reduction goals for industrial categories required to report under SARA section 313. These facilities would be required to prepare a toxics use and source reduction plan containing two and five year numeric goals to reduce the quantity of hazardous substances used in production and generated as hazardous wastes. The facilities would also be required to submit performance reports detailing their progress in meeting their two and five year goals and the goals established by the agency. S. 976, § 202.

Similar requirements are included in S. 761, a bill introduced by Senator Lieberman on March 21, 1991, and H.R. 2880, a bill introduced by Congressman Sikorsky on July 11, 1991. The Sikorsky bill, entitled the "Community Right to Know More Act of 1991," is perhaps the most far-reaching toxics use reduction proposal

(continued...)

can be required to prepare a plan that analyzes production processes to identify opportunities for reducing the use of regulated pollutants. The firms can be required to set quantitative reduction goals, and to develop a program and schedule for achieving them. This information can be included in the public review process for the permit, and be made part of the permit's enforceable conditions. Requiring facility planning of this nature would advance the zero-discharge goal of the act, promote the preventive concept of NPDES, and fall within the agency's broad range of discretion under sections 402 and 308.

EPA's recently-proposed storm water rule nicely illustrates the flexibility and power of permitting. As required by the Water Quality Act of 1987, EPA recently published a proposed regulation concerning the permitting of storm water discharges associated with industrial activity.[26] The agency plans to issue general permits in the first phase of this program.[27] Each facility covered by a general permit would be

---

25.(...continued)
introduced this session. The bill would add more than 500 chemicals to the reporting requirements of the Toxics Release Inventory, and require facilities to submit toxics use reduction plans and report on their progress. After five years, EPA would be authorized to set minimum performance standards for certain industries, based on the best-performing companies in each industry.

26. EPA, Proposed Rule, National Pollutant Discharge Elimination System General Permits and Reporting Requirements for Storm Water Discharges Associated With Industrial Activity, 56 Fed. Reg. 159 (Aug. 16, 1991). Section 405 of the Water Quality Act, which added section 402(p) to the Clean Water Act, directed EPA to regulate storm water discharges under NPDES.

27. Unlike the typical NPDES permit, which imposes obligations on a discharger as an individual permittee, general permits apply to a group of dischargers, such as to all storm water dischargers in a state. As the agency explains it, "[g]eneral permits should be viewed as an administrative tool enabling the issuance of one permit to authorize a group of dischargers." 56 Fed. Reg. at 40962.

After initially implementing storm water permitting through state-wide general permits ("Tier I" of the program), EPA plans to phase in, in sequence, watershed general permitting ("Tier II"), industry-specific general permitting ("Tier III"), and finally, facility-specific permitting ("Tier IV").

required to prepare a "storm water pollution prevention plan."[28] The plan would include a variety of mandatory activities, such as the formation of a "pollution prevention committee," a preventive maintenance program, good housekeeping measures, and employee training in pollution prevention.[29] The proposed rule also sets forth requirements as to monitoring and reporting.

This proposal demonstrates how dynamically EPA can use its NPDES authority to promote pollution prevention. The storm water provisions of the Water Quality Act of 1987, like section 402, did not specifically mention conditions relating to pollution prevention. Instead, the agency relied on its discretionary authority to require preventive measures. Neither the language nor legislative history of the 1987 act suggests that industrial storm water permitting was meant to be *more* innovative than ordinary NPDES permitting. On the contrary, Congress was responding to EPA's failure to bring storm water discharges into the NPDES system in the first place.[30] There is no statutory reason why the agency cannot extend the planning requirements of the proposed storm water rule, if not more stringent planning requirements, to the rest of NPDES permitting. Requirements of this nature would be "such other requirements as [the Administrator] deems appropriate," the broad standard governing the agency's discretion.[31]

---

28. *See* Draft General Storm Water Permit, Part III.C, 56 Fed. Reg. at 40995-40999.

29. *Id.* Part III.C.4.b(1),(3),(4),(8).

30. As Senator Durenberger stated during floor debate of the 1987 bill, the 1972 act "required all point sources, including storm water discharges, to apply for NPDES permits within 180 days of enactment. Despite this clear directive, EPA has failed to require most storm water point sources to apply for permits which would control pollutants in their discharges. . . . The conference bill therefore includes provisions which address industrial, municipal, and other storm water point sources." 133 Cong. Rec. S752 (daily ed. Jan. 14, 1987).

31. § 402(a)(2).

B. RCRA[32]

1. *Waste Reduction Policy*

RCRA, at its core, is a pollution prevention statute. Section 1003 establishes the statute's preventive philosophy quite clearly:

> The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.[33]

As this language indicates, RCRA is founded on a waste management hierarchy that places prevention first -- above control, treatment, and disposal. According to section 1003, only hazardous wastes that cannot feasibly be reduced or eliminated at the source may be treated, stored, or disposed of, and only then in a manner that minimizes risks to public health and environmental quality.

Of necessity, however, RCRA is both a waste *prevention* and a waste *management* statute. This dual focus has made it difficult to implement a coherent prevention policy under RCRA. The burdens of waste management regulation have tended to swallow much of the agency's time and effort, leaving less room for preventive approaches. Nonetheless, RCRA, like the Clean Water Act, provides substantial authority for promoting pollution prevention.

---

32. The Resource Recovery and Conservation Act of 1976, as amended, 42 U.S.C. §§ 6901-6992k.

33. This language was not originally part of RCRA. It was added by the Hazardous and Solid Waste Amendments of 1984 (HSWA). However, EPA clearly realized the waste reduction philosophy of RCRA from the earliest days of the statute. In 1976, the agency published a *Federal Register* notice stating that source reduction is the desired approach to hazardous waste management. *See* 41 Fed. Reg. 35050 (August 18, 1976).

2. *Enhancing the Waste Minimization Program*

The 1984 Hazardous and Solid Waste Amendments to RCRA (HSWA) created a new "waste minimization" program.[34] The program requires generators[35] who ship hazardous wastes off-site to certify in the written manifests accompanying their wastes that they have "a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable . . . ."[36] Generators required to obtain permits for on-site treatment, storage, or disposal must sign an identical certification, no less often than annually, as a condition of their permit.[37] Generators must also describe in biennial reports their efforts during the past year "to reduce the volume and toxicity of waste generated" and the "changes in volume and toxicity of waste actually achieved during the year in question in comparison with

34. "Waste minimization" differs from "pollution prevention" and "source reduction" primarily because it includes most forms of recycling.

35. For the purposes of RCRA, a hazardous waste "generator" is defined as "any person, by site, whose act or process produces hazardous waste identified or listed in Part 261 of this chapter or whose act first causes a hazardous waste to become subject to regulation." 40 C.F.R. § 260.10.

36. § 3002(b).

37. § 3005(h).

previous years . . . ."[38]

An examination of the legislative history of this program suggests that Congress had fairly limited expectations for generator certification. The certification provision requires only that generators attest that they have a waste reduction program "in place" which, in their judgment, is economically practicable. According to the Senate Report on the 1984 bill, the certification requirements do not authorize EPA "to interfere with or intrude into the production process or production decisions of individual generators."[39] In addition, the report suggests that EPA would have limited ability to enforce the certification requirement:

> With respect to the certification requirement, this section does not create civil or criminal consequences. Thus, for example, such certifications are not to be treated as a "material statement" under new section 3008(d)(3) of the Act. Nor is the content of these certifications to be cause for challenge regarding the issuance of permits. In keeping with the concept of these provisions, judgments made by the generators are not subject to external regulatory action.[40]

---

38. § 3002(a)(6)(C) & (D). The 1984 law also directed EPA to prepare a study on "the feasibility and desirability of establishing standards of performance or of taking other additional actions under this Act to require the generators of hazardous waste to reduce the volume or quantity and toxicity of the hazardous waste they generate . . . ." § 8002(r).

EPA's report, completed in 1986, concluded that mandatory standards of performance and required management practices were not feasible or desirable. Instead, the agency recommended a three-point waste minimization strategy consisting of information gathering, continuation of the core waste minimization program (including the publication of guidance documents and provision of technical assistance), and examination of longer term options, such as the possible prohibition of certain waste management practices. *See* U.S. Environmental Protection Agency, *Report to Congress: Minimization of Hazardous Waste* (October 1986).

The agency had planned to deliver a follow-up report to Congress in December 1990, but failed to do so. When this report will be forthcoming is uncertain.

39. S. Rep. No. 98-284, reprinted in The Institute of Law and Public Health Protection, *The Hazardous and Solid Waste Amendments of 1984: A Legislative History* at 224-6 (1986).

40. *Id.* at 224-7.

Consistent with the tentative spirit of the Senate Report, EPA implemented the certification provision through a very limited set of requirements. The agency simply incorporated the certification language of the statute directly into the language of the Uniform Hazardous Waste Manifest, below the generator's certification that the manifest is complete and accurate.[41] The agency amended the RCRA permitting regulations to require that an identical certification be placed in the operating file of TSDF-permitted generators.[42] In the preamble to these rules, EPA indicated that enforcement of the certification requirement "will be concerned primarily with compliance with the certification *signatory* requirement."[43] Thus, provided the generator has signed the certification statement, and has some kind of waste minimization program "in place," the agency apparently will not inquire into the content of the program. Instead, the rule simply exhorts generators to "make a good faith effort" to minimize waste.[44]

---

41. Item 16 of the Uniform Hazardous Waste Manifest reads in full as follows:

    GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international government regulations.

    Unless I am a small quantity generator who has been exempted by statute or regulation from the duty to make a waste minimization certification under section 3002(b) of RCRA, I also certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment.

42. 40 C.F.R. § 264.73(b)(9).

43. 50 Fed. Reg. 28702 (July 15, 1985) (emphasis added).

44. *Id.*

EPA has published non-binding guidance documents on what it considers to be a "program in place" under the certification requirement.[45] Along with technical assistance programs such as EPA's Pollution Prevention Information Clearinghouse and the Minnesota Technical Assistance Program (MnTAP), the guidance documents enable interested companies to learn about opportunities to reduce waste. Whether this guidance and technical assistance is actually used, however, depends entirely on voluntary efforts of generators.

Despite the cautionary tenor of the Senate Report, EPA has the opportunity to do more with generator certification. The language of the statute, not the Senate Report, governs EPA's actions. As long as the agency's interpretation of the statute is reasonable, looking only at the plain language of the law, its actions will likely survive legal challenge. Thus, the agency can use its broad information-gathering authority[46] to require generators to describe the contents of the waste reduction program they have "in place," and to spell out exactly why, in their judgment, a more aggressive program is not economically practicable. The agency can also use its inspection authority[47] to determine whether generators in fact have something more than a sham program in place. These actions would be consistent with language of the certification provision, the relevant test for legal purposes.

---

45. *See* Draft Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program, 54 Fed. Reg. 25056 (June 12, 1989); EPA Manual for Waste Minimization Opportunity Assessments, EPA 600/288/025 (April 1988).

46. *See* § 3007.

47. *See id.*

The biennial reporting provision gives EPA even greater authority to promote pollution prevention. Whereas the certification provision requires only that generators state that they have a waste minimization program "in place," the biennial reporting provision requires them to document their actual efforts and results achieved. The statute directs EPA to establish requirements governing the submission of biennial reports "setting out efforts undertaken during the year to reduce the volume and toxicity of waste generated" as well as "the changes in volume and toxicity of waste actually achieved during the year in question . . . ."[48] Congress gave EPA broad discretion to implement biennial reporting, authorizing the agency to promulgate regulations "establishing such standards . . . as may be necessary to protect human health and the environment . . . ."[49]

EPA has the opportunity to use biennial reporting as a means for requiring facility planning under RCRA. The agency could require generators to develop plans for reducing the volume and concentration of hazardous constituents in their RCRA-regulated wastes, and to report on the results achieved. These reports could be made available to the public and publicized in appropriate cases. Using biennial reporting in this manner fits within EPA's discretion to implement section 3002(a), since

---

48. § 3002(a)(6).

49. § 3002(a). In addition, the Senate Report did not attempt to place significant limitations on the biennial reporting requirement. Its only discussion of that requirement provided:

> In implementing the biennial reporting requirement, the Agency should not require reports that duplicate the Agency's existing biennial reports. In particular, to the extent that the existing report will provide all or some information required by this subsection, submission of that report should be deemed sufficient to comply with some or all reporting requirements of this subsection. Additionally, it is recognized that the volume and quantity and toxicity of wastes can vary significantly with respect to the production levels of the products associated with the waste and that this can certainly distort the implications of information presented under new section 3002(a)(6)(D).

the agency could reasonably consider such requirements "necessary to protect human health and the environment."[50]

3. *Permitting*

Like the agency's authority under NPDES, EPA has broad power to impose conditions in RCRA permits. Section 3005 provides that "[e]ach permit issued under this section shall contain such terms and conditions as the Administrator (or the State) determines necessary to protect human health and the environment."[51]

Under this provision, EPA and authorized states could require waste reduction plans similar to the ones described above in the context of NPDES permitting. A limitation to this approach is that it would reach only the generators required to obtain permits for on-site treatment, storage, and disposal, a subpopulation of all RCRA-regulated generators. For this reason, the scope of such a planning requirement would be less comprehensive than one imposed through NPDES permitting.

C. Enforcement

Enforcement actions can be used to impose specific preventive measures as part of agency settlements with violators.[52] EPA appears to be making increasing use of this

---

50. Biennial reporting also provides significant information-gathering opportunities, as discussed in Chapter 4.

51. § 3005(c)(3).

52. Of course, all enforcement indirectly promotes pollution prevention by creating an incentive for compliance. Thus, although ordinary enforcement does not directly encourage prevention, it is indispensable to the success of a pollution prevention program.

option. In February 1991, the Office of Enforcement published an interim policy on the inclusion of pollution prevention provisions in settlement agreements.[53] The document advises that settlements may include enforceable conditions for implementing specific preventive measures, including "specific activities which *correct the violation* or activities which will be undertaken *in addition to* those necessary to correct the violation."[54] Incorporating preventive measures into settlement agreements can enable the agency to tailor a prevention strategy to the individual characteristics of each site. As the interim policy suggests, EPA media programs can issue more specific guidance for implementing this policy into enforcement actions under their programs.[55]

---

53. Office of Enforcement, U.S. EPA, *Interim Policy on the Inclusion of Pollution Prevention and Recycling Provisions in Enforcement Settlements* (Feb. 25, 1991).

54. *Id.* at 3 (emphasis in original).

55. The interim policy states:

> Each national program manager may decide whether to develop its own specific pollution prevention guidance (consistent with this interim guidance) or continue to use the general interim guidance. Program-specific guidance should discuss *when* to include pollution prevention conditions in settlements, and describe the categories of violations for which pollution prevention "fixes" are most encouraged and the specific types of source reduction or recycling activities considered appropriate for that program. The National Program Manager may also adopt additional reporting or concurrence requirements beyond those described in this interim policy. The Programs can develop specific policies on their own schedule, utilizing this general interim policy until they do so. *Id.* at 11.

CHAPTER 2

STANDARD SETTING

A. Clean Water Act

1. *Using Effluent Guidelines to Promote Prevention*

At the heart of the Clean Water Act is a large and complex array of technology-based standards governing allowable discharges from industrial point sources. The act requires different levels or types of control depending on whether a source is new or existing, whether its discharges will be of "conventional" pollutants (biochemical oxygen demand, suspended solids, fecal coliform, acidity, and oil and grease), "toxic" pollutants (the list of 126 hazardous "priority pollutants" identified in the act), or "nonconventional pollutants" (pollutants which are neither "conventional" nor "toxic," as so defined), and whether the source releases pollutants directly into receiving waters or through a publicly owned treatment works (POTW).

For existing direct dischargers, section 301(b) sets forth a two-stage process of increasingly stringent controls. At the first stage, sources are required to achieve (by 1977) discharge levels which reflect the "application of the best practicable control technology currently available" (BPT).[56] At the second stage, sources are required to achieve (originally by 1983, now extended to 1989) discharge levels for toxic and nonconventional pollutants which reflect the "application of the best available technology

56. § 301(b)(1)(A). For the most part, the initial BPT regulations issued in the mid-1970s covered only conventional pollutants.

economically achievable" (BAT)[57], and discharge levels for conventional pollutants which reflect the "application of the best conventional pollutant control technology" (BCT).[58] New sources are required to achieve more stringent "new source performance standards" (NSPS) which reflect the "application of the best available demonstrated control technology . . . ."[59] Sources that discharge toxic or nonconventional pollutants into POTWs must satisfy "pretreatment standards"[60] which typically parallel the BAT limits for existing sources and the NSPS limits for new sources.

EPA sets these technology-based limitations by issuing "effluent guidelines" on an industry-by-industry basis.[61] The process of developing effluent guidelines involves, first, the gathering and analysis of information about particular industrial categories. Using this information, the agency proposes effluent reduction levels based on a set of flexible factors identified in section 304.[62] EPA then publishes its proposed guidelines and seeks comments from affected industries and the public. Finally, the agency promulgates final effluent limitations for the industrial category at issue, often including limits for BPT,

---

57. § 301(b)(2)(A). As discussed in Chapter 1, EPA can always impose tighter levels of control on, or prohibit, toxic pollutants.

58. § 301(b)(2)(E).

59. § 306(a)(1).

60. § 307(b)(1).

61. Point sources are regulated by industrial "category" and "subcategory." Each industrial category typically includes several subcategories. For example, the "fertilizer manufacturing point source category" consists of seven subcategories, ranging from the "phosphate subcategory" to the "mixed and blend fertilizer production subcategory." *See* 40 C.F.R. Pt. 418.

62. For example, to determine the effluent levels required by the initial stage of control, BPT, the agency must consider the age of the equipment and facilities involved, the processes employed, engineering aspects of various types of pollution control methods, process changes, the costs of achieving pollution reductions, non-water quality environmental impacts, and "the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application . . . ." § 304(b)(1)(B).

BAT, NSPS, and pretreatment standards. Each such rulemaking "represents a separate series of studies, judgments, and trade-offs"[63] that can take years to complete.

Nothing in the statute prevents sources from meeting their effluent limitations through pollution prevention. A facility is simply given numerical discharge limitations that it can satisfy however it wishes. The effluent limitations are neutral as to the particular treatment or reduction methods to be used, and sources can choose to achieve their discharge limits through input changes, product reformulation, process changes, or any other preventive practice. Thus, in theory, the effluent limits neither deter nor promote pollution prevention.

However, industry has responded to effluent guidelines in a way that reinforces traditional end-of-pipe approaches. End-of-pipe treatment can be used by many plants in an industry at similar cost, whereas pollution prevention can involve factors that differ from plant to plant. Companies often find it easier and cheaper (especially in the short run) to install uniform treatment technologies rather than to explore less certain avenues of pollution prevention. In addition, the development of innovative prevention technologies can eventually result in more stringent effluent limitations, since allowable discharge levels are keyed to the best-performing technology in an industry. For this reason, industry arguably has a disincentive to reduce discharges below the levels required by existing limits.[64] Thus, even though effluent guidelines are neutral as to the

---

63. 2 W. Rodgers, *Environmental Law* 425.

64. On the other hand, it might be argued that the development of an improved prevention technology that becomes the basis for a tightened effluent standard places a discharger at a competitive advantage to its peers, thus creating an *incentive* for innovation.

precise method of compliance, they have "resulted" in an emphasis on end-of-pipe treatment.[65]

This emphasis, however, is not attributable to a *statutory* defect. The Clean Water Act, even without revision, gives EPA ample authority to develop effluent guidelines based on preventive technologies. The statutory factors that must be considered in developing guidelines are quite flexible. The BAT factors, for example, include "process changes" and "such other factors as the Administrator deems appropriate . . . ."[66] The fact that BAT can include source reduction measures is supported by the zero-discharge goal of the act. Indeed, the legislative history of the act makes it clear that, in setting BAT, the agency should consider "the total plant" and not just "the control techniques used at the actual discharge of the point source."[67] The definition of NSPS also clearly anticipates the use of preventive technologies in setting effluent limitations:

> The term "standard of performance" means a standard for the control of the discharge of pollutants which reflects the greatest degree of effluent

---

65. A report of the Office of Technology Assessment places at least some of the blame on the guidelines process:

> Neither the [Clean Water Act] nor the regulations require that industrial facilities install the specific control technology on which limitations and standards are based. They must, however, achieve discharge limits that EPA determines are possible using the model technology. In fact, the use of the model technology does not assure that a facility is in compliance with the regulations. However, the technical Development Documents that support each regulation and the preamble to the regulations published in the *Federal Register* identify the technology used to set the limitations or standards. It seems obvious that a firm being subjected to new regulations would opt to use the identified technology rather than spend time and money devising an alternative. Thus, despite flexibility in the statute and the explicit mention of alternatives to pollution control, the system that has evolved under [the Clean Water Act] inhibits the adoption of waste reduction by industry.

OTA, *Serious Reduction of Hazardous Waste* 177-78 (Sept. 1986) (footnotes omitted).

66. § 304(b)(2)(B). Court challenges to the initial BPT regulations clarified that "process changes," as that term is used in the act, are not limited to end-of-the-pipe technological fixes but also include in-plant process modifications. *See* American Petroleum Inst. v. EPA, 540 F.2d 1023 (10th Cir. 1976); American Paper Inst. v. Train, 543 F.2d 328 (D.C. Cir. 1976).

67. H.R. Rep. No. 92-911, 92d Cong., 2d Sess., 102-03 (1972).

> reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, *processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.*[68]

Given this broad mandate, EPA can develop effluent guidelines which reflect the best *pollution prevention* technologies and practices in particular industrial categories. Most courts would support this approach. For example, a federal court of appeals recently held that a particular technology could be considered "demonstrated" for the purpose of setting a NSPS even if only a single plant used the technology in question.[69] In that case the court ruled that EPA improperly failed to consider a zero-discharge technology used by some plants in the industry.[70]

If EPA revises effluent guidelines to reflect source reduction practices, technology-based regulation under the Clean Water Act can realize its underlying mission -- achievement of the zero-discharge goal. Viewing prevention as a form of "technology" plainly advances the technology-forcing principles of the act.[71]

---

68. § 306(a)(1) (emphasis added).

69. Chemical Mfrs. Assn. v. EPA, 870 F.2d 177, 263 (5th Cir. 1989) (citing other court decisions).

70. *Id.* at 263-64.

71. Of course, under this approach affected sources could be expected to seek variances, claiming, for example, that their production processes differ from the technologies used to develop a zero-discharge effluent guideline, entitling them to a "fundamentally different factors" variance. It is unclear, however, whether these implementation headaches would significantly exceed those encountered under the present system.

2. *Using Water Quality Standards to Promote Prevention*

Although technology-based regulation has been the primary focus of EPA's efforts since 1972, there is increasing interest in reestablishing water quality-based regulation as a central aspect of Clean Water Act implementation.[72] Under section 303, states must establish water quality standards for all bodies of water within their jurisdiction. For each watercourse, the state must specify one or more "designated uses" (i.e., public drinking water supply or recreation), and establish water quality "criteria" setting the maximum ambient levels of pollutants that would not impair the water's designated uses. The criteria are typically expressed as numerical concentrations of pollutants (i.e., "not to exceed 0.019 milligrams of total residual chlorine per liter of water"), but are sometimes expressed as narrative standards (i.e., "waters shall be free from substances in concentrations or combinations toxic to humans, wildlife, or aquatic life").[73] EPA is responsible for approving the state water quality standards, and the standards must be reviewed every three years.

If a water body will not meet applicable water quality criteria after implementation of technology-based controls, sources must achieve more stringent

---

72. An exclusively quality-based approach to clean water regulation preceded the 1972 act. Under the Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903, states were required to establish water quality standards for interstate waters, subject to federal approval. The 1972 act shifted the focus away from the quality of the receiving water to the technological capabilities of dischargers, relying on uniform effluent limitations and pretreatment standards that could be developed and implemented on an industry-by-industry basis. This technology-based approach was designed to create a set of simple, source-specific set of controls that could be more readily enforced than state water quality standards. But the 1972 act did not abandon the water quality approach, as discussed in greater detail in this section.

73. *The Water Quality Act of 1987 added new section 303(c)(2)(B) to the act, requiring states to revise* water quality standards and adopt numerical criteria for all § 307(a) toxics for which EPA has published criteria under § 304(a), where the pollutant can reasonably be expected to interfere with the designated uses adopted by the state.

discharge limits.[74] Determining these limits typically involves the calculation of the "total maximum daily load" (TMDL) for the problem pollutants. The TMDL expresses the greatest amount of a pollutant that the water may receive in a single day from all sources -- natural, point, and non-point -- without exceeding applicable water quality criteria. The TMDL is allocated among the various regulated sources, each receiving a "wasteload allocation" (WLA), expressing its individual portion of the TMDL.

Because states are free to distribute wasteload allocations as they see fit, the allocation process provides an interesting opportunity to leverage pollution prevention through creative allocation schemes. The TMDL calculation includes contributions from both point and non-point sources. If a state decides to promote prevention in the agricultural sector through the imposition of stringent best management practices, it could allocate proportionally fewer pounds of a particular pollutant (phosphorus, for instance) to non-point sources. Conversely, the state could promote prevention in the industrial sector by allocating fewer pounds of a pollutant to point sources on a watercourse. The state could combine its wasteload allocation scheme with technical assistance, targeted enforcement, or other measures intended to encourage the adoption of preventive practices in the sector.

The development of individual control strategies under section 304(l) may also enable states and EPA to promote pollution prevention. Under this section, which was added to the act by the Water Quality Amendments of 1987, states were required to develop three lists of impaired waters by February 4, 1989: a "long list" (waters impaired

---

74. § 301(b)(1)(C).

by point and nonpoint sources of toxic, conventional, and nonconventional pollutants), a "medium list" (waters impaired by point and nonpoint sources of toxic pollutants), and a "short list" (waters impaired only by point sources of toxic pollutants). States must identify the specific sources causing the impairment, and devise "individual control strategies" (ICSs) sufficient to clean up the listed waters by June 1992.[75]

As defined by EPA, an ICS is "a final NPDES permit with supporting documentation showing that effluent limits are consistent with an approved wasteload allocation, or other documentation which shows that applicable water quality standards will be met not later than three years after the individual control strategy is established."[76] States must submit proposed ICSs to EPA for approval. If they fail to do so, or if EPA disapproves a proposal, EPA must develop and implement the ICS.[77]

States can require sources to undertake a toxicity reduction evaluation (TRE) to identify methods of reducing discharges in order to comply with a tightened effluent standard set forth in an ICS. EPA's guidance document on implementing § 304(l) recommends the use of TREs, which it describes as

> stud[ies] conducted to determine what control options are effective for complying with either toxicity or chemical concentration requirements. Control measures may include a range of options and do not necessarily entail the construction of additional wastewater treatment facilities. Actions taken in a plant may include product substitution, process changes, and

---

75. § 304(l)(1). In a controversial decision, EPA determined that ICSs would be required only for point sources contributing to the impairment of short-listed waters. This determination has been the subject of litigation, and a final resolution of the issue has not been reached.

76. 40 C.F.R. § 123.46.

77. § 304(l)(2).

in-process recycling.[78]

TREs can serve the same function as pollution prevention assessments. Through their analysis of problem pollutants, TREs can be used to identify options for reducing discharges through source reduction. EPA can assist states in using TREs in this manner by publishing guidance on pollution prevention opportunities in the implementation of ICSs.

B. RCRA's Land Disposal Restrictions

HSWA introduced a new program designed to restrict the disposal of hazardous wastes on land.[79] Congress specified dates when certain types of waste would be prohibited from land disposal unless either of two conditions were met: a showing that there would be "no migration" of hazardous constituents from the disposal unit or injection zone,[80] or compliance with technology-based "treatment standards" prior to disposal.[81] These treatment standards were to be promulgated by EPA according to a mandatory schedule which, if it were not met, would result in the automatic prohibition of land disposal of the specified wastes.

---

78. EPA, *Final Guidance: Implementation of Requirements Under § 304(l) of the Clean Water Act as Amended* 34 (March 1988).

79. Congress found that "reliance on land disposal should be minimized or eliminated, and land disposal, particularly landfill and surface impoundment, should be the least favored method for managing hazardous wastes . . . ." § 1002(b)(7). It defined land disposal "to include, but not be limited to, any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave." § 3004(k).

80. § 3004(d)(1), (e)(1), (g)(5).

81. § 3004(m)(1). The agency could also grant temporary extensions if adequate treatment technology was not yet available (a "national capacity variance"), § 3004(h)(2), or on a case-by-case basis, under certain conditions. § 3004(h)(3).

According to EPA's framework regulation for the land disposal restriction (LDR) program, LDR treatment standards are based on the "best demonstrated available technologies" (BDAT).[82] BDAT can be expressed either as a performance standard (reflecting the maximum allowable concentration of particular hazardous constituents), or as a specific technology or practice. BDAT standards are set according to a multiple-step process that involves dividing wastes into similar treatment groups, screening technologies for availability, performance, and quality, evaluating test data to determine the "best" technologies, and, ultimately, developing waste code-specific treatment standards.[83]

EPA has the opportunity to use preventive technologies in establishing BDAT standards. According to section 3004(m), the standards must specify levels or methods of treatment "which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized."

---

82. *See* 51 Fed. Reg. 40572 (Nov. 7, 1986). The agency had originally proposed an approach that would have used the BDAT standards in conjunction with risk-based standards. *See* 51 Fed. Reg. 1602 (Jan. 14, 1986). Wastes treated by BDAT could be land disposed even if they did not meet the risk-based criteria, but BDAT could impose limitations no lower than the risk-based standards. After this proposal "brought down a rain of fiery criticism," Novick & Stever, *Soil and Groundwater* in *Law of Environmental Protection* at 13-85, the agency abandoned the risk-based component of the equation.

83. EPA promulgated LDRs for the first group of wastes, dioxins and spent solvents, according to schedule on November 7, 1986. 51 Fed. Reg. 40572. It promulgated the second set of LDRs, covering the "California List" of wastes, on July 8, 1987. 52 Fed. Reg. 25760. The remaining wastes were divided for rulemaking purposes into three groups. The agency promulgated LDRs for the first third scheduled wastes on August 17, 1988, 53 Fed. Reg. 31138, for the second third scheduled wastes on June 23, 1989, 54 Fed. Reg. 26594, and for the third third scheduled wastes on June 1, 1990, 55 Fed. Reg. 22520, all within the statutory deadlines. The LDRs are codified in 40 C.F.R. Part 261.

The key issue is whether the term "treatment," as it is used section 3004(m), can include source reduction technologies. One might conceivably argue that "treatment," ipso facto, excludes any activities which prevent a waste from being generated. RCRA defines the term "treatment" as follows:

> The term "treatment," when used in connection with hazardous waste, means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume. Such term includes any activity or processing designed to change the physical form or chemical composition of hazardous waste so as to render it nonhazardous.[84]

Thus "treatment" is defined quite broadly as *any* method or process designed to reduce the volume or toxicity of hazardous wastes, or make them easier or less dangerous to handle. If source reduction diminishes the volume or toxicity of the waste that is generated (or eliminates it altogether), it can constitute "any" method or process designed to "render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume," the relevant statutory definition. This interpretation serves the statute's underlying purpose: to advance the national policy that "the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible."[85]

At the very least, establishing BDAT standards based on pollution prevention is within the agency's discretion. Interpreting section 3004(m) to embrace source reduction

---

84. § 1004(34).

85. § 1003(b).

is, at worst, something about which reasonable minds can differ. Courts in such situations almost invariably support the agency's reading of the statute. Basing BDAT on pollution prevention does not violate congressional intent or clearly contradict the language of RCRA. Quite the opposite, it advances important goals of the act and fits with the statutory language of section 3004(m) and RCRA's broad definition of the term "treatment."

In setting BDAT, EPA can require either a performance-based standard or a specific practice or technology. Performance standards in some respects appear more attractive. They enable regulated firms to meet applicable limits however they choose, thus creating flexibility for the development of alternative technologies. They also provide a simple test for proper operation and maintenance of control technologies -- the firm either complies with the numerical concentration limits or it does not. Operation and maintenance of mandatory technologies, by contrast, may be more difficult to enforce. Citing these benefits, EPA has indicated that it "would rather set concentration-based treatment standards whenever possible . . . ."[86]

Imposing specific technological requirements, however, does not necessarily lock firms into the use of that particular technology or impede innovation. The regulations enable generators to use different technologies than the ones required if "the alternative treatment method can achieve a measure of performance equivalent to that achievable by methods specified . . . ."[87] An applicant must submit information to EPA

---

86. 56 Fed. Reg. at 24445.

87. 40 C.F.R. § 268.42(b).

demonstrating the equivalence of the alternative treatment method. As explained by the agency, the demonstration is typically site- and waste-specific, and can be based on:

> (1) The development of a concentration-based standard that utilizes a surrogate or indicator compound that guarantees effective treatment of the hazardous constituents; (2) the development of a new analytical method for quantifying the hazardous constituents; and (3) other demonstrations of equivalence for an alternative method of treatment based on a statistical comparison of technologies, including comparison of specific design and operating parameters.[88]

Mandatory technologies or management practices may be particularly appropriate when imposed in conjunction with concentration-based performance standards. In some waste categories, the agency may discover that uniform best management practices can reasonably be required of all regulated entities. For example, basic operating and housekeeping requirements can be fairly cheap and simple to implement but at the same time yield significant waste reduction benefits. These mandatory practices, by themselves, need not achieve all of the reductions necessary, but can supplement concentration-based standards. Firms would be free to find additional reductions through whatever means they found most appropriate to their own needs and capabilities.

In an advance notice of proposed rulemaking (ANPRM) published on May 30, 1991, EPA stated that it is "currently investigating new approaches that would incorporate waste minimization techniques into the BDAT process."[89] The agency indicated that BDAT standards could be developed in a manner that uses source reduction and recycling as appropriate technologies for reducing hazardous constituents in waste. In

---

88. Preamble to Land Disposal Restrictions for Third Third Scheduled Wastes, 55 Fed. Reg. at 22536.

89. 56 Fed. Reg. at 24446.

addition, the agency suggested that there may be situations where specifying actual practices or technologies would be better than specifying only concentration-based performance levels. The agency concluded, however,

> All of this is not to say that the Agency will require waste minimization as BDAT, especially by identifying a specific technology that must be used. While the Agency believes that waste minimization is important, we also believe that there should be flexibility in the program in order to encourage innovation so as to find new and better methods to control hazardous wastes. Thus, the Agency welcomes comments on whether, and if so, how waste minimization could be factored into the development of BDAT.[90]

A review of the public comments responding to this ANPRM suggests that many in the regulated community *support* the use of preventive strategies in the development of BDAT standards. Although several commenters requested that EPA not impose mandatory technologies, several encouraged the agency to develop performance standards using information about preventive techniques.[91] With this generally positive feedback from industry, EPA has the opportunity to proceed full bore with the development of prevention-based BDAT standards under the land disposal restrictions program.

---

90. *Id.* at 24447.

91. An oil company wrote that the agency's development of BDAT standards based on solvent extraction for K048-K052 listed wastes was an example of this kind of approach.

CHAPTER 3

INCENTIVES

A. Fees

Charging a fee for pollution can be a direct means for creating an incentive for pollution prevention.[92] Firms can be expected to reduce discharges up to the point where the marginal cost of another unit of reduction equals or exceeds the charge for that unit. An effective fee system would provide an incentive for firms to develop better technologies for reducing pollution, thus acting as a catalyst for pollution prevention.[93]

A fee-based system may be appropriate for point source discharges of conventional pollutants under the Clean Water Act. NPDES already relies on a discharge monitoring system, a critical component of any market-based regime. Water quality standards can serve as baseline levels which must be satisfied in all cases. This would prevent sources from degrading waters below applicable quality criteria, while at the same time creating

---

92. The use of economic incentives to supplement or replace traditional command-and-control environmental regulation is receiving growing attention. Pollution abatement schemes that rely on economic incentives, such as discharge fees and allowance trading, are considered to be attractive alternatives to traditional forms of regulation because they create a form of pricing for units of pollution, thus internalizing the social costs of pollution, providing firms with clear inducements to seek reductions, and ultimately achieving environmental protection at lower overall costs to society.

Economic incentives are not a panacea, however. While often appearing extraordinarily promising in discussions that assume a smoothly functioning system -- with vigorous markets, perfect monitoring, and without significant transaction costs -- incentive-based systems face real problems in implementation that can limit their actual effectiveness. As policy makers gain real-life experience with market-based systems, they are developing a better understanding of when and why incentive-based systems are appropriate.

93. There can be difficulties in implementing an effective pollution fee system. For example, it is hard to anticipate a firm's response to a fee at any particular level. A fee that is set too low would provide an inadequate incentive for reducing pollution, defeating its purpose. Since pollution fees face strong political opposition, it may be difficult to set the fee at an appropriately high level.

an economic incentive to seek additional reductions.

Several states currently charge fees as part of the NPDES permitting process. The fees are imposed on a one-time basis, and, in some states, on an annual basis as well. California uses a sliding scale to set fees, basing the amount on the type and volume of wastes discharged. In the category of "domestic and municipal discharge," for example, fees range from $1,000 for less that 0.5 million gallons per day (mgd) to $20,000 for discharges greater than 10 mgd. New York also separates dischargers into different categories, and bases the permit fee on the volume of the discharge. For example, charges range from $50 to $15,000 in the "private/commercial/industrial" category.[94]

But these fee systems are intended primarily to generate revenue for the state's NPDES program. While the fees provide some incentive to reduce discharges, they are not high enough to serve as a strong inducement for prevention, nor are intended to be. Indeed, there appears to be little experience world-wide in the use of pollution fees as an incentive-based regulatory tool as opposed to a mere revenue raising device.

Germany's fee system for water pollution may be an exception. According to the Organization for Economic Cooperation and Development, "[t]he German water pollution charge is the only known effluent charge system in the field of water pollution with a clearly stated incentive purpose."[95] The German fee system operates within a

---

94. These fee systems, as well as those for Arkansas, Colorado, Hawaii, Kentucky, and Washington are described in Anderson, Hofmann & Rusin, *The Use of Economic Incentive Mechanisms in Environmental Management* 25 (August 1989).

95. OECD, *The Application of Economic Instruments for Environmental Protection* 43 (1989).

framework of water quality and technology-based regulation. Charges are imposed on biological oxygen demand, chemical oxygen demand, mercury, cadmium, and substances toxic to fish. Sources which exceed applicable water quality and technology standards must pay a fee per unit of discharge.[96] Sources meeting applicable standards pay a lowered fee. However, there is little empirical research about the effectiveness of the German system.

EPA arguably has the authority to institute an incentive-based fee system under the agency's broad section 402 powers.[97] The legal status of such a fee system would rest on shaky footing, however, particularly if the charges were set at a high level. If the system could be characterized as a "tax," it could be ruled unconstitutional as an undelegated exercise of the taxing power. Even if the charge could properly be characterized as a user fee, the absence of clear congressional authorization would cast doubt on the system. Thus, incentive-based discharge fees will probably have to await action by Congress.[98]

---

96. Although the charges increased more than threefold between 1981 and 1986, they remain below the cost of treatment. Anderson, et. al, *The Use of Economic Incentive Mechanisms in Environmental Management* at 32.

97. *See* § 402(a)(2) (in administering the NPDES program, the Administrator may establish "such other requirements as he deems appropriate."). In states where EPA administers the NPDES program, the Independent Offices Appropriation Act, 31 U.S.C. § 9701, authorizes the agency to charge a "fair and equitable" fee in connection with permit applications, provided the agency establishes the fee schedule by regulation.

98. The Senate reauthorization bill takes, at best, a very small step toward the use of incentive-based discharge fees. The bill would authorize EPA to impose a fee on industrial sources in order to recover the cost of developing effluent guidelines and pretreatment standards. S. 1081, § 7(f). The amount of the fee would be based on the volume and toxicity of the source's discharges. The fee could be reduced in cases where the source "will demonstrate new or innovative technology . . . ." The bill also would require states to establish annual permit fees. *Id.* § 21. These fees would create a small incentive favoring source reduction. But the fees are intended primarily to defray administrative costs, and they seem unlikely to play a significant role in the capital investment decisions of affected industries.

B. Allowance Trading

Allowance trading offers another opportunity to promote pollution prevention through incentive-based environmental regulation. Under this approach, the government predetermines the level of pollution that will be allowed, and allocates permission to emit this level of pollution among regulated firms in the form of money-like units called "permits," "credits," "allowances," or some similar label (this discussion will use the term "allowance" to designate the tradable unit). A firm's emissions may not exceed the level of its pollution allowances. If a firm reduces emissions below the specified level, it can, depending on the system, trade its extra allowances to other firms, sell them to third-party brokers, or save them for future use. Because allowance trading creates an incentive to find extra reductions, and thus free up additional allowances for trading, it can induce firms to find new ways to prevent pollution.

Unlike incentive-based discharge fees, allowance trading has already been implemented by environmental regulators in the United States. The phasedown in lead in gasoline was implemented through an allowance trading system, and emissions trading, in the form of netting, offsets, and bubbles, has been a feature of Clean Air Act regulation since the 1970s. Recent amendments to the Clean Air Act created a new trading system for acid rain-causing sulphur dioxide (SO2) emissions from utility plants.[99]

Effective allowance trading depends on several key factors, however, as illustrated by SO2 trading under the new acid rain law. First, the pollution must be easily

---

99. Clean Air Act Amendments of 1990, Title IV, Pub. L. No. 101-549, 104 Stat. 2399 (1990).

measurable, and there must be a measurement system in place that is accurate and reliable. The acid rain program involves a finite number of large utility plants which emit measurable levels of SO2 from identifiable points -- their smokestacks. Continuous emissions monitoring is now available that can track emissions with a high degree of precision. Without this continuous monitoring technology, the program would fail.

Second, trading cannot allow for the buildup of localized concentrations of pollutants, as could occur under perfect free market conditions. The acid rain program avoids this problem because a pre-existing system of health-based limits on ambient SO2 levels prevents any single utility from emitting unhealthy levels of SO2. Plants may buy up as many SO2 allowances as they wish, but their emissions may not cause localized concentrations of SO2 that violate the health-based air standards in their locality. Trading of other pollutants, however, might create localized "hot spots" with serious environmental consequences. Pollutants having strong localized effects, like toxic water pollutants, would not be good candidates for allowance trading.

Third, the initial allocation of pollution allowances is critical. If the baseline level of pollution is set too high, there is nothing the market can do to correct the problem. The acid rain program sets a lowered cap on total SO2 emissions per year, ensuring reductions in acid rain. However, if the program distributed allowances that merely reflected current emissions levels, acid rain would continue to be a problem.

Finally, the administrative oversight required for the system should be minimal so that trading can occur without significant transaction costs.[100] The acid rain program involves a manageable number of large facilities. Many have already developed trading relationships through the sale of surplus power supply. But other applications, such as a trading system for smog-causing VOC emissions, would involve a sizable and diverse array of large, medium, and small sources. The administrative oversight required for such a program would likely be substantial.[101]

Given these practical limitations, allowance trading under the Clean Water Act may be appropriate only for conventional water pollutants. For example, it might be possible to create a trading system involving wasteload allocations of conventional pollutants among point and non-point sources in a particular water basin. However, because it is difficult to measure pollution from non-point sources, discharge calculations would have to depend on rough estimates.

Allowance trading of conventional pollutants could be explored in a pilot program in a state where EPA administers the NPDES program. The agency could also provide

---

100. A good example of this was the lead trading program, which involved self-monitoring and reporting by gasoline refineries. There was little day-to-day oversight by EPA. Refineries were required to account for their lead trading in quarterly reports to the agency. The minimal administrative requirements and transaction costs involved in lead trading played a significant role in the program's success. *See* Hahn & Hester, *Marketable Permits: Lessons for Theory and Practice*, 16 Ecology L.Q. at 390.

101. This problem also limits the usefulness of allowance trading among RCRA-regulated generators. In October 1990, the agency called for comments on the possibility of instituting an allowance trading system in this context. *See* EPA, Waste Minimization Incentives, Notice and Request for Comment on Desirable and Feasible Incentives to Reduce or Eliminate the Generation of Hazardous Waste, 55 Fed. Reg. 40881, 40885 (Oct. 5, 1990) ("Can long term incentives that have been put in place for other medium programs, such as marketable rights for air emissions, be modified in a way that provides incentives for hazardous waste reduction?"). A review of the public comments submitted in response to this notice reveals strong opposition to the idea of allowance trading among RCRA generators, primarily because of the administrative oversight required. As one commenter put it, development of the trading program would be "an administrative nightmare."

special funds to encourage other states to institute such a program. One program already in place is the Dillon Reservoir, Colorado, trading system for point and non-point sources of phosphorus.[102] Still in its early stages, this program might reveal lessons for programs in other states. EPA could undertake a research project to study the Dillon Reservoir system, and assess its possible application in other settings.

C. Government Procurement

Government procurement can create an incentive for pollution prevention. A precedent for using procurement incentives already exists under RCRA, although it is designed to promote recycling rather than prevention. RCRA section 6002 directs EPA to develop guidelines specifying items that can be produced using recycled materials, and recommending practices for their procurement. In purchasing the items listed in the guidelines, all federal agencies must select the items having the "highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition . . . ." Agencies are required to develop their own procurement programs based either on mandatory recovered materials standards or case-by-case

---

102. For a description of the Dillon Reservoir program, as well as a less successful trading effort among point source dischargers into Wisconsin's Fox River, see Hahn & Hester, *Marketable Permits: Lessons From Theory and Practice*, 16 Ecology L.Q. 361 (1989).

determinations.[103]

EPA may have an opportunity to promote pollution prevention more directly by revising its current procurement policy. The Federal Acquisition Regulations (FAR) establish the parameters of the procurement policies of all federal agencies.[104] Agencies may issue their own regulations implementing or supplementing the FAR,[105] or they may be granted a "deviation" from the FAR "when necessary to meet the specific needs and requirements of each agency."[106] Subchapter D of the FAR sets forth policies concerning "socioeconomic" matters, including small business concerns, areas of heavy unemployment, and environmental issues.[107] Part 26 of Subchapter D, entitled "other socioeconomic programs," has been left intentionally blank. It was "created to facilitate promulgation of additional agency-level socioeconomic coverage which properly falls under FAR

---

103. Implementation of RCRA's procurement policy (responsibility for which is shared between EPA and the Executive Office of Procurement Policy) has been slow. The Senate reauthorization bill, S. 976, would add language stating that the Executive Office of Procurement Policy, in cooperation with EPA, "shall have the affirmative duty and responsibility to implement the requirements of this section and the national policy established in section 1003(b), including enforcement of such requirements with respect to procuring agencies." S. 796, § 304(d).

The Sikorsky bill would expand the scope of section 6002 by requiring EPA to develop a procurement policy that "substantially reduces, avoids, or eliminates the acquisition of agency procurement items made with or containing hazardous substances." The agency would also be required to provide recommendations to Congress for a national toxics use reduction procurement policy covering all procuring agencies.

104. The FAR system is codified at 48 C.F.R. Chapter 1.

105. 48 C.F.R. § 1.301.

106. *Id.* § 1.402.

107. Section 23.105 of the FAR states:

> "(a) It is the Government's policy to improve environmental quality. Accordingly, executive agencies shall conduct their acquisition activities in a manner that will result in effective enforcement of the Clean Air Act (the Air Act) and the Clean Water Act (the Water Act).
>
> (b) Except as provided in 23.104, executive agencies shall not enter into, renew, or extend contracts with firms proposing to use facilities listed by EPA (40 CFR part 15) as violating facilities under the Air Act or Water Act."

In addition, Part 23 establishes policies involving energy conservation, the identification of hazardous materials in contracts, the use of recovered materials, and drug-free workplace.

Subchapter D--Socioeconomic Programs, but which neither implements or supplements existing FAR [socioeconomic programs]."[108]

EPA may have the opportunity to establish a pollution prevention procurement policy as an "additional" socioeconomic program under Part 26 of the FAR. Such a policy might target particular purchasing areas where pollution prevention can be especially effective, and provide that the agency would purchase items made with nonhazardous substances whenever possible. The FAR anticipates that agencies will use their procurement policies to advance socioeconomic programs of this nature. This is evident not only from the note accompanying Part 26, which seems to invite the development of procurement policies for "other socioeconomic programs," but also in the following statement in the deviation policy:

> The development and testing of new techniques and methods of acquisition should not be stifled simply because such action would require a FAR deviation. The fact that deviation authority is required should not, of itself, deter agencies in their development and testing of new techniques and acquisition methods.[109]

The development of an effective pollution prevention procurement policy at EPA might persuade other agencies to adopt similar programs, and might spark the creation of a new legislative program by Congress.[110]

---

108. 48 C.F.R. Part 26 (note).

109. *Id.* § 1.402.

110. Congress often uses government procurement to promote social programs and other matters of public interest. *See, e.g.*, FAR subpart 8.7, 48 C.F.R. §§ 8.700-8.715, "Acquisition From the Blind and Other Severely Handicapped" (implementing the Javits-Wagner-O'Day Act, 41 U.S.C. §§ 46-48c).

D. Compliance Extensions

Compliance extensions can provide another opportunity to promote pollution prevention. When faced with a rapidly-approaching compliance deadline, firms may find it easier and safer to implement end-of-pipe treatment technologies than to seek new ways to prevent pollution. Under appropriate circumstances, firms can be persuaded to achieve compliance through source reduction if they are given more lead-in time before the onset of a compliance date. To achieve their intended purpose, however, compliance extensions should not enable regulated firms to delay compliance without actually undertaking pollution prevention. Thus the standards for granting compliance extensions need to be carefully written and enforced.

1. *Compliance Extensions Under Section 301(k) of the Clean Water Act*

Section 301(k) of the Clean Water Act represented one attempt to encourage innovation through compliance extensions. This provision originally extended compliance with BAT to July 1, 1987 for sources that installed innovative production processes or control technologies.[111] The Water Quality Act of 1987 lengthened the availability of the extension to two years following an otherwise applicable compliance date, and made the extension applicable to BCT as well as to BAT.[112] However, because compliance with

---

111. To receive the extension, an innovative technology had to have the potential for industry-wide application. If it involved a production process, the technology also had to result in significantly greater effluent reductions than otherwise required. If it involved a control technique, the technology had to either achieve a significantly greater effluent reduction than otherwise required, or achieve BAT at significantly lower costs than the systems identified by EPA as being economically achievable.

112. Water Quality Act of 1987, § 305.

BAT and BCT was required "in no case later March 31, 1989,"[113] any two-year extension would have expired on March 31, 1991, making section 301(k) extensions no longer usable.

During the years it was available, the incentive offered by section 301(k) produced little action from industry.[114] EPA received only a handful of applications for section 301(k) extensions, and few of these were ultimately ever issued. The IPP Project includes a research component examining section 301(k). In conducting this study, EPA has the opportunity to identify why section 301(k) was a disappointment, and to develop a better approach to compliance extensions.[115]

2. *Compliance Extensions for Newly-Listed Wastes Under RCRA*

EPA has the authority to provide generators of newly-listed wastes with a lengthened period of time to implement source reduction measures before the effective date of required waste management obligations. The agency sought comments on this approach in October 1990,[116] noting that compliance deadlines for newly-listed wastes

---

113. § 301(b).

114. *See* EPA, *Report and Recommendations of the Technology Innovation and Economics Committee -- Permitting and Compliance Policy: Barriers to U.S. Environmental Technology Innovation* 57 (January 1991).

115. The reasons behind section 301(k)'s failings may have included a lack of knowledge by industry that the compliance extension was available, the fact that the showing required by section 301(k) -- a "significant" reduction in discharge levels or costs -- may have been seen as difficult to establish, and the fact that any innovative technology had to have the potential for use on a national scale.

One conceivable change would be to reward a compliance extension to sources that implement preventive technologies without requiring the technique to have national application. If a compliance extension can persuade sources to implement facility-specific pollution prevention measures, then the incentive will have "worked."

116. *See* EPA, Waste Minimization Incentives, Notice and Request for Comment on Desirable and Feasible Incentives to Reduce or Eliminate the Generation of Hazardous Waste, 55 Fed. Reg. 40881, 40885 (Oct. 5, 1990).

may limit the choices available to regulated facilities. A number of commenters reacted favorably to this approach. For example, a state environmental protection agency suggested that EPA could create two separate compliance schedules, one for waste minimization and one for waste management. The agency noted, however, that EPA would need to ensure that companies who opted for the lengthened compliance schedule would actually implement waste minimization measures. It suggested that enforcement penalties could be assessed against generators who used the extension improperly.[117]

---

117. The state agency wrote:
"The difficulty in encouraging incentives is to balance minimization considerations with management and compliance concerns. The [state agency] believes the establishment of split time frames for compliance, i.e., one for waste minimization and one for waste management, is one possible option. Recognizing that implementation of waste minimization options can be more capital intensive than the mere purchase of waste management services merits consideration of delaying the compliance time frame for businesses wishing to pursue the waste minimization option. In order to ensure that businesses did not take advantage of the later compliance date with no real intent to implement waste minimization options, enforcement penalties could be assessed for those generators who falsely choose to use the later implementation date."

CHAPTER 4

INFORMATION MANAGEMENT AND OUTREACH

A. Measuring Progress

Data that measure progress in pollution prevention are indispensable to effective policy making. The Pollution Prevention Act of 1990 requires EPA to establish standard methods of measuring source reduction, and to "identify, where appropriate, measurable goals which reflect the policy of this Act, the tasks necessary to achieve the goals, dates at which the principal tasks are to be accomplished, required resources, organizational responsibilities, and the means by which progress in meeting the goals will be measured . . . ."[118] The act requires the agency to submit periodic reports to Congress on its implementation of this directive. The first report is due in 1992.

RCRA's biennial reporting system provides an opportunity to measure progress in pollution prevention. As noted in Chapter 1, HSWA directed EPA to use biennial reporting as a means for collecting information on generators' efforts to minimize waste. The statute requires generators to provide two critical pieces of information: the efforts undertaken during the previous year to reduce the volume and toxicity of waste generated, and the changes in volume and toxicity of waste actually achieved.[119]

---

118. Pollution Prevention Act of 1990, § 4(b)(6).

119. § 3002(a)(6).

The 1985 biennial report was the first to request this information. The instructions given to generators were minimal, however. They provided in full:

> Describe in the space provided your efforts, undertaken during calendar year 1985, to reduce the volume and toxicity of the hazardous waste which your business generates. Also describe changes in waste volume and toxicity actually achieved during 1985 in comparison to previous years, to the extent possible.[120]

The agency did not provide any additional guidance to generators. According to a 1986 OTA report, one EPA official advised generators who called the agency that responding with the statement "I have no waste minimization program" would satisfy the reporting obligation, since the statutory language did not actually *require* generators to have such a program.[121]

EPA substantially revised the waste minimization report for the 1987 biennial cycle. The agency developed a two-part waste minimization form (Form WM), and provided detailed accompanying instructions. Part I of Form WM consisted of ten questions about efforts undertaken to implement a waste minimization program.[122] Part II of the form required generators to document the actual reduction of individual hazardous wastes achieved during the previous year. Instead of narrative descriptions, the form used fill-in-the-blank questions requesting specific information. EPA revised

---

120. U.S. EPA, *Hazardous Waste Generator Report for 1985.*

121. *See* OTA, *Serious Reduction of Hazardous Waste* at 165.

122. The instructions defined "waste minimization" to include both source reduction and recycling which resulted in reductions in the volume or toxicity of hazardous wastes produced. "Source reduction" and "recycling" were also defined. *See* EPA, *1987 Hazardous Waste Generation and Shipment Report Instructions (Package A)* 25 (revised Dec. 1987).

form WM in several respects for the 1989 biennial cycle.[123]

The agency can further improve biennial reporting so that it better measures pollution prevention.[124] First, the report can be modified to request data about the concentration and toxicity of the hazardous wastes reported. This information is important. The removal of nonhazardous constituents from a waste may appear to result in pollution prevention -- by lowering the quantity of waste reported -- but it can actually render the waste more hazardous by concentrating its toxic constituents. The 1987 biennial form requested only that generators indicate whether their waste minimization efforts increased or decreased the toxicity of their wastes.[125] The toxicity question was removed entirely from the 1989 form.

Second, the report can request more specific information about production levels and processes.[126] Pollution prevention numbers can be misleading without good production data, since the volume of waste generated will rise and fall with production levels independent of source reduction efforts. What might appear to be a reduction

---

123. *See* EPA, *1989 Waste Minimization Report Instructions and Forms* (revised Nov. 1989). The agency shifted some of the information reported in Part I of the 1987 Form WM to the Identification and Certification Form (Form IC), deleted some items, and consolidated the rest in a single, revised Form WM.

124. Problems with RCRA's biennial reporting system have been noted by the agency, *see* EPA, *The Nation's Hazardous Waste Management Program at a Crossroads: The RCRA Implementation Study* 97-100 (July 1990), and by others, *see, e.g.*, GAO, *Hazardous Waste: Data Management Problems Delay EPA's Assessment of Minimization Efforts* (June 1991); GAO, *Hazardous Waste: EPA's Generation and Management Data Need Further Improvement* (Feb. 1990); OTA, *Serious Reduction in Hazardous Waste* 113-141.

125. This information was reduced to a single-digit code number, indicating changes such as "decrease in the concentration of hazardous constituents in a fixed quantity of the wastes" and "substitution of less hazardous constituents in the waste." *See 1987 Biennial Reporting Instructions* at 31.

126. The importance of production data was highlighted by many of the participants of ELI's 1990 Enforcement Colloquium. *See* Individual Response Questionnaires, Session on Measures, ELI Colloquium on Federal-State Relations in Environmental Enforcement (Nov. 1990) (on file with ELI).

attributable to pollution prevention might actually reflect a drop in production. Form WM requests generators to calculate an "activity/production index" (a single numerical ratio intended to compare production levels between the reporting year and the previous year),[127] but it does not request product- or process-specific information. A single raw production ratio will not accurately account for production shifts among different products. This is a problem because some products and processes generate more hazardous waste than others. Even if a generator's *aggregate* production level drops, its waste numbers might stay the same or increase depending on the particular mix of products and processes involved.[128]

Third, small-quantity generators (SQGs) could be required to submit waste minimization reports. SQGs were brought into the RCRA system by HSWA. They are required to comply with the certification provisions of the waste minimization program, but they are not required to complete the biennial waste minimization form. Although individually small, SQGs may collectively be responsible for a sizable portion of the nation's hazardous waste. SQGs, moreover, are less likely to implement plant-wide pollution prevention measures than large-quantity generators; and they are more likely

---

127. Providing this information is not mandatory, however. The instructions state that "EPA understands that some sites may find it impractical or impossible to create a meaningful activity/production index. If it is not possible to calculate an activity/production index for your site, enter 'NA.'" EPA, *1989 Biennial Reporting Instructions* at 15.

128. GAO's June 1991 report highlights this problem:
> "[A] generator in the semiconductor industry in Texas told us that it operates over 100 waste-generating activities and has a rapidly changing mix of products. Under the biennial reporting system, this generator is required to report data on its total waste but not on the products it makes, even though manufacturing different products can result in substantially different quantities of hazardous wastes. Without information on the products produced, EPA cannot identify whether and how much waste generation reductions were due to minimization activities or to product changes." GAO, *Data Management Problems Delay EPA's Assessment of Minimization Efforts* at 27.

to use land disposal. Waste minimization reporting that includes only large-quantity generators may lead to an incomplete and inaccurate picture of national pollution prevention trends.

Finally, EPA can integrate biennial reporting information with Toxic Release Inventory (TRI) data. The TRI system requires manufacturers to submit annual reports to EPA covering more than 300 chemicals.[129] The Pollution Prevention Act added to the TRI obligations. It requires TRI reporters to include a source reduction and recycling report for the previous year in each annual filing.[130] The report must include -- on a facility-by-facility and chemical-by-chemical basis -- data on the quantity of chemicals entering any waste stream prior to recycling, treatment, or disposal, as well as information about source reduction practices with respect to each of those chemicals, production levels, and techniques used to identify source reduction opportunities.[131] An integrated TRI/biennial report data base would measure pollution prevention more effectively than either system standing alone. EPA's *RCRA Implementation Study* recommends such an integration. The study states that integrating the two systems would be possible "if senior managers in both the RCRA and toxic substances programs agree it is a high priority."[132]

All of these measures can be implemented without statutory amendment. EPA

---

129. The TRI system was established by section 313 of the Superfund Amendments and Reauthorization Act of 1986 (SARA).

130. Pollution Prevention Act of 1990, § 7.

131. *Id.* § 7(b).

132. *RCRA Implementation Study* at 100.

can revise the biennial reporting form to track pollution prevention more effectively. It can require product-specific production and constituent information. It can account for toxicity. It can bring SQGs into the waste minimization reporting system. And it can develop an integrated pollution prevention data base that includes both biennial reporting information and TRI data.

B. Publicizing Performance

Another opportunity to promote pollution prevention is to publicize the performance of specific firms or industrial sectors. A basic principle of modern environmental policy is that people have the right to know about the toxic chemicals used in their communities. This principle formed the basis for the law that created TRI, and it accords with deeply-rooted tenets of American democracy. Knowledge empowers individuals to use the tools of free-market society -- including legal mechanisms, political processes, and the power of consumer choice -- to advance their commitment to a clean environment.

Polls continually demonstrate that a significant majority of Americans are committed to promoting environmental quality. Unfortunately, a void has developed between the tools available for advancing this commitment on a personal level (i.e., recycling and yard composting) and the tools designed to do the lion's share of the work (complex environmental legislation administered by harried agencies and mediated by behind-the-scenes interest group bargaining on both sides).

Informational systems like TRI hold the promise of helping to bridge this gap. Industry's response to TRI suggests that publicity can exert an enormous power in forcing change. Several major chemical manufacturers announced voluntary cuts in toxic chemical use soon after TRI went into effect.

EPA has an opportunity to tap into this power. In addition to its congressionally-mandated activities, the agency can use TRI data to publicize specific successes and failures. EPA already uses TRI data in publications such as *Toxics in the Community.*[133] Yet the agency can more specifically identify firms that have risen above their peers in implementing source reduction measures, and it can throw the spotlight on those who continue to lag behind. While environmental advocacy groups often use TRI in this manner, the message would gain substantial credibility and force coming from EPA. Using targeted publicity is well within the agency's mission.[134] It would not thrust EPA into an improper role, but would simply restate the findings of a congressionally-mandated reporting effort. Such publicity can operate as a strong inducement for pollution prevention.

A formal awards program for pollution prevention could also be established. As suggested in a recent article on the subject,[135] EPA could model a pollution prevention award on OSHA's "Voluntary Protection Program," under which OSHA accords "Star"

---

133. *See* EPA, *Toxics in the Community: National and Local Perspectives*, EPA 560/4-90-017 (Sept. 1990).

134. For example, the Office of Enforcement has made a serious attempt to publicize the results of its activities, both in aggregate and in individual cases.

135. *See* Pendergrass & Pendergrass, *Beyond Compliance: A Call for EPA Recognition of Voluntary Efforts to Reduce Pollution*, 21 ELR 10305 (June 1991).

status to firms that satisfy specified worker safety criteria. EPA could create a similar award to recognize pollution prevention efforts that are particularly innovative and successful.[136] In addition, the agency could award a special pollution prevention "certification" to firms with a demonstrated record of success in pollution prevention.[137]

The authority for establishing a pollution prevention award could derive from the agency's general powers, since the program would not impose any specific regulatory obligations, or from provisions of existing statutes. The Clean Water Act, for example, authorizes the creation of a program to recognize firms that have "demonstrated an outstanding technological achievement or an innovative process, method, or device in their waste treatment and pollution abatement programs."[138] EPA is to "award a certificate or plaque of suitable design" to worthy recipients.[139]

---

136. The authors of the article note:
"A program that encourages regulated entities to prevent pollution by publicly recognizing those that are successful can have a wider impact that the improvements at specific sites. EPA can point to recognized sites as models of how facilities should be operated to avoid environmental degradation. When the facilities publicize their recognition, other facilities will be stimulated to compete with the Star facilities for the attendant positive publicity. This is likely to be particularly effective in an era when consumers are actively attempting to make environmentally sound choices in the market." *Id.* at 10307.

137. In response to EPA's October 1990 request for comments on waste minimization incentives, one commenter suggested:
"Another type of incentive would be the establishment of 'certified pollution prevention facilities,' analogous to certified organic farmers programs. Facilities would have to demonstrate over a period of time that they established and implemented pollution prevention practices that meet certain criteria. An inspection by a team of "certified environmental assessors" would determine if the facility qualifies for the designation. As the public demands for more environmentally-responsible products and facilities increases, the incentive for industries to acquire this certification should increase as well."

138. § 501(e)(1).

139. § 501(e)(2). One observer has noted:
"Surely the reader (like this writer) is consumed by curiosity to find out who has won a 'certificate or plaque of suitable design' and for what heroic deeds of water pollution control. One of the trials of contemporary legal research is that the grand performances (or perhaps failed attempts to achieve them) are virtually out of reach while the trivial and the ordinary
(continued...)

C. Providing Technical Assistance

EPA has made substantial efforts to provide technical assistance to firms interested in pollution prevention. The agency publishes brochures, videos, and a newsletter on pollution prevention,[140] and has developed guidance documents advising firms how to institute a waste minimization program.[141] It has created an information center -- the Pollution Prevention Information Clearinghouse -- which is accessible through a personal computer modem or a toll-free telephone hotline. It has also provided support for a number of state technical assistance programs. In addition, the agency recently established a program under which firms are encouraged to reduce, on a voluntary basis, aggregate releases of 17 toxic chemicals by 33 per cent by the end of 1992 and 50 per cent by the end of 1995.[142]

EPA can continue to provide technical assistance, particularly with regard to source reduction techniques in specific industrial processes. For example, an EPA guidance document, *Waste Minimization in Metal Parts Cleaning*,[143] provides detailed descriptions of various approaches and technologies for reducing releases from solvent-

---

139.(...continued)
clamor for recognition in the case reports."
2 W. Rodgers, *Environmental Law* at 26.

140. *See, e.g.*, EPA, *Waste Minimization: Environmental Quality with Economic Benefits*, EPA/530-SW-90-044 (2d ed. April 1990); EPA, *Less is More: Pollution Prevention is Good Business* (Video available through Pollution Prevention Information Clearinghouse).

141. *See, e.g.*, Draft Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program, 54 Fed. Reg. 25056 (June 12, 1989); EPA, *Waste Minimization Opportunity Assessments Manual*, EPA 600/2-88/025 (April 1988).

142. The details of this "33/50" program are explained in EPA, *Pollution Prevention Strategy* at 33-44.

143. EPA/530-SW-89-049 (August 1989).

and water-based cleaning methods. EPA can use its information-gathering authorities to gain more and better information about specific pollution prevention techniques. Under the Clean Water Act, for example, EPA can use the information gathered during the development of effluent guidelines to learn more about pollution prevention techniques.[144]

D. Driving Research and Development

EPA research and development policies can influence the direction of research in the private and academic sectors, helping to drive science and industry in the right direction --toward the development of long-range solutions to the problem of maintaining a thriving economy and a high standard of living with limited environmental resources. The agency has developed a Pollution Prevention Research Plan,[145] and has a number of current research initiatives. These include the "Waste Reduction Innovative Technology Evaluation Program" (WRITE), a cooperative agreement with California, Connecticut, Illinois, Minnesota, New Jersey, and Washington to study waste reduction technologies having industry-wide application, and the "Waste Reduction Assessments

144. The Senate reauthorization bill, S. 1081, would make the gathering of such information easier and less costly. The bill would require EPA to charge a fee to cover the costs of developing effluent guidelines and pretreatment standards. S. 1081, § 7(f). EPA would be authorized to reduce the fee if a source allows the agency "such access to such source as will facilitate the full and effective development of the guideline or standard . . . ." *Id.* § 7(f)(5). The amount of the reduction would be made up by proportionally increasing the fees paid by the other sources in the category. *Id.* This provision of the bill would give sources an incentive to provide information to and cooperate with the agency during the development of effluent guidelines. The bill also provides that any information request in the development of effluent guidelines shall not be "subject to any review, modification or other requirement established by any other provision of law or by a requirement of any other department, agency or instrumentality of the Executive Branch." *Id.* § 7(g).

145. EPA, *Pollution Prevention Research Plan: Report to Congress*, EPA/600/9-90/015 (Mar. 1990).

Program" (WRAP), designed to promote industrial waste reduction assessments.[146]

EPA has the latitude to direct an even greater portion of its research efforts toward pollution prevention. It has the power to do so under its general authority to establish research priorities, and under the R&D provisions of specific statutes. Section 104(a) of the Clean Water Act, for example, authorizes research "relating to the causes, effects, extent, *prevention, reduction, and elimination* of pollution."[147] RCRA provides similar authority under subchapter VII of the statute. Under these provisions, the agency has the discretion to establish pollution prevention as a top priority for grant-making.

146. *See id.* 1-17 - 1-18.

147. § 104(a) (emphasis added).

CONCLUSION

Existing statutes provide EPA with substantial (and still largely untapped) authority to promote industrial pollution prevention using a variety of regulatory methods. Through direct regulatory action, the agency can ban the discharge of toxic water pollutants, make pollution prevention plans an integral part of facility permitting, and use enforcement settlements to require source reduction. In setting standards, the agency can base effluent guidelines and RCRA technology-based land disposal restrictions on pollution prevention technologies. Using economic and regulatory incentives, the agency can create new inducements for pollution prevention. And in improving its information management, the agency can establish concrete goals for pollution prevention, measure progress in attaining them, and use the power of publicity to leverage pollution prevention.

The barriers to a dynamic pollution prevention program are not statutory in origin. As demonstrated by this report's examination of the Clean Water Act and RCRA, existing statutes provide more than adequate authority to promote industrial pollution prevention boldly, vigorously, and without delay.

The opportunity exists for EPA to become the leader of a nationwide effort to promote and implement industrial pollution prevention. While encouraging voluntary measures by industry is important, the agency can move beyond this exhortative approach. There is a basis to begin building a pollution prevention program based on solid regulatory action. The tools are clearly there.