Selected Reading Material

These documents were determined to be some of the key documents in the field related to pollution prevention. They are provided as background materials to save faculty the time of locating them in the library.
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Articles

- Scott W. Clearwater & Joanne M. Scanlon, *Legal Incentives for Minimizing Waste*, 10 ENVTL. PROGRESS, Aug. 1991, at 169.
- Lynn E. Grayson, *The Pollution Prevention Act of 1990: Emergence of a New Environmental Policy*, 22 Envtl. L. Rep. (Envtl. L. Inst.) 10,392 (1992).
- Lakshman Guruswamy, *Integrated Thoughtways: Re-Opening of the Environmental Mind?* 1989 WIS. L. REV. 463.
- Stephen M. Johnson, *From Reaction to Proaction: The 1990 Pollution Prevention Act*, 17 COLUM. J. ENVTL. L. 153 (1992).

Statutes

- Connecticut Environmental Assistance to Business Act, Conn. Gen. Stat. Ann. App. Pamphlet, PA 91-376 (1992). Voluntary state statute.
- Massachusetts Toxics Use Reduction Act, Mass. Ann. Laws Ch. 211 Sec. 1-23 (Law. Co-op Supp. 1992). Mandatory state statute.
- Pollution Prevention Act of 1990, 42 U.S.C. Sec. 13101-13109. The federal statute.

Legal Incentives for Minimizing Waste

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Waste minimization, or pollution prevention, has become an integral component of federal and state environmental regulation. Minimizing waste offers many economic and public relations benefits. In addition, waste minimization efforts can also dramatically reduce potential criminal requirements. This paper addresses the legal incentives for minimizing waste under current and proposed environmental laws and regulations.

INTRODUCTION

Waste minimization, or pollution prevention, has become a popular phrase in today's age of increased environmental regulation and potential liability. The U.S. Environmental Protection Agency (EPA) estimates that $120 billion is spent annually "to treat or contain wastes once they are generated" [1]. Further, the agency states that hazardous waste treatment and disposal costs have risen as much as 300 percent over the past decade due to the ban on land disposal of hazardous waste, minimum technology requirements for hazardous waste units, and limited treatment and disposal capacity [2]. *Ibid.*

Through waste minimization and pollution prevention, EPA anticipates that industrial facilitates can save money on waste management, reduce the use of raw materials, and minimize potential environmental liability [2]. Despite these incentives to minimize waste, corporations are often reluctant to commence waste minimization programs prior to being forced to do so by federal or state government, and incurring substantial criminal and civil penalties. Potential toxic tort and Superfund liabilities can also be substantial.

Legal incentives for waste minimization exist under all major environmental laws, including the Resource Conservation and Recovery Act (RCRA), the Clean Air Act, the Clean Water Act, and Superfund. Moreover, under each of these statutes, there is always the threat of federal, state, and private citizen enforcement actions, as well as potential criminal liability. Penalties under these laws can amount to as much as $25,000 per day for each violation. Needless to say, such penalties can easily result in the assessment of multimillion dollar fines against a company. Furthermore, mandatory jail time has become a stark (and increasingly common) reality for environmental crimes.

As a result of increased environmental liability, companies must reevaluate past waste disposal practices and devise innovative solutions to recover and recycle materials that were previously released or disposed to air, land, or water.

Discussion

Waste Minimization: An Historical Perspective

Waste minimization and pollution prevention have recently captured the attention of EPA and the public. As President Bush announced in October, 1990:

> *Environmental programs that focus on the end of the pipe or the top of the stack, on cleaning up after the damage is done, are no longer adequate. We need new policies, technologies, and processes that prevent or minimize pollution—that stop it from being created in the first place* [4].

As defined by EPA, waste minimization is:

> *The reduction, to the extent feasible, of hazardous waste that is generated prior to treatment storage or disposal of the waste stored or disposed of. It is defined as any source reduction or recycling activity that results in either (1) reduction of total volume or of hazardous waste; (2) reduction of toxicity of hazardous waste; or (3) both, as long as that reduction is consistent with the general goal of minimizing present and future threats to human health and the environment* [5].

With President Bush's recent "mandate" in place, EPA is now attempting to move to the forefront of the waste minimization and pollution prevention arena. However, waste minimization goals have been around for a number of years.

Waste minimization was first introduced as a national policy in the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA. Despite this professed waste minimization policy, however, only a few regulations force industry to minimize waste.

RCRA provides a prime example of the absence of mandatory waste minimization provisions. HSWA endorses a waste

minimization policy and, in that spirit, requires hazardous waste generators to have programs in place to reduce the volume and toxicity of their waste to the degree economically feasible, and to minimize present and future threats to human health and the environment from treatment, storage, and disposal methods. However, under this provision it is within a company's discretion to determine what level of waste minimization is "economically feasible." In fact, EPA recognizes that this term "is to be defined and determined by the generator and is not subject to subsequent reevaluation by EPA" [6]. Thus, the generator has the flexibility to determine what is economically practical for the generator's circumstances and there is no real mechanism to enforce compliance with RCRA's waste minimization goal [7]. *Ibid.*

In addition to implementing waste minimization programs, RCRA § 3002 (a) (6) requires hazardous waste generators to identify in their biennial reports to EPA (or the State): (1) the efforts undertaken during the year to reduce the volume and toxicity of waste generated; and (2) the changes in volume and toxicity actually achieved in comparison with previous years, to the extent such information is available. Once again, no direct incentives are provided in RCRA to force waste minimization efforts.

Finally, HSWA's land ban had the indirect effect of forcing waste minimization. Specifically, HSWA prohibited land disposal of hazardous wastes that do not meet a specified treatment standard using the best demonstrated available technology. This ban on land disposal caused generators to analyze methods for reducing the volume and/or toxicity of the hazardous waste generated. EPA's recent regulations governing the burning of hazardous waste in boilers and industrial furnaces may have this same indirect effect of minimizing waste [8].

Waste Minimization: Today's Incentives

Although there are few direct regulatory incentives for waste minimization, today's climate of increased criminal and civil liability should encourage a corporate pollution prevention philosophy. If the threat of jail time does not provide a sufficient incentive for minimizing waste, substantial fines, as well as Superfund and toxic tort liability, will attract a corporations's attention.

Criminal Liability

Throughout the eight-year existence of the U.S. Department of Justice's Environmental and National Resources Division, criminal prosecutions for environmental crimes have increased sharply. In all, the Division has successfully sought indictments of 703 defendents — 222 corporations and 481 individuals. A total of 581 convictions resulted — 163 corporations and 354 individuals. Fines alone amounted to over $56 million. Particularly eye-opening is the fact that under federal sentencing guidelines, persons convicted of illegally storing or transporting hazardous wastes will, in most cases, be subject to mandatory prison terms.

Fiscal year 1990 was a record year for criminal enforcement actions. During 1990, EPA referred 375 civil cases and 65 criminal cases to the Justice Department. The Justice Department returned 134 indictments in FY 1990 and achieved a 95 percent conviction rate. More than three quarters of these indictments were against corporations and their top officers. Moreover, in 1990 courts sentenced environmental violators to a total of 745 months in prison, which was reduced to 222 months after suspension of sentences. According to the Justice Department, more than half of the individuals convicted last year for environmental crimes were given prison sentences, with about three quarters of those persons serving jail time, which averaged more than a year. Aside from prison sentences, the Justice Department estimates that fines imposed for environmental crimes rose to a record $30 million in FY 1990, up from $12.7 million in FY 1989 [9].

The following provide a few examples of this dramatic trend in criminal enforcement for environmental violations:

1. The president of a California hazardous waste management company was sentenced December 3, 1990 to six months in jail and fined $28,000 for illegally storing and transporting hazardous waste in violation of RCRA [10].
2. In a Clean Water Act criminal case, a Massachusetts metal finishing company president was sentenced November 11, 1990 to serve 26 months in prison, placed on two years probation, and ordered to pay a $400,000 fine. His company was fined $50,000 and ordered to pay insurance premiums for two employees exposed to toxic levels of nitric acid, nitrogen dioxide, and nickel. Both the president and the company were convicted in May 1990 of illegally discharging nickel plating wastes and nitric acid from the company's metal finishing operations to the public sewer system [11].
3. On November 16, 1990 the Weyerhaeuser Company pleaded guilty to criminal charges and agreed to pay $500,000 for discharging paint wastes and wash water into a river in violation of the Clean Water Act [12].
4. On November 5, 1990, a Kentucky company and its president were indicted on eleven counts of violating the Safe Drinking Water Act. They were charged with willfully constructing and operating five underground injection wells to inject fluids into an underground drinking water source without obtaining a permit. If found guilty, the president faces a maximum jail sentence of 35 years and a $2.75 million penalty. The company could be fined up to $5.5 million [13].

Civil Liability

In addition to the record criminal prosecution during FY 1990, the Justice Department had the largest ever total civil penalty assessments, amounting to $32 million, with the largest single civil penalty being assessed against Texas Eastern Pipeline Company, which was fined $15 million.

Under most environmental statutes, civil penalties can be assessed up to $25,000 per day per violation. EPA is making a concerted effort to increase civil penalties. Penalties should be sufficient to reflect the gravity of past violations, deter noncompliance, and eliminate economic incentives to violate the law. The following represent some cases studies of both litigated and settled environmental cases brought by both government and private citizens:

1. Public Interest Research Group of New Jersey (NJPIRG) filed a Clean Water Act citizen suit against Powell Duffryn Terminals, a bulk chemical storage facility, in 1984. After 5 years of litigation, the federal district court assessed a record $3.2 million dollar penalty. The court concluded that the maximum penalty that could be assessed against Powell Duffryn was $4.2 million, but because the State had aquiesced in Powell Duffryn's noncompliance, the court reduced that maximum amount by $1 million. On appeal, the Third Circuit held that the district court's $1 million reduction was improper—in other words, even if the State agrees that a facility is doing the best that it can in controlling pollution, if a permit is violated, no reliance can be made on state nonfeasance [14].
2. In a RCRA action, a citizen's group intervened in an action brought by EPA, claiming that Environmental Waste Control's (EWC) operation of a hazardous waste landfill violated several aspects of RCRA. After concluding that the company was liable because it had vi-

ated the statue, the court calculated a maximum nalty of over $60 million. Finding this amount to be cessive, however, the court reduced the penalty to 778,000. The court also issued an injunction permanently closing the landfill, a remedy which the citin's group, not EPA, had sought [15].

Exxon recently settled a Clean Water Act citizen suit leging violations of Exxon's wastewater discharge per- at the Company's Bayonne, New Jersey facility. In s case, two citizen groups provided Exxon with 60 ys' notice of their intent to file a Clean Water Act izen suit. During that 60-day period, Exxon installed granulated activated carbon unit, which greatly imoved Exxon's discharge. Despite Exxon's good faith empts to minimize pollutants in its wastewater disarge, the citizen groups filed suit. Under the terms of e settlement agreement, Exxon agreed to invest 845,000 for environmentally beneficial mitigation ojects at the Bayonne facility. In this connection, xxon agreed to spend $1,850,000 to install dome roofs fifteen petroleum product storage tanks and to spend 95,000 for the design and implementation of a petroum product collection system at the facility's barge r to allow further recovery of petroleum products m the facility's wastewater collection system [16].

a sense, the Exxon settlement agreement was a "winn" situation. On the other hand, the citizen suit reited in minimization of waste discharged to the watery. In addition, without admitting liability, Exxon reed to fund environmentally beneficial mitigation ojects, instead of risking substantial civil penalties.

ter almost 6 years of litigation, Union Oil of Calirnia recently agreed to a settlement in a Clean Water t case with the Sierra Club and the State of California quiring Union Oil to make payments totaling 550,000. Attorney's fees alone amounted to $1.25 illion [17].

St also becoming more active:

e State of Washington recently fined a solvent reling firm over $900,000. Alleged violations included ling fuel containing hazardous waste, hazardous waste lls resulting in soil and groundwater contamination, eeding waste storage capacity, failing to report waste eived, improper labelling of waste containers, storing mmable waste in violation of fire codes, and improper ployee training and spill prevention plans [18].

e Monsanto Co. recently agreed to pay a $1 million nalty for illegally disposing untreated wastewater conning hydrochloric acid. The company was also di-ted to pay an additional $200,000 to a state trust fund].

Kentucky, Ashland Petroleum Co. agreed in Novem- 1990 to pay a $750,000 penalty and construct adional emission control equipment costing $65 million settle claims the company violated state air quality ulations at its Catlettsburg, Kentucky refinery. The million investment includes $15 million to construct electrostatic precipitator to reduce emissions from refinery's catalytic cracking unit and a $47 million er recovery unit to enhance the refinery's ability to imize sulfur dioxide emissions [20].

Tox ort Liability

Li y resulting from toxic tort claims can also be substan For example, settlement agreements amounting to over million have been reached between four chemical companies and more than 1200 individuals who claimed injury from dioxin contamination in Times Beach, Missouri [21]. Similarly, in a toxic tort case against Ashland Oil, the jury awarded a $10.3 million judgment to four persons alleging refinery emissions damaged their property and quality of life [22].

Superfund Liability

Superfund costs have also risen dramatically, growing by more than 28 percent in FY 1990. EPA estimates that private companies have agreed to pay $1.3 billion to clean up hazardous waste sites. A total of 151 Superfund cases were filed in 1990, 50 percent more than filed the year before [23]. Also, during FY 1990, EPA referred 79 cases, valued at $185 million, for prosecution to recover agency expenditures. This represents a 30 percent increase over 1989 figures. EPA also issued 131 unilateral administrative orders in FY 1990, up from 100 in 1989 [24].

A few recent examples typify this upward trend. Under a Superfund consent decree filed in federal court in October 1990, a group of 23 companies agreed to pay nearly $3 million for cleaning and monitoring costs at the Lees Cane Landfill Superfund site in Kentucky [25]. Similarly, at Arizona's largest Superfund site, the responsible parties agreed to pay approximately $17.3 million to remove volatile organic compounds from ground water [26]. Finally, to clean up the New Bedford, Massachusetts harbor and for natural resources damages, the Justice Department reached an agreement with three parties requiring them to contribute over $78 million [27].

Minimizing Potential Liability

Because of the threat of significant criminal and civil liability resulting from waste disposal practices, waste minimization incentives are increasing every day.

Statutory Incentives

The Clean Air Act Amendments of 1990. The Clean Air Act Amendments of 1990 provide a significant opportunity for pollution prevention. Specifically, Title III offers credit for early reductions of toxic air emissions and Title IV provides economic incentives for reducing sulfur dioxide and nitrogen oxide emissions. First, under Title III, industrial sources can obtain a six-year extension from compliance with Maximum Achievable Control Technology (MACT) standards if they: (1) achieve reductions of 90 to 95 percent below a baseline year (no earlier than 1987) before such standards are proposed; or (2) enter into enforceable commitments to achieve such reductions by January 1, 1994. Clean Air Act § 112 (i) (5). However, despite this statutory incentive to reduce emissions early, as yet, there are no EPA guidelines on how to establish an appropriate baseline year. Moreover, a source could encounter several problems in establishing an appropriate baseline. First, EPA could contend that the year chosen by the source is not representative of the source's historic emissions. Second, EPA could dispute the methodology that the source used to calculate its emissions. Thus, a source could spend considerable funds attempting to comply with the voluntary reduction provisions only to later have EPA dispute the source's baseline. If EPA prevails, the source could be required to immediately install MACT, even though the source had already drastically reduced emissions. Prior to the issuance of EPA guidance on this issue, it may be advisable to obtain EPA advance approval of the source's baseline emissions.

Emission reductions also exist under Section 112 (i) (6) of the Clean Air Act, as amended. That section provides that if an existing source has installed Best Available Control Technology (BACT) (to comply with Prevention of Significant Deterioration Requirements) or Lowest Achievable Emission Rate

(LAER) (to comply with nonattainment new source review) prior to the promulgation of a standard, then that source's compliance date is extended for five years from the date on which BACT or LAER was installed or the reductions achieved. This exemption acknowledges that BACT and LAER result in substantial emission reductions and that immediately requiring any additional reductions would be inequitable. However, like the 6-year extension of Section 112 (i) (5), this exemption may have limited effect since those pollutants regulated by BACT and LAER will only slightly overlap those regulated by the Air Toxics provision.

In addition to Title III's emission reduction incentives, Title IV incorporates a system of marketable allowances for sulfur dioxide (SO_2) and nitrogen oxide (NO_x) emissions. This system allows sources to market their "extra" emissions reductions (that is, reductions beyond those otherwise required) to other sources seeking to emit more than is permitted. Clean Air Act § 403 (b).

Finally, Section 404 (d) allows the owner or operator of an affected unit under Title IV to petition EPA for a two-year extension of Title IV's 1995 SO_2 emissions reduction deadline. To obtain the two-year extension, the unit must either use a qualifying technology, or transfer its emissions reduction obligation to another unit using a qualifying technology. A qualifying technology is a technological system of continuous emissions reduction that achieves a 90 percent reduction in SO_2 emissions. The NO_x emission limitation for these units will also be extended for two years. Clean Air Act § 407 (a).

SARA § 313. EPA considers the Toxic Release Inventory (TRI) established under Section 313 of the Emergency Planning and Community Right-to-Know Act to be the most powerful tool available to EPA at the present time for tracking pollution prevention efforts from industrial sources. The public accountability fostered by the TRI has also created a strong incentive to minimize waste [*28*].

Section 313 requires certain manufacturers to report the amount of each of more than 300 toxic chemicals listed in the Act that are released to the air, land, or water. The reporting requirements, which will expand to cover more than 28,000 facilities nationwide for 1989 data, apply to manufacturing plants that employ at least 10 people and use at least 10,000 pounds or manufacture at least 25,000 pounds of any TRI chemical.

Several states are using the TRI as the basis for a number of legislative efforts. Louisiana has a law mandating 50 percent reduction in toxic air emissions by 1994. Massachusetts and Oregon have enacted similar laws. New Jersey now requires firms to submit with their TRI data additional information about pollution prevention practices. Other states have instituted a fee system based on TRI emissions to provide an economic incentive to reduce emissions.

EPA is also using Section 313 violations to force waste minimization and pollution prevention efforts. For example, EPA Region V announced in December 1990 that two manufacturers agreed to install pollution controls in exchange for reduced fines under Section 313. One company agreed to spend $85,000 to incorporate pesticides automatically into the company's fertilizer product in lieu of a manually operated system. The other company agreed to spend over $45,000 to convert from solvent-based to water-based coatings in its plastics manufacturing operations. For both cases, EPA reduced the proposed penalties from a combined $76,000 to just over $21,000 [*29*].

Pollution Prevention Act of 1990. The Pollution Prevention Act of 1990 requires EPA to develop and implement a strategy to promote pollution prevention. The Act includes provisions directing EPA to set measurable goals, to consider the impact of regulation on source reduction, and to evaluate regulatory and non-regulatory barriers. In addition, the Act amends Section 313 of SARA to require industries to quantify the effect of source reduction, as well as recycling and treatment, in reducing environmental releases of toxic chemicals.

To implement the mandates of the Pollution Prevention Act, EPA is relying on voluntary efforts, which will offer industry the advantage of maximum flexibility, and sufficient time to make economically sound changes in production or use of raw materials [*30*].

EPA's Pollution Prevention Strategy. EPA's recently issued Pollution Prevention Strategy anticipates that "pollution prevention can be the most effective way to reduce risks by reducing or eliminating pollution at its source" [*31*]. In EPA's assessment, waste minimization is often the most cost-effective option because it reduces raw material losses, the need for extensive "end of pipe" pollution control technologies, and long-term liability. Thus, EPA concludes that pollution prevention "offers the unique advantage of harmonizing environmental protection with economic efficiency" [*32*]. *Ibid.*

EPA's Pollution Prevention Strategy identifies two primary goals: (1) investigate and, where possible, eliminate barriers to cost-effective investments in prevention in existing and new regulatory programs; and (2) encourage voluntary actions by industry that reduce the need for EPA to take action.

To institute this program, EPA has devised an Industrial Toxics Project. Specifically, on February 7, 1991, EPA launched a new initiative to prevent toxic chemical pollution [*33*]. EPA's new initiative requests over 600 designated companies to reduce pollution voluntarily to air, water, and land. The Project targets seventeen chemicals from the manufacturing sector and develops focused prevention strategies for them. EPA's goal is to reduce aggregate environmental releases of these targeted chemicals, as measured by the Toxics Release Inventory in 1988, by 33 percent by the end of 1992 and at least 50 percent by the end of 1995. Although participation in the Industrial Toxics Project is voluntary, EPA will work with companies to ensure that any initiative taken to reduce emissions ahead of statutory schedule receives appropriate credit toward complying with any subsequent regulatory requirements. Furthermore, EPA Administrator Reilly has expressed his commitment to develop the incentives necessary to ensure participation in this Project and to assure companies that voluntary compliance will not result in the forfeiture of various allowances under the new Clean Air Act [*34*].

Future Regulatory and Liability Incentives

In addition to requesting voluntary compliance with waste minimization efforts, EPA is expected to continue its increased civil and criminal enforcement efforts. EPA's "Great Lakes Initiative" is representative of the types of environmental lawsuits to come. Under this Initiative, the Justice Department filed three suits in federal district court against three companies alleging violations of the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and RCRA [*35*]. These types of suits test the agency's new multi-media, geographic-based approach to environmental law violations.

Also, on February 22, 1991, EPA and the Justice Department filed eight lawsuits and 20 administrative actions to enforce RCRA's restrictions on land disposal of hazardous waste [*36*]. One of the federal court actions involved a $1.85 million settlement with E. I. DuPont de Nemours Co. [*37*]. DuPont was charged with unlawful disposal of corrosive acids and solvent wastes, as well as waste analysis and recordkeeping violations. To settle the lawsuit, DuPont agreed to audit company facilities nationwide to ensure compliance with RCRA's land ban restrictions.

While civil and criminal liability will continue to increase, EPA has also requested public comments on ways to revise EPA's regulations to better encourage waste minimization and pollution prevention. In this regard, on October 5, 1990, EPA issued a request for comments on the desirability and feasibility of waste minimization incentives [*38*]. EPA requested comments on a number of specific issues, which, if implemented by the agency, could dramatically change the nature of current

waste minimization incentives. The following are a few of the specific questions raised by EPA:

Should EPA consider changing the definition of "solid waste" to promote additional source reduction and recycling? Here, EPA is attempting to respond to criticism that EPA's current permitting process is cumbersome, time-consuming, and carries associated regulatory costs and liabilities.

Should EPA consider marketable waste generation trading rights or other long-term economic incentives to reduce waste generation? [*39*] *Ibid.* In this connection, EPA espouses that it could issue rights to generate a limited quantity or toxicity of hazardous waste. EPA sets forth two variations of this alternative. Under the first variation, a facility, in the first year, would receive transferrable rights for the quantity of waste generated during a base period. The next year the facility would receive rights to generate a smaller percentage (e.g., 5% less) and so on over time. If a facility implemented waste minimization efforts which reduced its need for these rights, it could sell them to other firms. Under the second alternative, EPA would allocate waste generation rights without respect to a facility's individual current waste generation rates. To allocate those rights, EPA would hold auctions with companies which have bought the rights being able to trade them to others if they did not need them [*40*]. *Ibid.*

Should EPA consider waste characterization assessment and listing incentives? One potential long-term option focuses on expanding the data collection and analysis portion of the listing process to require collection and dissemination of source reduction and recycling information for processes that generate the waste [*41*]. *Ibid.* Another approach would be to allow generators to enter into an agreement with EPA that provides time for the generator to identify, design, and install source reduction and recycling technologies that will either significantly reduce or eliminate hazardous waste generated [*42*]. *Ibid.*

Should EPA consider waste minimization incentives in the RCRA Treatment, Storage, and Disposal (TSD) permit process? EPA suggests that the agency could include waste minimization commitments as a condition to permit approval. EPA is also analyzing whether to require permittees to submit a waste minimization facility plan either as a condition for issuing a TSD permit, or as a supplement that must be submitted within a certain time frame (e.g., 150 days) following issuance of a permit. The facility plan would include information on the amount and type of hazardous waste generated, identification of the source of waste by waste stream, an analysis of technically and economically feasible hazardous waste reduction techniques, and a program and schedule for implementing feasible reduction techniques [*43*]. *Ibid.*

Should compliance monitoring and enforcement play a greater role in promoting waste minimization? EPA believes that broadened enforcement efforts could promote pollution prevention beyond that achieved by market forces. Specifically, EPA's enforcement settlement process will be used by the agency to implement pollution prevention strategies by incorporating them into settlement agreements. "For example, settlements could require a company to conduct periodic waste audits or to submit a comprehensive analysis of the effect of waste minimization on its operations, or make specific process changes to minimize waste generation" [*44*]. *Ibid.* EPA expects this policy, to take effect in FY 1991, to be applicable to both administrative actions and civil judicial settlements negotiated in conjunction with the U.S. Department of Justice. Specifically, EPA encourages the inclusion of pollution prevention conditions, as either the means of correcting a violation, or as additional conditions incidental to injunctive relief. Such conditions may offer the best chance of avoiding recurring or future violations, without negative cross-media impacts, provided that technologically and economically feasible options exist. EPA notes, however, that civil penalties will continue to be a mandatory component of the agency's settlement policy [*45*].

Conclusion

In sum, the minimization of waste can have significant benefits. Waste reduction and recycling not only save industry money directly through the reduction in raw material usage, but will also minimize potential environmental criminal and civil liability, as well as future Superfund and toxic tort claims. Industry must reanalyze waste generation and disposal so as to minimize future liability. Waste minimization can be accomplished through raw material substitution, product reformulation, process or equipment modification, improved housekeeping, better management practices, and on-site closed loop recycling [*46*].

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The Pollution Prevention Act of 1990: Emergence of a New Environmental Policy

by E. Lynn Grayson

Editors' Summary: EPA's toxics release inventory (TRI), compiled under §313 of the Emergency Planning and Community Right-to-Know Act (EPCRA), is the most comprehensive national database on toxic chemical emissions. TRI data have helped direct national, state, and local efforts to evaluate patterns in industrial toxic pollution, and have been instrumental in attempts to encourage industrial source reduction, such as EPA's 33/50 initiative, which aims for a 33 percent voluntary reduction of releases and transfers of 17 high-priority TRI chemicals by 1992 and 50 percent by 1995. EPA estimates that in 1989, manufacturing facilities required to report under EPCRA §313 released into the environment or transferred off site 5.7 billion pounds of chemicals. EPA derived these 1989 estimates from data in 81,891 forms that 22,569 facilities submitted to comply with EPCRA §313. Although the TRI fills an information gap on industrial chemical pollution, it covers only the tip of the toxic iceberg. More than 95 percent of all chemical emissions—about 400 billion pounds—goes unreported each year. The TRI's role in promoting and assessing pollution prevention efforts has been accordingly limited.

The Pollution Prevention Act of 1990 broadens the TRI's role in reducing chemical source pollution. The Act makes pollution prevention reporting mandatory by requiring each TRI-regulated facility to file, beginning July 1, 1992, a source reduction and recycling report with its TRI reporting form. This source reduction and recycling report will detail the amount of source reduction achieved for each TRI chemical, as well as the pollution prevention methods employed. This Article examines the Act's new reporting obligations for TRI-regulated industries. The author discusses the reasons behind industry's cautious response to the Act, ranging from implementation costs to mandated process changes and potential enforcement ramifications. Observing that the Act imposes costly, increased reporting burdens on the very businesses from whom EPA hopes to receive support for its pollution prevention objectives, the author concludes that industry's cooperation with the Pollution Prevention Act may depend on obtaining assurances that prevention costs expended today will not result in higher costs from new regulatory mandates tomorrow.

A new environmental policy aimed at preventing toxic chemical pollution was initiated by the Pollution Prevention Act of 1990 (the Act).[1] The new Act's goal is pollution prevention, or in more practical terms, pollution source reduction. Traditional waste management methods are cast aside in favor of a more proactive recycling and waste generation avoidance strategy.

The new law, in theory, addresses an admirable goal: Pollution should be prevented or reduced at the source. Any pollution that cannot be prevented should be recycled in an environmentally safe manner. Disposal or release of waste into the environment is a last resort that should also be conducted in a safe manner.

The reality of complying with the new policy calls into question the prudency of the Act. The new law imposes costly, increased reporting responsibilities on the very businesses from whom the U.S. Environmental Protection Agency (EPA) hopes to receive support for the accomplishment of its pollution prevention objectives. Specifically, the Act requires that regulated entities provide source reduction and recycling information for every toxic chemical reported on the annual toxic chemical release form.[2] EPA's economic analysis estimates that a maximum of 28,000 facilities are expected to submit a maximum of 112,000 reports on toxic chemical releases in 1992.[3] This new compliance cost to industry of reporting pollution prevention information is estimated to be $49.5 million the first year and more than $36 million in all subsequent years.[4]

This Article examines the Act and explains pollution prevention through source reduction. It further discusses and evaluates the new reporting obligations for businesses.

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1. Pub. L. No. 101-508, §§6601-6610, 104 Stat. 1388, 1388-321 to 1388-327 (codified at 42 U.S.C.A. §§13101-13109 (West Supp. 1991)).

2. 42 U.S.C.A. §13106. *See also* Emergency Planning and Community Right-to-Know Act (EPCRA) §313, 42 U.S.C. §11023, ELR STAT. EPCRA 006 (toxic chemical release inventory reporting requirements).

3. 56 Fed. Reg. 48475, 48500 (1991).

4. *Id.*

It also analyzes the possible negative impacts on industry that may not relate to pollution prevention objectives.

Source Reductions and Other Act Mandates

The single most important goal of the EPA pollution prevention program is source reduction.[5] As such, EPA joins industry and environmental leaders in advocating that pollution-related problems be addressed by preventing pollution at its source, whether through changes in production or by reducing reliance on environmentally harmful materials. EPA supports studies that show pollution prevention can be the most effective way to reduce risks by reducing or eliminating pollution at its source; it also is often the most cost-effective option because it reduces raw material losses and the need for expensive "end-of-pipe" technologies, and in some instances may mitigate long-term liabilities. EPA envisions that pollution prevention offers the unique advantage of harmonizing environmental protection with economic efficiency.[6]

Central to the Act is its definition of the term "source reduction," which demonstrates what EPA's enforcement approach will be. Source reduction means any practice that

> (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.[7]

Source reduction does not include any practice that alters the physical, chemical, or biological characteristics, or the volume of a hazardous substance, pollutant, or contaminant through a process or activity that is not integral to producing a product or providing a service.[8] The definition of source reduction makes clear that the Act's focus is on changing and altering industrial activities regarding hazardous substances before recycling, treatment, or disposal.

Source reduction is fundamentally different from traditionally accepted concepts of waste management and pollution control. Source reduction requires that industry evaluate its manufacturing and operational practices at the outset, as opposed to controlling possible pollution sources during the process, or managing wastes produced as an end product.

To promote source reduction, the Act mandates that EPA make affirmative attempts to encourage a multimedia approach to source reduction.[9] The Act directs EPA to establish a special office to oversee the implementation of source reduction activities on behalf of the Agency.[10] In addition, grants are available to states for technical assistance programs to advance the use of source reduction technologies by businesses.[11] The Act requires that states match federal monies in order to develop these special programs.

The critical aspect of the Act concerns data compilation regarding source reduction. As part of this effort, the Act requires the EPA to establish a Source Reduction Clearinghouse to compile information, including a computer database that contains information on management, technical, and operational approaches to source reduction.[12] One of the greatest sources of such data will be the new reporting obligations incorporated into the annual toxic chemical release form under §313 of the Emergency Planning and Community Right-to-Know Act (EPCRA).[13] The new information will cover data relating to source reduction and recycling and must be reported for the first time for the calendar year 1991, or by July 1, 1992.[14]

Reporting Changes Effective July 1, 1992

Pursuant to EPCRA §313, certain facilities are required to submit reports each year on the amounts of listed toxic chemicals released into the environment.[15] The toxic chemicals regulated include more than 300 chemicals and 20 separate chemical categories. At present, facilities must file an annual report known as a toxic chemical release inventory reporting form (Form R) if their operations manufacture, import, or process at least 25,000 pounds of the chemical during the calendar year or otherwise use at least 10,000 pounds of the chemical during the calendar year.[16] The reports must be filed by July 1 of each year and cover releases and transfers that occurred during the previous calendar year.[17]

The Pollution Prevention Act requirements are specifically intended to augment the information collection obligations of EPCRA §313. It also is intended that the public be provided with information on industry efforts to prevent the generation of waste at the source, as well as to reduce direct releases to the environment through other methods. To implement the new data collection, EPA proposes to modify Sections 6, 7, and 8 of the current Form R.[18] Section 6, entitled "Transfers of the Chemical in Waste to Off-Site Locations," and Section 7, entitled "Waste Treatment Methods and Efficiency," would be modified to include off-site and on-site recycling activities. Section 8, currently entitled "Pollution Prevention: Optional Information or Waste Minimization," would be revised to incorporate the majority of the new additional reporting elements, and its optional format would become mandatory. EPA proposes to phase in the reporting requirements throughout both 1991 and 1992 reporting years. The Act's mandates will be satisfied for the 1991 reporting year through the modifica-

5. *See* 42 U.S.C.A. §13101(b).
6. 56 Fed. Reg. 7849 (1991) (pollution prevention strategy).
7. 42 U.S.C.A. §13102(5)(A).
8. *Id.* §13102(5)(B).
9. *Id.* §13101(a).
10. *Id.* §13101(b).
11. *Id.* §13104.
12. *Id.* §13105.
13. EPCRA §313, 42 U.S.C. §11023, ELR STAT. EPCRA 006.
14. 42 U.S.C.A. §13106(a).
15. 42 U.S.C. §11023, ELR STAT. EPCRA 006; 40 C.F.R. pt. 372 (1991).
16. EPCRA §313(f), 42 U.S.C. §11023(f), ELR STAT. EPCRA 007; 40 C.F.R. §372.25.
17. EPCRA §313(a), 42 U.S.C. §11023(a), ELR STAT. EPCRA 006; 40 C.F.R. §§372.30, 372.85.
18. 56 Fed. Reg. 48477 (1991) (proposed changes to toxic chemical release reporting).

tion of Sections 6 and 8, but a greater level of detail would be implemented for the 1992 reporting year with the modification of Section 7.[19]

Additional information the Act requires to be incorporated into the Form R will constitute the toxic chemical source reduction and recycling report.[20] On a facility-by-facility basis, the toxic chemical source reduction and recycling report must include the following source reduction-related information for each reportable calendar year:

- quantity of chemical entering any waste stream, or otherwise released, prior to recycling, treatment or disposal;
- amount of chemical from the facility that is recycled either on site or off site;
- techniques used to identify source reduction opportunities; and
- amount of chemical that is treated either on site or off site.

In addition to the factual data required, the toxic chemical source reduction and recycling report requires the calculation of a percentage change over the previous year for much of the data collected. Production statistics and certain other release documentation also must be included.

Pollution Prevention Strategy

On February 26, 1991, EPA published its *Pollution Prevention Strategy* as the first step toward achieving the requirements imposed by the Act.[21] According to EPA, this document presents the Agency's blueprint for a comprehensive national pollution prevention strategy. Specifically, it is designed to fulfill two purposes: (1) to provide guidance and direction for efforts to incorporate pollution prevention with EPA's existing regulatory and nonregulatory programs; and (2) to set forth a program that will achieve specific objectives in pollution prevention within a reasonable time frame.[22]

The first objective reflects EPA's belief that for pollution prevention to succeed, it must be a central part of the Agency's primary mission of protecting human health and the environment. To address the second objective, the strategy includes a plan for targeting 15 to 20 high-risk chemicals that offer opportunities for prevention, and sets a voluntary goal of reducing environmental releases of these chemicals by 33 percent by the end of 1992, and at least 50 percent by the end of 1995.[23] This program has become known as the Industrial Toxic Project or the "33/50" Initiative. By establishing this program, EPA redefines its relationship with industry by allowing companies to voluntarily select which chemical releases to reduce and at which facilities.

Based on these two pursuits, EPA will conduct the following activities:

- identifying and overcoming obstacles to prevention;
- ng public participation and choice;
- ging partnerships with federal agencies;
- g in the states through its pollution pre- centives for states grant programs;
- ing outreach and training programs;
- ng current regulations and permits to the regulatory framework to provide entives for prevention;
- ging pollution prevention conditions in nt settlements;
- ing both short-term and long-term pre- search goals; and
- ing new products and technologies.

In it ategy, EPA targets three broad industrial secto cial attention and priority status: manufacturin mical use, agriculture, and energy and transporta A determined these three sectors to be a prior result of the 1988 toxic release inventory data g releases of toxic chemicals. The data for fisca 9 revealed the following statistics relating to re toxic chemicals:

- f 5.7 billion pounds were released into t ment;
- n pounds were emitted into the air;
- on pounds were injected into under- g ls;
- illion pounds were transferred off site;
- lion pounds were transferred to public s
- illion pounds were on-site land releases;
- a
- lion pounds were released into surface w

Sou tion may best be understood by considering what to the EPA-designated priority sectors in terms tional changes and business practice modification suggests that pollution may be prevented by adopt approaches, which include consideration of the fo possible changes within the priority sectors:

M ring and Chemical Use

- g inputs/reducing reliance on toxic or ha raw materials
- ng changes/increasing efficiency/impr intenance practices
- g outputs/reducing reliance on toxic or ha products

Ag

- ment and adoption of low-input sustainab ture practices
- d soil conservation and land manageme ices

19. *Id.*

20. 42 U.S.C. §13106(a), (b).

21. 56 Fed. Reg. at 7849 (pollution prevention strategy).

22. *Id.*

23. *Id.* at 7850.

24. EP E OF TOXIC SUBSTANCES, No. EPA 560/4-91-014, To E COMMUNITY, NATIONAL AND LOCAL PERSPECTIVES, 198 RELEASE INVENTORY NATIONAL REPORT 56 (Sept. 199

Energy and Transportation

- increasing energy efficiency to reduce the generation of pollutants
- increasing reliance on clean renewable energy sources. [25]

If implemented, these changes are anticipated to reduce releases.

Analysis of Act Impact and Implications

The goals of the Pollution Prevention Act are admirable, but pollution prevention in this day and age does not mean that industry will be able to eliminate all wastes from all production processes. Pollution prevention, however, may be a cost-effective means of minimizing waste generation. According to the new strategy, it is the first step in a hierarchy of options for reducing the risks to human health and the environment from pollution. The second logical step in the hierarchy is responsible recycling of any wastes that cannot be eliminated at the source. Recycling also shares many of the positive aspects of prevention, including the conservation of energy and other resources, and the reduction both of reliance on raw materials and of the need for end-of-pipe treatment or containment of wastes. If recycling alternatives are impractical for certain wastes, these wastes should be treated in accord with environmental standards that are designed to reduce both the hazard and volume of waste streams. Finally, any residues remaining from the treatment of wastes should be disposed of safely, to minimize their potential for release into the environment. [26]

Certainly, the Act promotes a more cooperative relationship between industry and EPA by encouraging companies to participate in EPA's efforts to achieve pollution prevention objectives. The possibility for an improved relationship between industry and EPA is furthered by the Act's establishing a set of presumptions instead of ironclad rules. EPA can rely on industry to support, and to the extent feasible, to advance the cause of pollution prevention as it has done for several years. Industry will continue to evaluate prevention opportunities, depending on the balance of associated costs and benefits. This evaluation process may take into account such factors as the savings in raw material and operating expenditures, pollution prevention costs, reduced liabilities, and improved relationships with local communities and governmental entities.

Industry representatives, however, are cautiously monitoring EPA's pollution prevention efforts. While industry supports the popularized concept of pollution prevention, it fears that the data collection activities underway may be a prelude to negative implications, such as mandated process changes, which industry vehemently opposes. In addition, industry fears the potential enforcement ramifications of the increased reporting requirements. The ultimate implementation costs associated with the Act also are a concern for industry.

Mandated Process Changes

EPA says it is committed to promoting pollution prevention as a means of protecting the environment without imposing strict, and often expensive, command and control measures on industry. EPA encourages voluntary action by industry, which it believes minimizes the need for intensive federal regulation. For industry, however, EPA's hand-in-hand approach may signal trouble.

Given the new detailed information concerning production totals and manufacturing processes the Act requires to be reported on the Form R, industry contemplates that such information may be used not only to advance pollution prevention goals, but also to form the technical basis to institute mandated manufacturing process changes.

Once EPA is in possession of sufficient data to demonstrate the viability of prevention-related technologies, it is possible that such options will be transformed into mandatory obligations imposed by regulation. Since prevention-related technologies are often site-specific, this scenario creates an enormous disincentive for industry compliance.

Even the potential for mandated process changes is sufficient risk to cause industry to reevaluate its interest in pollution prevention. In a program where success depends on the willingness of companies to participate, EPA should carefully consider taking any actions along the lines of process changes. EPA already has informed industry that it will not turn voluntary commitments into enforceable permit conditions without an individual company's consent, to the extent that those commitments go beyond a company's obligations under the law. [27] Armed with the power of prevention-related data, EPA may be in a position to amend the law to reflect this promise.

Increased Enforcement Possibilities

Measuring the progress of pollution prevention initiatives is probably the most visible function of the new data EPA will collect. It is unclear to industry, however, to what extent new data may be used for enforcement-related purposes. It is clear that EPA intends to use the prevention-related information to determine whether pollution prevention can succeed on a voluntary basis, or whether a more enforcement-oriented approach will be used to reduce toxic chemicals at the source. [28]

Industry has reason for concern over EPA's past enforcement-related activities connected with the submission of toxic chemical release data. Since it first appeared in 1988, toxic release inventory data has been the sole basis, and often the supporting evidence, in numerous enforcement actions. Given past practices, industry should restrict its reporting to data strictly required. Even this may prove detrimental.

EPA contends that vigorous enforcement remains a primary tool for creating an incentive to reduce industrial pollution. Generally, EPA observes that enforcement creates an environment in which permanent solutions such as eliminating some pollutants entirely may be preferred to less reliable approaches to compliance. [29] If EPA persists in emphasizing enforcement tactics to achieve solutions, the continued success of the voluntary pollution prevention program is doomed.

25. 56 Fed. Reg. at 7853-54.
26. *Id.* at 7855.
27. *Id.* at 7861.
28. *Id.* at 48499.
29. *Id.* at 7859.

Cost Burdens

EPA's economic analysis estimates that a maximum of 28,000 facilities are expected to submit a maximum of 112,000 reports on releases of toxic chemicals in 1992. The total cost to industry of reporting pollution prevention information is estimated to be $49.5 million the first year, $37.7 million the second year, and $36.4 million in all subsequent years. [30]

This new compliance cost increases the total annual burden for reporting under EPCRA §313 from a current $146.7 million to $196.2 million in the first year of reporting. In the second and subsequent years, the total annual burden would be $184.4 million and $183.3 million, respectively. [31] In 1992, assuming four reports will be submitted per facility, the total first year cost of reporting pollution prevention information will be an estimated $1,768 per facility. In the second and subsequent years, costs per facility are estimated at $1,334 and $1,298, respectively. [32]

30. *Id.* at 48500.

31. *Id.*

32. *Id.*

It is evident that industry is making a substantial financial investment to support pollution prevention. These economic figures relate solely to the increased costs associated with the completion and filing of the revised Form R, and do not account for further financial investments industry may commit to undertake prevention-related research and to institute new prevention technologies. In difficult economic times, however, industry may require assurances from EPA that prevention costs expended now will not result in higher costs tomorrow from new regulations or other mandates.

Conclusion

The July 1, 1992, compliance deadline will challenge businesses to provide highly complex data in a timely manner and in an accurate format so that EPA may measure the progress of source reduction and related efforts to prevent pollution in the environment. In the months and years to come, the success of this new environmental policy may be measured in quantitative terms concerning the actual amount of pollution eliminated from the environment. The more appropriate measure of success, however, will be qualitative in nature, concerning the new relationship formed between industry and government to achieve environmental protection objectives.

Published Bimonthly
Subscription Price $24.00 a year to all addresses.
Subscriptions are available for the year currently being published only.
Single copies (both current and back issues) are $6.00 each.
Back Volumes (Nos. 1-6 of any year from 1985 to 1989) are $36.00 each.

Issues through Volume 1985 inclusive can be obtained from William S. Hein & Co., Inc., 1285 Main Street, Buffalo, New York 14209.

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The Wisconsin Law Review (ISSN 0043-650X) is published bimonthly at the University of Wisconsin Law School, Madison, Dane County, Wisconsin 53706. Second class postage paid at Madison, Wisconsin with additional entry at Lincoln, Nebraska. POSTMASTER: Send address changes to WISCONSIN LAW REVIEW, University of Wisconsin Law School, Madison, Wisconsin 53706.

Address all correspondence to: Wisconsin Law Review, University of Wisconsin Law School, Madison, Wisconsin 53706. Manuscripts should be triple spaced with wide margins on 8½ × 11 bond paper. Manuscripts cannot be returned except upon receipt of postage and handling fees of $2.00.

CITE AS 1989 WIS. L. REV. 000

ARTICLES

INTEGRATING THOUGHTWAYS: RE-OPENING OF THE ENVIRONMENTAL MIND?

LAKSHMAN GURUSWAMY*

The implementation of environmental law and policy has assumed that pollution could be contained, corralled and interdicted within the medium (air, land, or water) in which unpleasant effects are encountered. Sweeping, but piecemeal, federal legislation in the 1970s aspired to create healthy air, together with fishable, swimmable and drinkable waters. Despite impressive gains, these goals have not been achieved. There have been painful failures, compounded by the mounting costs of environmental protection. While the need for environmental protection is generally accepted, the effectiveness and efficiency of regulation based on the legislation of the 1970s has been questioned in the 1980s.

This Article argues that the twin goals of efficiency and effectiveness could be satisfied by adopting an integrated approach to pollution control. It is fundamental to such an approach that the effects of pollution should be pursued to their sources, and that air, land and water be considered as one environment rather than as separate and discrete parts. Professor Guruswamy develops his argument by tracing the legislative history of two epochal environmental events: the enactment of the Clean Air and Clean Water Acts of the 1970s and the establishment of the Environmental Protection Agency (EPA). He points out how the integrative thrust behind the EPA floundered amidst a climate of opinion hostile to New Deal expertise, legislative turf battles and administrative jealousies. Maintaining that integration is an idea whose time has come, Professor Guruswamy nevertheless contends that new comprehensive environmental legislation will face insuperable obstacles. Arguing for an administrative solution, he relies on evolving concepts of environmental policy, and comparative examples abroad, to recall EPA to its original mandate of integration. Finally, Professor Guruswamy analyzes the Toxic Substances Control Act (TSCA) to demonstrate the considerable extent to which an integrated approach, based on TSCA, could be implemented by the EPA.

Table of Contents

* Visiting Professor of Law, University of Iowa; Member, Clare Hall Pollution Research Group, University of Cambridge; Lecturer in Law, University of Durham, United Kingdom. A previous draft of this Article was presented at a faculty seminar at the University of Iowa. I am indebted to Professors David Baldus, Arthur Bonfield, Steven Burton, Herbert Hovenkamp, Nicholas Johnson, Richard Matasar, and John-Mark Stensvaag, all of the College of Law, University of Iowa. I am also indebted to Blair Bower, Senior Fellow, Conservation Foundation, together with Professors Donald Elliot, Yale Law School, and Carol Rose, Northwestern University School of Law. I am especially indebted to Professors David Vernon, John Reitz, Dean William Hines, my indefatigable research assistant Brad Kragel, all of the College of Law, University of Iowa, and Professor William H. Rodgers, University of Washington School of Law, for their invaluable and generous help and assistance.

* * * * *

THE HYDRA-HEADED OGRE

This is a fable[1] *about the hydra-headed ogre of pollution (the Hydra). Having found its way into the United States, it began its predations about the middle of the twentieth century. It did so invisibly, often deviously, so that most people did not realize what it was doing and, therefore, did little to stop it.*[2] *Left virtually unmolested for nearly two decades, it grew worse, feasting on the surrounding environment and people. The Hydra became quite bold in its attacks in the air, water and land, showing different heads at different places.*[3] *The people felt threatened and called on Congress and the President for help. They were given laws dealing with air pollution,*[4] *water pollution*[5] *and*

1. This allegory is derived from sources cited throughout the Article. In the United States, the main thrust towards a cross-media approach to pollution control has come from the Conservation Foundation. *See* CONSERVATION FOUNDATION, CONTROLLING CROSS-MEDIA POLLUTANTS (1984) [hereinafter CROSS-MEDIA POLLUTANTS]; CONSERVATION FOUNDATION, NEW PERSPECTIVES ON POLLUTION CONTROL: CROSS-MEDIA PROBLEMS (1985); CONSERVATION FOUNDATION, STATE OF THE ENVIRONMENT: AN ASSESSMENT AT MID-DECADE (1984) [hereinafter NEW PERSPECTIVES]; B. RABE, FRAGMENTATION AND INTEGRATION IN STATE ENVIRONMENTAL MANAGEMENT (1986). The National Research Council and National Academy of Public Administration, after studying the subject have lent their weighty support to the adoption of an integrated approach to pollution control. *See* NATIONAL RESEARCH COUNCIL, MULTIMEDIA APPROACHES TO POLLUTION CONTROL: A SYMPOSIUM PROCEEDINGS (1987); NATIONAL ACADEMY OF PUBLIC ADMINISTRATION, STEPS TOWARD A STABLE FUTURE (1986). In the United Kingdom, the Royal Commission on Environmental Pollution (RCEP) has taken the lead in advocating an integrated approach. *See* ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, BEST PRACTICABLE ENVIRONMENTAL OPTION (Rep. No. 12, 1988) [hereinafter RCEP, No. 12]; ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, MANAGING WASTE: THE DUTY OF CARE (Rep. No. 11, 1985) [hereinafter RCEP, No. 11]; ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, TACKLING POLLUTION-EXPERIENCES AND PROSPECTS (Rep. No. 10, 1984) [hereinafter RCEP, No. 10]; ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, AIR POLLUTION CONTROL: AN INTEGRATED APPROACH (Rep. No. 5, 1976) [hereinafter RCEP, No. 5]. *See also* ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, STATE OF THE ENVIRONMENT (1985). Two further publications—DEPARTMENT OF THE ENVIRONMENT (UNITED KINGDOM), INTEGRATED POLLUTION CONTROL (1988) and CONSERVATION FOUNDATION, THE ENVIRONMENTAL PROTECTION ACT (Second Draft, 1988)—have arrived too late to be considered except in a very impressionistic manner.

2. Prior to 1948, there was little federal legislation dealing with environmental pollution. Environmental control was traditionally viewed as protecting the health, safety and welfare of the people and, therefore, was a function of the states under their police powers. F. GRAD, G. RATHJENS & A. ROSENTHAL, ENVIRONMENTAL CONTROL: POLICIES AND THE LAW 49 (1971); R. MELNICK, REGULATION AND THE COURTS: THE CASE OF THE CLEAN AIR ACT 25 (1983). There were exceptions, such as the Rivers and Harbors Appropriation Act of 1899, but they were rarely applied until the Environmental Protection Agency (EPA) rediscovered them in 1971. *See infra* note 5.

3. In the early 1960s, there were shocking reports about pollution headlined in *Redbook*, *Sports Illustrated* and *Life Magazine*. For example, thousands of fish killed in the Passaic River in 1960; a temperature inversion (an unusual meteorological occurrence in which a layer of warmer air overlies a heavier, cooler layer that holds down pollution) in New York in 1966 that resulted in 80 deaths; and the oil spills on the York River, Cape Cod and Wake Island in 1967. The history of such incidents is recounted in J. PETULA, ENVIRONMENTAL PROTECTION IN THE UNITED STATES 39-61 (1987).

4. The Clean Air Act, Pub. L. No. 88-206, 77 Stat. 392 (1963); Motor Vehicle Air Pollution Control Act, Pub. L. No. 89-272, 79 Stat. 992 (1965); Air Quality Act of 1967, Pub. L. No. 90-148, 81 Stat. 485 (1967). The agency responsible for implementation was the National Air Pollution Control Administration in the Department of Health, Education and Welfare (HEW).

5. Water Pollution Control Act, Pub. L. No. 80-845, 62 Stat. 1155 (1948); Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903 (1965); Clean Water Restoration Act of 1966, Pub. L. No. 89-753, 80 Stat. 1246 (1966); Water Quality Improvement Act of 1970, Pub. L. No. 91-224, 84 Stat. 91 (1970). The 1965 act created the Federal Water Pollution Control Administration within the Department of the Interior; this agency was to oversee the adoption and implementation of water quality standards. *See* Hines, *Nor Any Drop To Drink: Public Regulation of Water Quality*, 52 IOWA L. REV. 186 (1966); Barry, *The Evolution of the Enforcement Provisions of the Federal Water Quality Control Act: A Study of the Difficulty in Developing Effective Legislation*, 68 MICH. L. REV. 1103 (1970). At the same time, section 13 of the Rivers and Harbors Appropriation Act, 30 Stat. 1152 (1899), was revived to prevent the discharge of polluting wastes. The history of how this act was developed is recounted in 2 W. RODGERS, ENVIRONMENTAL LAW AIR AND WATER 162-80 (1986).

solid waste pollution.[6] *In addition, corresponding agencies were provided to fight the ogre. The laws and agencies proved to be no match for the Hydra.*[7] *It continued to feast on the environment and people, expanding to fiendish proportions. Then, having grown so powerful, and too massive to remain hidden, it spurned its hiding places and openly terrorized the people on land and in the air and water.*[8]

The people had, by now, become truly terrified. They poured out into the streets and packed meetings on Earth Day, imploring Congress and the President to end the tyranny.[9] *Public outrage at the extent of pollution resulted in incessant calls for action against the Hydra.*[10] *The nation had become engaged in a crusade.*[11]

The crusade, however, was conducted in disunity. Disunity was manifested between the President and Congress, within congressional subcommittees, and between the President and

6. Solid Waste Disposal Act, Pub. L. No. 89-272, 79 Stat. 997 (1965). This act authorized research and grant programs, and led to the creation of the Bureau of Solid Waste Management in HEW. The Resource Recovery Act of 1970, Pub. L. No. 91-512, 84 Stat. 1227 (1970), amended the Solid Waste Disposal Act.

7. W. RODGERS, HANDBOOK ON ENVIRONMENTAL LAW 210-11 (1977); Schoenbrod, *Goals Statutes or Rules Statutes: The Case of the Clean Air Act*, 30 UCLA L. REV. 740, 744-45 (1983). *See also* R. MELNICK, *supra* note 2, at 28; R. TOBIN, THE SOCIAL GAMBLE: DETERMINING ACCEPTABLE LEVELS OF AIR QUALITY 71-75 (1979); J. DAVIES & B. DAVIES, THE POLITICS OF POLLUTION 26-57 (1975).

8. In 1969, the Cuyahoga River burst into flames. In the same year, over 800 miles of ocean were despoiled by the Santa Barbara oil spill. The problem of smog in Los Angeles increased dramatically. The water supply of many midwestern cities was found to be polluted with excessive nitrates. It was feared that Lake Erie was dying. *See* B. COMMONER, THE CLOSING CIRCLE 1-111 (1971). In 1976, *Newsweek* implicated environmental pollutants as a cause of cancer. There were hundreds of reports in newspapers and on prime time television showing public outcries over environmental pollution in its various forms. In 1978, heavy media coverage was given to the devastating effect of chemicals seeping into homes around Love Canal in Niagara Falls, New York. An account of these events is found in J. PETULA, *supra* note 3, at 57-61.

9. Earth Day was held on April 22, 1970, and millions participated. The *New York Times* proclaimed: "Millions Join Earth Day Observances across the Nation." N.Y. Times, Apr. 23, 1970, at 1, col. 3. Astonished accounts of the extent and feeling of the meetings and demonstrations were reported in all the media. For a summary of the nationwide reporting of these activities and their impact, even on conservative politicians and observers, see J. WHITAKER, STRIKING A BALANCE 2-16 (1976).

10. ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS, PROTECTING THE ENVIRONMENT: POLITICS, POLLUTION AND FEDERAL POLICY 18 (1981) [hereinafter ACIR, PROTECTING THE ENVIRONMENT]; *see also* Erskine, *The Polls: Pollution and Its Cost*, 36 PUB. OPINION Q. 120 (1972) (noting the remarkable speed with which environmental consciousness sprang, as it were, from "nowhere" to major proportions in a few years). Jaffe, *The Administrative Agency and Environmental Control*, 20 BUFFALO L. REV. 231, 233-34 (1970) ("Until recently there has been no organized pressure for environmental control. The political situation has changed radically. Every politician is now sounding the call for pure air and pure water. The legislative activity is tremendous."); R. MELNICK, *supra* note 2, at 28; C. JONES, CLEAN AIR 137-55 (1975).

11. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196, 1217 (1977).

EPA.[12] *Moreover, the crusaders were unaware or uncertain about how to kill the Hydra. Those whom the air Hydra threatened were so concerned with air pollution damage that they overlooked the devastation the Hydra caused in the water or on the land. Accordingly, they focused on efforts to slay the air Hydra and were given new laws directed at destroying air pollution.*[13] *Others, who encountered the Hydra on water, found it so horrifying that they, too, developed tunnel vision and ignored what the Hydra was doing in the air or on the land. They demanded and were given new water pollution legislation.*[14] *Those who confronted the Hydra on land did likewise and were rewarded with new solid waste disposal laws.*[15]

At one stage, the President thought that a single, integrated agency should conduct a unified battle against the monster. He established the Great Agency for this purpose.[16] *The President and Congress also recognized the need for an integrated campaign against the Hydra by enacting laws dealing with national environmental policy*[17] *and toxic waste.*[18] *Unfortunately, these laws did not put an end to the disunity between the President and Congress. Furthermore, earlier laws had already divided the environment into sectors, and bureaucracies had become accustomed to acting only within defined programs and the confined jurisdictions of air, water, or land. These bureaucracies felt that the original mission of the Great Agency and the objectives found in integrating laws were impracticable, and integration was soon forgotten.*[19]

Alas, the attempt to deal with pollution within individual sectors was not altogether successful. As the saga unfolded, it became apparent that the felling of one head of the Hydra often resulted in the appearance of another. The proclaimed decapitation and "elimination" of a single head proved to be an illusion.

12. R. MELNICK, *supra* note 2, at 31-35.

13. Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (1970); Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685 (1977).

14. Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (1972); Safe Drinking Water Act, Pub. L. No. 93-523, 88 Stat. 1660 (1974); Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (1977).

15. Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (1976); Hazardous and Solid Waste Amendments of 1984, Pub. L. No. 98-616, 98 Stat. 3221 (1984). Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767 (1980).

16. Reorganization Plan No. 3 of 1970, 35 Fed. Reg. 15,623 (1970) [hereinafter Reorganization Plan].

17. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970).

18. Toxic Substances Control Act, Pub. L. No. 94-469, 90 Stat. 2003 (1976).

19. *See infra* notes 116-47 and accompanying text.

Instead of being eliminated or neutralized (by chemical or physical processes that changed it into a non-pollutant), a pollutant was simply transferred from one medium to another. Pollution controllers failed to realize that each head (of pollution) arose from its source (the Hydra's body or wastes) and that the whole Hydra constituted the real enemy.

Pollution apparently dispelled from the air did some ominous things. Sometimes it appeared at different and distant places in a form more fierce than before.[20] *In other instances, pollution disappeared from the air only to alight on water*[21] *or, when interdicted in the air, materialized on land.*[22] *Similarly, pollution apparently expelled from water reemerged in the air or materialized on land.*[23] *When the Hydra was prohibited from entering the water, it sometimes took different and equally intimidating forms.*[24] *The story repeated itself on land.*[25]

20. When sulfur dioxide was sent away from one area, it combined with nitrogen oxides to cause acid deposition in another. *See* Martin, *Acid Rain From Source to Receptor*, 5 CANADA-U.S. L.J. 16 (1982); Snipes, *Acid Rain: Causes, Effects, and Remedies*, 3 STAN. ENVTL. L. ANN. 118 (1981); Kramer, *Transboundary Air Pollution and the Clean Air Act: An Historical Perspective*, 32 U. KAN. L. REV. 181 (1983); 1 NATIONAL ACID PRECIPITATION ASSESSMENT PROGRAM, INTERIM ASSESSMENT: THE CAUSES AND EFFECTS OF ACIDIC DEPOSITION (1987) (executive summary). Sulfur dioxide, which results from the combustion of coal, tends to settle out of the air close to the point from which it is emitted. To prevent this, tall stacks were built (usually with high velocities in them), and sulfur dioxide was emitted into the air from these stacks. It was hoped that sulfur dioxide would be removed from the point of origin, while the dispersive processes in the atmosphere would dilute it below the level of physiological significance. Unforeseen was the extent to which it could combine with other pollutants to cause acid rain which affects vegetation and land, as well as water.

21. In the mid-1970s, the fish in Lake George, a popular recreational lake in New York, had accumulated dangerously high levels of mercury and polychlorinated biphenyls (PCBs). A significant, though not the sole, cause was deposition from the air. Similarly, deposition from the air is a major source of pollution in the Great Lakes. In fact, the single largest source of lead, zinc and copper pollution is not direct discharge into water, but atmospheric deposition. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 1, 16-17; Elder, *Air Toxics: A Headache for the Great Lakes*, 14 EPA JOURNAL 37 (1988). Once again, the attempt to get rid of air pollution by discharging it into the air did not take account of the extent to which there was an interface between air and water pollution. What the atmosphere was unable to disperse came down on land or water.

22. For example, technologies used to comply with air pollution laws may produce from three to six tons of scrubber sludge for every ton of sulfur dioxide removed from flue gases. About four fifths of the 118 million tons of dry metric sludge produced annually is the direct result of air pollution controls mandated for industrial and power plants. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 9. A preponderance of this sludge is deposited on land. Another example, from East Helena, Montana, is quite revealing. Cadmium was controlled by ambient air quality standards in order to prevent damage to human health caused by inhalation of cadmium. Experts found, however, that the perceived cause for concern and control (inhalation) was much less damaging than exposure through the consumption of locally grown food contaminated by air depositions of cadmium. The problem was that ambient air quality standards directed at inhalation did not cover food contaminated by the fall-out of cadmium. There was little appreciation of the total exposure of a person to cadmium through different pathways. *Id.* at 2.

23. A recent EPA study of what happened to toxic substances—which include organic pollutants (such as pesticide solvents, PCBs and dioxins), metals (such as mercury, cadmium, zinc and copper), and other compounds (such as asbestos and cyanide)—entering a sewage treatment plant shows that typically only about 50% of toxics are actually removed. Of the remainder, 20% go into air, 15% are deposited on land in the form of sewage sludge and 15% go back into the water, without treatment. These statistics enable one to understand how a municipal wastewater treatment plant in Philadelphia is the largest source of air pollution in that metropolitan area. Letter from J. Clarence Davies, Executive Vice-President of the Conservation Foundation, to Mr Hank Schilling, Office of Policy Planning and Evaluation of EPA, and Members of the Advisory Committee (March 13, 1987). This is not an illustration of the inadequacy of treatment works. It raises the more fundamental question of why these toxics were allowed to enter the sewer in the first place. Were the effects of these toxics on the entire environment assessed before the decision to discharge them into water? Although section 307 of the Clean Water Act, dealing with pre-treatment of affluent, goes some way towards recognizing the problem, this section does not offer a complete solution.

24. In one particular industrial plant, the removal of two tons of pollutants from its liquid effluent generated 1.9 tons of other forms of pollutants. RCEP, No. 12, *supra* note 1, ¶ 3.10, at 15.

25. It has been well documented that leaching is a major means by which pollutants migrate from waste management sites on land into groundwater. V. PYE, R. PATRICK & J. QUARLES, GROUNDWATER CONTAMINATION IN THE UNITED STATES (1983); GEOPHYSICS RESEARCH FORUM, STUDIES IN GEOPHYSICS: GROUNDWATER CONTAMINATION (1984); U.S. ENVIRONMENTAL PROTECTION AGENCY, GROUND-WATER PROTECTION STRATEGY (1984); COUNCIL ON ENVIRONMENTAL QUALITY, CONTAMINATION OF GROUNDWATER BY TOXIC ORGANIC CHEMICALS (1981). Similarly, volatilization is a process by which pollutants in waste sites can find their way into the air. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 15-16 (citing COMMITTEE TO REVIEW METHODS OF ECOTOXICOLOGY, NATIONAL RESEARCH COUNCIL, TESTING FOR EFFECTS OF CHEMICALS ON ECOSYSTEMS 1618 (1981)). Not surprisingly, a study of 27 out of 200 chemicals found in Love Canal (a notorious abandoned waste dump) showed that 18 of the 27 pollutants were found in air, water and soil. An assessment of case histories at a variety of other waste sites showed that 32% of the pollutants found affected groundwater, 31% soil, 29% surface water, and 8% air. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 11. Once again, the question is whether the effects of disposal of wastes on land were considered.

26. A. KNEESE & B. BOWER, ENVIRONMENTAL QUALITY AND RESIDUALS MANAGEMENT 1-12 (1979); RABE, *supra* note 1, at 15 n.46; Kneese, *Pollution and a Better Environment*, 10 ARIZ. L. REV. 11 (1968); A. KNEESE, ECONOMICS AND THE ENVIRONMENT 16-73 (1977); M. HUFSCHMIDT, D. JAMES, A. MESITER, B. BOWER & J. DIXON, ENVIRONMENT, NATURAL SYSTEMS AND DEVELOPMENT 73-113 (1983); L. ORTOLANDO, ENVIRONMENTAL PLANNING AND DECISION MAKING 25-34 (1984); J. LOWE, D. LEWIS & M. ATKINS, TOTAL ENVIRONMENTAL CONTROL 3 (1982).

* * * * *

I. INTRODUCTION

Modern industrial societies engage in a staggering range of domestic and industrial activities that make high demands on energy and raw materials. The matter and energy used in these activities are neither created nor destroyed, but instead merely transformed. Massive quantities of wastes or residuals are, therefore, the unavoidable by-products of today's living.[26] For example, the residuals generated by even an ordinary city bus include noise, heat, hydrocarbons, particulates and carbon monoxide. Residuals arise from the manufacture, processing and packaging of new products out of raw materials and natural resources undertaken at an iron or steel complex, a motor car plant, or an

oil refinery. Residuals also arise when the finished products—whether cars, machinery, disposable razors, or waste oil—are discarded rather than re-used. Residuals may consist of either materials or energy. Material residuals take the form of gases (such as carbon monoxide, nitrogen dioxide and sulphur dioxide), particulates, dry solids (such as rubbish and scrap), and wet solids (such as garbage, sewage and industrial wastes suspended or dissolved in water). Energy residuals take the form of noise or waste heat; for example, waste heat is returned to the atmosphere when coal is burned to produce electricity.[27] So long as wastes and residuals are produced, they have to go somewhere and are, therefore, a potential source of pollution.

The aquatic, atmospheric and terrestrial environments are capable of performing tremendous scavenging, assimilating and dispersing functions. Every modern society has made the fundamental assumption that the environment can and should be used as a medium for disposing of wastes. When, however, the environment is incapable of coping with residuals, or its neutralizing capacity is overburdened, pollution occurs.[28] In general, pollution laws have not absolutely prohibited the disposal of such wastes in the environment. An absolute prohibition would be impossible without banning many of the activities on which Western society is dependent. What the laws have done, except in very special circumstances, is to control only the harmful effects of potentially polluting activities.[29] Under such laws, discharges of harmful residuals have been treated, processed, or redistributed in an effort to remove the undesirable substances or render them harmless.[30]

27. A. KNEESE & B. BOWER, *supra* note 26, at 26.

28. U.S. COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY, FIRST ANNUAL REPORT 6-11 (1970) [hereinafter FIRST ANNUAL REPORT]; AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, AIR CONSERVATION 23-39 (1965).

29. This is the underlying premise of almost all pollution control legislation. *See* W. RODGERS, *supra* note 7 at 2-4; F. GRAD, ENVIRONMENTAL LAW 4-6 (3d ed. 1985); R. STEWART & J. KRIER, ENVIRONMENTAL LAW AND POLICY 25-27 (2d ed. 1978). Even some of the most stringent pieces of legislation are not exceptions to this premise. For example, the cost-oblivious mandates of the Clean Air Act oblige EPA to set primary ambient air quality standards for criteria pollutants "allowing an adequate margin of safety." 42 U.S.C. § 7409(b)(1) (1982). The mandates of the Clean Water Act require industries to install "the best available technology economically achievable" by 1983. 33 U.S.C. § 1311(b)(2)(A) (1982). The Delaney Amendment to the federal Food, Drug and Cosmetics Act states that no cancer forming substances may be added to food. 21 U.S.C. § 348(c)(3)(a) (1982). These provisions do not constitute absolute prohibitions, but seek to exclude pollutants which cause harm, and only to the extent that they cause harm to human health.

There are some notable exceptions to the premise. For example, the goals of the Clean Water Act called for the elimination of discharges into navigable waters by 1985. Clean Water Act § 101(a)(1) & (2), 33 U.S.C. § 1251(a)(1) & (2) (1982). The prevention of significant deterioration (psd) provisions of the Clean Air Act which designated all national parks and wilderness areas as class one areas in order to protect these areas from significant deterioration in air quality, may also fall within the exceptions. 42 U.S.C. § 7472 (1982).

30. The attempt by the Clean Water Act to eliminate all discharges into navigable waters has been characterized as "impossible." W. RODGERS, *supra* note 5, at 19.

Unfortunately, the formidable, complicated web of law and policy controlling pollution in the United States, and in most European industrial countries, leads to a regrettable conclusion. Separate pollution control programs for air, water and land have been established without an adequate appreciation of the interrelated character of the three environmental sectors, a comprehension of the total burden of pollution, or a determination of which method of disposal would cause the least environmental damage overall. The result, in many situations, is that present pollution controls are ineffective and inefficient.[31] This conclusion is not based upon an economic cost-benefit analysis, which would require that the environment be used to its "optimal" level, but it is consistent with political decisions to protect fragile environments or even to protect the environment for its own sake, and is quite independent of individual preferences based upon dollar values.

This Article will explore the basis and rationale for the fragmentation of law and policy dealing with pollution, and make the case for a more integrated approach. In doing so, the Article will traverse the broader issues of administrative law, policy and politics surrounding integration. Part II will deal with the defects of fragmented controls, explaining why such controls are ineffective from an environmentalist standpoint while also being inefficient from an economic perspective. It will then review the reasons leading to the adoption of a fragmented approach to policy and law in the early 1970s. Part III attempts a preliminary exposition of a functional concept of integration. It then sharply distinguishes the integration advocated in this Article from deregulation and the changes urged by regulatory reformers. Part III concludes by examining how integrated policies are incorporated in the National Environmental Policy Act[32] and the Environmental Protection Agency.[33]

Part IV explores the way ahead and argues that the time has come for an integrated approach. A different configuration of ideas is taking place in the 1980s. A convergence of ecological thinking and administrative policies based on rationality seems to be evolving towards integration. Part IV examines the Draft Act on environmental integration proposed by the Conservation Foundation but concludes that the enactment of a new, integrated act is a near impossibility. It argues that

31. A recent example from Britain is instructive. Air pollution controls in that country obliged a corporation to remove gaseous fluoride from a gas stream by wet scrubbing. The scrubbing liquor was discharged into water as a trade effluent and found its way into sewage sludge which was spread on grazing land. As a result, cattle fed on grass fertilized by that sludge developed fluorosis. In the view of the British Royal Commission on Environmental Pollution, "a minor air pollution problem had been converted to a serious land pollution problem." RCEP No. 12, *supra* note 1, ¶ 3.10, at 15.

32. National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4370a (1982).

33. Reorganization Plan, *supra* note 16.

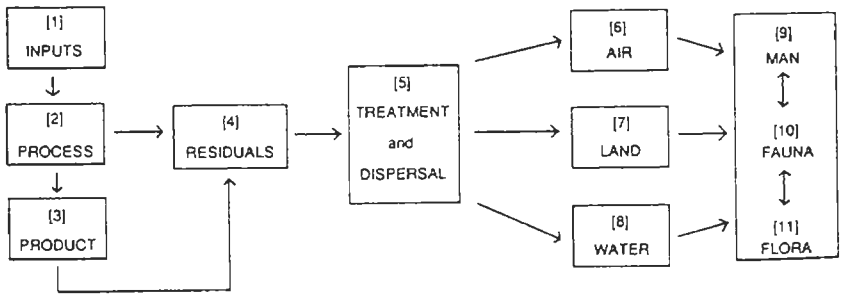
the tide of fragmentation could, however, be turned by the use of existing legislation and institutions. An analysis of the Toxic Substances Control Act of 1976 demonstrates how this can be done.

II. The Fragmented System

A. Defects of Fragmented Controls

A productive enterprise engaged in manufacturing, mining, logging, or agriculture employs capital equipment, together with human and non-human energy, to produce physical, chemical and biological reactions or changes in raw materials. The purpose of the endeavor is the creation of desired products or outputs. Residuals are the unavoidable corollary of such a productive activity. They vary according to the types of inputs of raw materials and energy used in the activity, such as coal, oil, or wood; the end products of the process, be they electricity, petroleum, steel, or toilet paper rolls; and the process employed (a combination of equipment and energy to create the desired products out of raw materials). Boxes 1, 2, and 3 of Diagram A illustrate this productive activity.

Diagram A



The present fragmentation of the environment by the law, policy and administration (the fragmented approach) fails to provide effective pollution controls for numerous reasons that Diagram A illustrates. First, the fragmented approach does not usually consider the part played by inputs in the creation of residuals. The relationship of inputs to residuals can be illustrated by the coal electric industry. In a coal-burning power plant, the combustion of coal to create electricity produces sulfur dioxide (SO_2), oxides of nitrogen (NO x), particulates, bottom ash, and other unwanted materials. The quantity of SO_2 generated in combustion is a function of the sulfur content of raw coal and the extent, if any, of its removal in coal processing or by washing. The extent to which the sulfur content of the coal (the input) determines the nature of the residuals has been vividly demonstrated.[34] The gains achieved by simple and inexpensive washing techniques used on high-sulfur coal, prior to its use in production, varied from twenty to forty percent, compared to less than fifty percent gained from employing billion-dollar scrubbers. Similarly, the burning of high quality natural gas releases even fewer harmful residues.[35]

Second, the fragmented approach generally does not hold the end product accountable for harmful residuals. Yet, the extent to which the final product influences the residuals discharged is considerable. For example, the production of a highly bright (bleached) white paper requires substantially greater quantities of chemicals, water and energy, resulting in the generation of larger amounts of residuals than an unbleached paper. One study found that the liquid residuals were reduced by eighty-five to ninety percent, while gaseous residuals were reduced by fifty percent, by producing unbleached paper.[36] The same argument applies to a wide variety of end products. Accordingly, certain environmental costs of the bewildering and often unnecessary products that are paraded on the market are often ignored.

Pollution laws, in general, concentrate on end-of-line controls and do not treat input and final products as part of the problem. When regulating end-of-line controls on industrial processes, pollution control laws have set separate standards for air, water and land. Controls applicable to each medium are applied and administered independently of each other. In so doing, congressional laws have ignored the overriding law of nature that "nothing goes away." A basic law of physics states that matter is indestructible.[37] This law dictates that the residuals from a production process cannot be destroyed. Their initial destination may be altered, but ultimately they re-enter the flow of materials within the environment. While limitations on discharges may correct the immediate environmental problem to which they are directed, these restrictions themselves often have impacts in other places. These impacts, known as cross-media or inter-media pollution transfers,[38] could happen either by direct transfers ("trade-offs") or by indirect transfers.

Direct transfers occur when control technologies aimed at achieving specific limits to pollution generate new streams of residuals which have adverse environmental effects on other media. Unfortunately, when limitations on discharges into one medium are imposed, those

34. Ackerman & Hassler, *Beyond the New Deal: Coal and the Clean Air Act*, 89 YALE L.J. 1466, 1481-82 (1980).
35. A. KNEESE & B. BOWER, *supra* note 26, at 44.
36. *Id.* at 64-75.
37. *See* sources cited *supra* note 26. *See also* B. COMMONER, *supra* note 8, at 39.
38. *See* sources cited *supra* note 1.

ordering the limitation sometimes give scant attention or consideration to the parallel impacts. The massive quantities of sludge created by existing pollution controls offer disturbing evidence of this problem. EPA has estimated that between three and six tons of scrubber sludge may be produced for each ton of sulphur dioxide removed from flue gases.[39] Consequently, the problem of sulphur dioxide in the air is replaced by one of sludge disposal. Municipal wastewater treatment and sewage treatment plants also produce large quantities of sludge. Some of this contains toxic substances[40] which are nondegradable and bioaccumulable. In all, it is estimated that over 118 million metric tons of sludge are produced annually.[41]

The troubling question is: Where does the sludge go? It could be spread or buried on land, incinerated, or dumped at sea. But all these solutions have attendant problems. If managed on land, there is a danger either of rain water run-off transferring heavy metal into water, or of organic chemicals leaching into surface and ground water.[42] While sewage sludge may fertilize agricultural land, this could result in heavy metals and organic chemicals being absorbed by plants and entering the food chain.[43] Incineration is possible but very expensive. Moreover, even incinerators capable of cutting emissions by ninety percent still produce ash containing heavy metals and organic chemicals. Burying contaminated ash presents many of the problems of land waste disposal that incineration was intended to avoid.[44] Dumping at sea raises questions similar to those applicable to water pollution.[45]

Direct transfers are only part of the picture. They are compounded by indirect transfers which take place in a number of ways. For example, pollutants discharged into the air can leave the atmosphere through precipitation or can adhere to particles carried by the wind and later be deposited on land.[46] Pollutants on land may erode with soil particles into a stream, leach into groundwater, or volatilize into air. The present fragmented system of controls does not trace the path of a pollutant through its entire ecological chain from source to receptor. Consequently, the fragmented approach does not take sufficient account of indirect cross-media transfers. To be effective, pollution controls need to trace and track every stage of a pollutant's journey, including its

39. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 8-9.
40. *Id.* at 9.
41. *Id.*
42. 2 W. RODGERS, ENVIRONMENTAL LAW AIR AND WATER 124-25 (1986).
43. Feliciano, *Sludge on Lands: Where We Are, But Where Are We Going?*, 54 J. WATER POLLUTION CONTROL FED'N 1259-66 (1982).
44. Chicago Tribune, Aug. 14, 1988, at 6, § 1, col. 1; CROSS-MEDIA POLLUTANTS, *supra* note 1, at 9.
45. *See* W. Rodgers, *supra* note 7, at 488-99.
46. *See supra* note 20.

origination in a plant, its migration through the environment, and its final sinks or receptors. A proper risk evaluation, revealing where and how a substance is capable of causing harm, should be undertaken.[47] Recognition of the enormous problem caused by cross-media or intermedia transfers led the British Royal Commission on Environmental Pollution to conclude that "most of the present and future problems in environmental pollution will be of this cross-media type,"[48] and for the National Research Council in the United States to assume that "multimedia transport of pollution appears to be the rule rather than the exception."[49]

Finally, the fragmented approach considers each end-of-line source of pollution in isolation. The use of separate technologies to control discharges into a single medium means that the effects of one set of controls upon another are not considered, and that the waste loads produced are not considered simultaneously. Fragmented controls show little thought to the way in which the plant is designed, to the manner of its operation, to the distribution of wastes, and to coordination of efforts to reduce the overall impact of pollution. The wastes or residuals generated by an industrial activity have to go somewhere, yet the first destination of the wastes or residuals generated by an industrial activity is largely predetermined by plant design and pollution control technology. Thus, in order to induce changes in technology that reduce or eliminate some of the pollutants in question, effective pollution controls should target plant design and production methods. Pollution controls should attempt to reach the best balance of residuals. This, however, is not usually the case.

The present approach also lacks economic efficiency. Pollution controls already in place ensure that wastes cannot be discharged or offloaded onto the environment at a polluter's option. In a case where air pollution controls require a plant to reduce air pollution, the atmospheric gases and dusts created by a plant may be trapped in a spray of water or washed out of filters. The resulting polluted water could be discharged into a river or directly into the sea. The water could also be piped into a lagoon to settle and dry out and then be disposed of on land as solid waste. In this example, the efforts to meet air pollution requirements might lead to water discharges or solid waste disposal problems that cause greater overall damage to the environment than might be the case if the wastes had been distributed differently. It is also possible that other controls applicable to water and land could prevent the wastes resulting from air pollution controls from simply being dis-

47. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 4.
48. RCEP, No. 10, *supra* note 1, ¶ 6.35.
49. NATIONAL RESEARCH COUNCIL, *supra* note 1, at 4.

charged into water or disposed of as solid waste, without further treatment. Because additional costs are involved, the question becomes whether such costs can be justified.

A more efficient and cost-effective method of pollution control would be to divide the wastes between the three media of water, air and land, thus making optimum use of the environment and of any special or particular assimilative capacity it might possess. Lawmakers must consider whether the present controls make optimal use of the environment as a resource, or whether these controls are too stringent in one place and too lax in another.[50]

B. Reasons for Fragmented Controls

The late 1960s and the early 1970s were a period in which the "policy primeval soup"[51] of environmental policy bubbled with a rich mix of ideas. Ideas based on integration prevailed and gave birth to two notable developments: the National Environmental Policy Act (NEPA) and the Environmental Protection Agency (EPA). These developments marked the high tide of environmentalism, yet two following pieces of legislation flowed in a different direction. Out of the dialectic interaction between fragmentation and integration, fragmentation emerged as the more powerful policy stream.

The predominance of fragmentation is borne out first in the Clean Air Act of 1970, which was signed into law just thirty days after EPA began operations,[52] and the 1972 amendments to the Federal Water Pollution Control Act. Both acts contained provisions dictating clear goals, specific means by which these goals should be achieved, and rigorous timetables for implementing these goals and means. Such provisions overran the integrative thrust of NEPA and EPA. The Clean Air Act of 1970, for example, required EPA to set quantitative primary and secondary air quality standards[53] and to produce a timetable for (1) designating air quality control regions,[54] (2) issuance of air quality criteria and information on air pollution techniques for major pollutants,[55] (3) establishment of ambient air quality standards for major

50. *See, e.g.*, B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR 10-12 (1981); A. KNEESE & C. SCHULTZE, POLLUTION, PRICES, AND PUBLIC POLICY 81 (1975); Krier, *The Irrational National Air Quality Standards: Macro- and Micro-Mistakes*, 22 UCLA L. REV. 323, 324-30 (1974).

51. J. KINGDON, AGENDAS, ALTERNATIVES AND PUBLIC POLICIES 122-23 (1984).

52. A. MARCUS, PROMISE AND PERFORMANCE CHOOSING AND IMPLEMENTATION OF ENVIRONMENTAL POLICY 56-57 (1980). Marcus sets out an interesting chronology tracing the parallel developments leading to the creation of the EPA and the enactment of the Clean Air Act of 1970.

53. 42 U.S.C. § 7409 (1982).

54. *Id.* § 7407.

55. *Id.* § 7408.

pollutants,[56] (4) preparation of implementation plans by the states,[57] (5) review and revision of those plans by EPA,[58] and (6) enforcement of the plans. The Federal Water Pollution Control Act of 1972 (FWPCA)[59] set at least six similar legislative deadlines.[60]

The greater force of fragmentation is further evidenced by the way in which EPA was exempted from making environmental impact assessments under NEPA. A fundamentally important step towards an integrated approach lies in ascertaining the total environmental impact of an activity. That essential first stage is provided for in NEPA. It requires that all agencies of the federal government make environmental impact assessments where their proposed actions might significantly affect the environment.[61] A plain reading of NEPA leaves no doubt that the making of environmental regulations constitutes an action significantly affecting the environment. It would seem to follow, therefore, that EPA should be legally obliged to make environmental impact assessments when undertaking their regulatory functions. When making environmental impact assessments, EPA would confront the inescapable cross-media impacts of their regulations and be compelled to evaluate both the wisdom and the necessity of an integrated approach.

EPA did not become engaged in this exercise for a number of reasons. To begin with, Senator Edmund Muskie sought to exclude air and water pollution controllers from the application of NEPA.[62] Additionally, the deadlines in the Clean Air Act relating to the preparation of implementation plans for meeting national ambient standards[63] argua-

56. *Id.* § 7409.

57. *Id.* § 7410(a)(1).

58. *Id.* §§ 7410(a)(2), 7410(c)(2).

59. 33 U.S.C. §§ 1251-1387 (1982 & Supp. III 1985).

60. These were to (1) issue effluent guidelines to major industrial categories by 1973, (2) grant permits to all water pollution sources by 1974, (3) ensure that the best practicable water pollution technology was installed by 1977, (4) make all major waterways in the United States fishable and swimmable by 1981, (5) ensure that all polluting sources installed the best available technology by 1983, and (6) ensure that all polluting discharges into the nation's waterways be eliminated by 1985.

61. 42 U.S.C. § 4332(2)(c) (1982).

62. *See infra* text accompanying notes 95-115. NEPA's basic substantive policy was to ensure that the federal government "use all practicable means and measures" to protect environmental values, avoid environmental degradation, preserve historic, cultural, and natural resources, and promote the widest range of beneficial uses of the environment without undesirable and unintended consequences. 42 U.S.C. § 4331 (1982). Congress directed that to the fullest extent possible the policies, regulations and public laws of the United States shall be interpreted and administered in accordance with NEPA and that all agencies of the federal government should follow the procedures set out in NEPA. *Id.* § 4332. The procedures set out that responsible officials of all agencies should prepare a detailed statement covering the impact of particular actions on the environment, the environmental costs which might be avoided, and alternative measures which might alter the cost-benefit equation. *Id.* § 4332(2)(c).

63. Such plans were to include adequate provision for enforcing, monitoring and limiting emissions, and were designed to achieve and maintain the ambient air quality standards re-

bly could have prevented EPA from undertaking the strict and formal environmental assessments required by NEPA. Stringent timetables applicable to the setting of emission standards for new stationary sources could have presented similar problems. The court in *Portland Cement Ass'n v. Ruckelshaus*[64] viewed those time constraints[65] as a "substantial consideration" in deciding that EPA was not subject to NEPA.[66] *Portland Cement* and other cases following it, however, interpreted the new stationary source requirements as setting out the "functional equivalent" of a NEPA assessment.[67] In some instances, a regulatory authority was obliged to take account of cross-media impacts. But:

> [I]n other instances the relevant statutory provision would seem to preclude considerations of effects in other media. Thus the prospects of serious water pollution generated by air pollution control devices such as stack scrubbers, would apparently not be grounds for an extension of the deadlines for achieving the primary ambient air standards in section 110 of the Clean Air Act, nor would a comparable threat of air pollution permit EPA to excuse an industrial source of water pollution from complying with FWPCA's technology based effluent limitation deadlines.[68]

Finally, the express statutory exemption from NEPA assessments granted under the FWPCA, and later under the Clean Air Act, served to confirm and supply an even firmer foundation to the segmented and discrete approach to pollution control embodied in some of their provisions. Equally important, the exemption reflected EPA's own predilec-

ferred to. 42 U.S.C. § 1857c-5(a)(1) (1970). These plans had to be approved or disapproved within four months of submission. *Id.* § 1857c-5(a)(2). The sole criterion for approval or disapproval of a state implementation plan was whether it would provide for the attainment and maintenance of air quality standards within three years from its effective date. *Id.* § 1857c-5(a)(2)(A)(i). In interpreting this provision, EPA's task force concluded that even where national standards could be met only by creating substantial problems of water or land pollution, EPA was not empowered to reject state plans so long as they did provide for meeting the air quality standards. ENVIRONMENTAL PROTECTION AGENCY, APPLICATION OF THE NEPA TO EPA'S ENVIRONMENTAL REGULATORY ACTIVITIES: TASK FORCE REPORT 18 (1973) [hereinafter TASK FORCE REPORT].

64. 486 F.2d 375 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974).

65. For example, with regard to new stationary sources, the 1970 Clean Air Act directed the Administrator to publish a list of such sources within 90 days. 42 U.S.C. § 1857c (b)(1)(A) (1970). Within 120 days after publication, EPA had to propose emission limitations, labeled "standards of performance," and promulgate final standards within 90 days of this. *Id.* § 1857c-6 (b)(1)(B). Thus, EPA was allowed only 300 days from the date of enactment to promulgate new source emission standards. EPA pleaded inability to carry out the requirements of NEPA. They argued that the specific provisions of the Clean Air Act should take priority over "any peripheral or indirect consequences" referred to in NEPA. Brief for EPA at 21-22, Appalachian Power Co. v. EPA, 486 F.2d 427 (D.C. Cir. 1973) (No. 72-1079).

66. *Portland Cement*, 486 F.2d at 381.

67. *Id.* at 384.

68. R. STEWART & J. KRIER, *supra* note 29, at 800.

tions. Some analysts have suggested that the Clean Air Act and FWPCA "failed to even pay lip service to cross-media considerations,"[69] but this analysis is not entirely accurate. There were some integrative strands, and as this Article argues, these strands may be meshed with subsequent legislation to provide a more integrative web of policy and law. In the early 1970s, however, the thrust of the Clean Air Act, FWPCA and other legislation was decidedly segmental.

It is useful to understand why Congress legislated in the way it did.[70] To the extent that some reference to political theory is unavoidable, this part of the exposition supports the dynamic view of the policy-forming process taken by political scientists such as John Kingdon and James Q. Wilson. Kingdon rejects the doctrinally simplistic "public choice"[71] theories of legislation, as well as the usual political science preoccupation with pressure and influence.[72] Instead, he makes excursions into the world of ideas and politics, and recognizes their importance in the form and content of legislation.[73] Wilson has clarified why

69. B. RABE, *supra* note 1, at 11.

70. There is no pretence that what is being undertaken represents an excursion into institutional political science theory, or theories of legislation. This is no more than a modest effort to point to ideas, concepts and persons who influenced the legislation being discussed.

71. Like Kingdon, this Article rejects the unsophisticated "public choice" model of legislation advocated primarily by economists and also by a few legal camp followers. These "public choice" theorists apply economic theory to political decisionmaking, and treat the legislative process as a microeconomic system in which actual political choices are determined by the efforts of individuals and groups to further their own interest. *See* D. MUELLER, PUBLIC CHOICE (1979); J. BUCHANAN & G. TULLOCK, THE CALCULUS OF CONSENT 1-9, 17-39 (1962); A. DOWNS, AN ECONOMIC THEORY OF DEMOCRACY 27-31, 291, 295 (1957); Landes & Posner, *The Independent Judiciary in an Interest-Group Perspective*, 18 J. L. & ECON. 875 (1975); Easterbrook, *Statutes Domain*, 50 U. CHI. L. REV. 533 (1983). For a fuller review of public choice literature, see Farber & Frickey, *The Jurisprudence of Public Choice*, 65 TEX. L. REV. 873 (1987).

72. *See* R. DAHL, A PREFACE TO DEMOCRATIC THEORY 132-51 (1956); D. TRUMAN, THE GOVERNMENTAL PROCESS (2d ed. 1971) (especially vii-xii, xvii-xlviii, 501-35); A. BENTLEY, THE PROCESS OF GOVERNMENT 208-22, 260-61 (1967); T. LOWI, THE END OF LIBERALISM 42-63 (2d ed. 1979); E. SCHATTSCHNEIDER, THE SEMI SOVEREIGN PEOPLE 20-46 (1960); L. MILBRATH, THE WASHINGTON LOBBYISTS 28-53 (1963); R. BAUER, I. POOL & L. DEXTER, AMERICAN BUSINESS AND PUBLIC POLICY 127-53, 321-99 (1963); K. SCHLOZMAN & J. TIERNEY, ORGANIZED INTERESTS AND AMERICAN DEMOCRACY 1-13, 386-410 (1986).

73. Kingdon, *supra* note 51. Kingdon borrows from the "garbage can" model of organizational choice, described in Cohen, March & Olsen, *A Garbage Can Model of Organizational Choice*, 17 ADMIN. SCI. Q. 1 (1972), that views the political system as a garbage can in which "streams" exist. The streams consist of "problem recognition," "policy proposals," and "politics." *Id.* at 92. He suggests that the enactment of a law requires the convergence of all three streams, together with the presence of an "entrepreneur" to guide the law's passage through Congress. Kingdon's analysis can be adapted and applied to the Clean Air Act and FWPCA to explain their form and shape. "Problem recognition" consisted of how air and water pollution was perceived. The felt necessities of the time dictated that a serious problem existed. "Politics" refers to the state of public opinion, which after "Earth Day" was running heavily in favor of fast and effective environmental action. The "policy proposals" which arose in response to the perceived environmental crisis were influenced by a powerfully articulated disenchantment with New Deal beliefs in the ability of expert administrators to solve social problems. The "entrepreneurs" re-

the politics of legislation and regulation cannot be explained by one neat model of predictive behavior based on rent-seeking legislators.[74]

1. DISAFFECTION WITH NEW DEAL IDEALISM

The crucible of ideas in the 1960s gave rise to two different currents of thinking. On the one hand, environmentalism in the late 1960s was rooted in holistic and ecological thinking which found expression in the enactment of NEPA and the creation of EPA. On the other hand, serious doubts about whether the New Deal belief in independent and expert administrative agencies could creatively regulate a complex social problem in the public interest affected the approaches taken to environmental problems.[75] As we shall see in Section III C.1, beliefs in interconnected ecosystems offer a holistic, rather than a fragmented, view of the world. Translating this world view into practice required the integration of political and administrative policies dealing with the environment. Air, water and land were part of one environment and did not constitute separate and discrete entities. However, the complex and uncertain nature of environmental problems did not admit of preordained solutions. To legislate in advance on how the balance should be struck in the myriad of situations crying out for solutions would only create procrustean beds. Pollution control required fine and expert balancing that could best be done by expert and sensitive agencies vested with power over the whole environment and empowered to act in the particular circumstances of the case. An integrated approach called for a broad delegation of power. Arguments for integration based on ecological thinking, however, were countered by others which resisted the granting of wide discretionary power.

During the New Deal, champions of the administrative process prevailed with their view that there was an objective public interest that could be ascertained and implemented by expert administrators.[76] Their approach came under heavy attack from political scientists[77] on constitutional and political grounds. The constitutional objection has

sponsible for the Clean Air Act and FWPCA were Ralph Nader and Senator Edmund Muskie, respectively.

74. Wilson divides the politics of legislation and regulation into four types: majoritarian, interest group, client and entrepreneurial. J. WILSON, THE POLITICS OF REGULATION 367-70 (1980). *See infra* note 104 and accompanying text.

75. Ackerman & Hassler, *supra* note 34, at 1468.

76. Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1667, 1682-85 (1975); Ackerman & Hassler, *supra* note 34, at 1471-74; Sunstein, *Constitutionalism After the New Deal*, 101 HARV. L. REV. 421, 460-61 (1987).

77. Jaffe, *The New Deal Agency-A New Scapegoat*, 65 YALE L.J. 1068 (1956). *See also* Jaffe, *supra* note 10, at 232 (pointing out that lawyers, as distinct from political scientists, were partial to the independent administrative agencies).

still not been resolved,[78] but the political argument has nevertheless prevailed. Those attacking the technocratic philosophy charged that independent agencies, having no duly constituted master, were falling under the domination of private interests, usually the very interests whose activities they were supposed to regulate.[79] A somewhat different criticism was leveled by economists who saw regulation as being inefficient because it was created and administered for the benefit of well-organized interests at the expense of the public. These critics either advocated deregulation or regulatory reform. Ironically, political and economic critics of regulation agreed that regulation benefitted the regulated rather than the public.[80]

By the end of the 1960s, much of the regulation in the United States was seen to be in "deep trouble."[81] It became necessary to face up to the problem of how agencies had misused and even abused the broad delegated power conferred upon them. Confidence in the ability of administrative agencies to implement statutes effectively and in the public interest had apparently evaporated. Many influential commentators referred to the problems arising out of the unsatisfactory or inadequate implementation of the legislative mandates given to administrative agencies. They suggested that one way of remedying this problem lay in statutes with clear mandates and definite obligations.[82] One reason for the malaise was the nature of the legislative mandate. According to one critic, statutory mandates lacked clarity and rarely provided clear directions to the new agency.[83] The vagueness was deliberate and resulted from the lobbying of well-organized private groups who were the subject of the regulation. Having failed in their efforts to prevent the

78. The constitutional objection was, first, that all executive functions should be subject to presidential control and that independent agencies were a headless fourth branch of government. Secondly, it was argued that these independent agencies combined powers previously distributed among the three traditional branches. *See* S. BREYER & R. STEWART, ADMINISTRATIVE LAW AND REGULATORY POLICY 128 (2d ed. 1985).

79. *See, e.g.*, T. LOWI, *supra* note 72; R. FELLMETH, THE INTERSTATE COMMERCE COMMISSION: THE PUBLIC INTEREST AND THE ICC 311-25 (1970); J. TURNER, THE CHEMICAL FEAST 185-246 (1970).

80. *See* sources cited *infra* note 179; P. MACAVOY, THE CRISIS OF THE REGULATORY AGENCIES (1970). For a succinct survey of these criticisms, see S. BREYER & R. STEWART, *supra* note 78, at 36-38. For a fuller discussion, see *infra* text accompanying notes 178-221.

81. R. NOLL, REFORMING REGULATION 110 (1971). Whether this perception was valid is open to question. *See* J. WILSON, *supra* note 74, at 362.

82. *See* M. BERNSTEIN, REGULATING BUSINESS BY INDEPENDENT COMMISSION 286 (1955); Bernstein set up an influential model of agency obsolescence in which he traced the cycle of a regulatory agency from gestation to youth, youth to maturity, and maturity to old age when the agency suffered debility and decline and "surrendered" to the regulated. *Id.* at 74-102. *See also* K. DAVIS, ADMINISTRATIVE LAW TREATISE 9-53 (1958); H. FRIENDLY, THE FEDERAL ADMINISTRATIVE AGENCIES: THE NEED FOR BETTER DEFINITION OF STANDARDS 165-68 (1962); T. LOWI, *supra* note 72.

83. M. BERNSTEIN, *supra* note 82, at 75-76.

enactment of legislation affecting them, these private groups concentrated on making the regulatory provisions as vague and innocuous as possible,[84] confident that they could "capture" the agency in question. The unwillingness or inability of Congress to give better directives to its agencies was also criticized.[85]

Professor Kenneth C. Davis, in his Administrative Law Treatise and later in his book *Discretionary Justice*,[86] had demonstrated with compelling and devastating effect, the injustice and dangers of unnecessarily wide delegation of discretionary power. In his book *The End of Liberalism*,[87] Theodore Lowi synthesized the criticisms of the New Deal agencies and suggested that one remedy for many of their troubles might lie in statutes which had clear goals and explicit means of implementation.[88] These new statutory norms would target and institutionalize the public needs which led to the statute in the first place, and would make it difficult for the agency to postpone the performance of its obligations.[89] One of the central themes present when environmental legislation was being formed, therefore, was that expertise could be an excuse for inaction, and even worse, could be captured by special interests. The remedy suggested by believers in regulation was the enactment of legislation setting forth explicit goals, specific means by which these goals could be attained, and rigorous timetables in which to do so.

2. PRAGMATISM AND INCREMENTALISM

Another compelling policy stream which converged with New Deal dissatisfaction with expert solutions to complicated problems was that of pragmatic incrementalism or "muddling through." A number of writers emphasized the incremental nature of policy formulation and decisionmaking[90] and doubted the practical applicability of a comprehensively rational model of decisionmaking. They pointed out that decisionmakers have neither the assets nor the time to collect the information required for rational choice. When making choices, decisionmakers do not confront a limited universe of relevant conse-

84. *Id.* at 96.

85. H. FRIENDLY, *supra* note 82, at 168.

86. *See supra* note 82; K. DAVIS, DISCRETIONARY JUSTICE (1977).

87. *See supra* note 72.

88. This was not the only suggested method of relief. Others demanded that the agencies should redeem their New Deal promise by generating clear standards through creative rulemaking. *See* Ackerman & Hassler, *supra* note 34, at 1479. Another solution was to look to the courts for action. *See* Jaffe, *supra* note 10, at 235.

89. T. LOWI, *supra* note 72, at 125-56.

90. *E.g.*, D. BRAYBROOKE & C. LINDBLOM, A STRATEGY OF DECISION 37-57, 61-110 (1963); R. DAHL & C. LINDBLOM, POLITICS, ECONOMICS AND WELFARE 82-88 (1953).

quences; instead, they face an open system of variables in which all consequences cannot be surveyed. A decisionmaker attempting to adhere to the tenets of a rationalistic model will become frustrated, exhaust his resources without coming to a decision, and remain without an effective decisionmaking model to guide him.[91] With specific reference to environmental policy, Charles Lindblom was skeptical about integrated environmental management. At a conference organized under the auspices of the EPA in 1973, he articulated his doubts about a policy which adopted an holistic approach to the environment. He argued that precisely because everything is interconnected, the environmental problem is beyond our capacity to control in one unified policy. The very enormity of the interconnected environment makes it impossible to treat as a whole. Critical points of intervention (tactically defensible or strategically defensive points of intervention) must be found.[92] According to this argument, a step-by-step approach will solve a problem better than one based upon the necessarily incomplete analysis offered by comprehensive rationality.

The appeal of incrementalism as an approach to environmental protection becomes immediately evident. When faced with a particularly difficult problem of pollution in one medium, the natural response is to solve that problem. An environmental crisis usually manifests itself in one medium, and its linkage with other media is often unknown. Finding time to devise a comprehensively rational way of dealing with the problem required exceptional sagacity, especially when from Boston to Washington, a summer-long siege of "daily air pollution alerts" left "little doubt . . . that the country was facing an air pollution crisis."[93] Congressman Rogers, referring to the problems of air pollution, could well have been echoing the feelings of fellow congressmen in stressing the immediacy of the problem: "Air pollution is one of the most pressing forms of pollution because unlike others, the air around us is unavoidable. We do not have to swim or look at dying lakes. But

91. In his well-known article *The Science of Muddling Through*, Professor Charles Lindblom explained that a "rational-comprehensive" analysis which adopts a synoptic view of a problem, collects all relevant information, and explores all relevant solutions after considering all relevant answers, in order to arrive at a policy decision, is quite impossible. Such an approach, which is admittedly marked by clarity of objective, explicitness of evaluation, a high degree of comprehensiveness of overview, and possible quantification of values for mathematical analysis, was only possible when dealing with small scale problems with a very limited number of variables. Lindblom, *The Science of Muddling Through*, 19 PUB. ADMIN. REV. 79, 79-82 (1959) [hereinafter Lindblom, *Muddling*]. He has suggested, therefore, that poor as it is, incremental politics ordinarily offers the best chance of offering beneficial political changes. Lindblom, *Still Muddling, Not Yet Through*, 39 PUB. ADMIN. REV. 517, 521 (1979).

92. Lindblom, *Incrementalism and Environmentalism*, in MANAGING THE ENVIRONMENT 83 (1973).

93. 116 CONG. REC. 42,381 (1970) (remarks of Sen. Muskie).

everyone must breathe."[94] In that context, the need to do something about air pollution at least, and to cross one bridge at a time, becomes understandable. The same was true of water pollution, and politicians responded to the call for quick, demonstrable action against pollution in the legislation that followed.

3. THE POLITICAL CONTEXT

A fragmented approach to legislation also arose from the way in which jurisdiction over environmental legislation was carved up between congressional committees.[95] Environmental legislation is almost entirely drafted and piloted through Congress by committees. It is a rare occurrence for the full House or Senate to overturn a committee decision.[96] The committees responsible for various aspects of environmental law and policy guard their jurisdiction jealously.[97] In the late 1960s and the early 1970s, the Subcommittee on Air and Water Pollution Control of the Public Works Committee had the primary responsibility for air and water pollution legislation. It was headed by Senator Muskie, then the dominant congressional figure in pollution control.[98] Another committee which assumed some influence and importance in formulating environmental policy was the Committee on Interior and Insular Affairs, chaired by Senator Henry Jackson. He was the architect of NEPA, which sought to place environmental policy within an integrated framework.[99] Muskie resisted attempts to extend NEPA to air and water pollution control agencies. At one level, his approach to NEPA was an exercise in turf protection.[100] Accordingly, it has been suggested that Muskie was more concerned with keeping air and water pollution control under the jurisdiction of the subcommittee of the Senate Public Works Committee, which he chaired, than with preventing integration. He was engaged in the gambit of preventing encroachment

94. 116 CONG. REC. 19,210 (1970).

95. Committee jurisdiction covers three areas: (1) formulating and approving legislation, (2) conducting oversight hearings and investigations, and (3) reviewing and approving appropriations. *See* J. DAVIES & B. DAVIES, THE POLITICS OF POLLUTION 61-79 (2d ed. 1976).

96. *Id.* at 61.

97. It has been pointed out that "jurisdictional politics is an ubiquitous feature of present day congressional policy making. To hold jurisdiction means to claim a piece of the action. Therefore, jurisdiction is as central to the life of a member or a congressional subunit as votes or the ability to hire staff." Davidson, *Subcommittee Government: New Channels for Policy Making*, in THE NEW CONGRESS 118-19 (T. Mann & N. Ornstein eds. 1981).

98. J. DAVIES & B. DAVIES, *supra* note 95, at 63-66; A. MARCUS, *supra* note 52, at 53-78.

99. *See supra* note 62.

100. Professors Ackerman and Stewart have noted that powerful organized interests such as congressional committees have vested interests in protecting the status quo. Ackerman & Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1333-34 (1985).

on the agencies under his committee by Jackson's Interior and Insular Affairs Committee, which had drafted NEPA.[101]

The symbiotic political relationship between public interest activists and subcommittee chairpersons interested in gaining national prominence has been explained and substantiated.[102] What happened with the Clean Air Act was strikingly different. Muskie had been the chief architect of the air and water pollution legislation passed by Congress in the 1960s, and his Senate Subcommittee on Air and Water Pollution began drafting amendments to the Clean Air Act in 1970. Case studies on the enactment of the Clean Air Act reveal the extent to which Ralph Nader's intervention, through the publication of John Esposito's *Vanishing Air* in 1970, led to a dramatic tightening of the provisions of the final bill presented by Muskie's subcommittee.[103] They also reveal the extent to which Muskie's presidential campaign in 1972 made him especially vulnerable to political pressure of the entrepreneurial kind.

James Q. Wilson has clarified four different manifestations of the politics of legislation and regulation: majoritarian, interest group, client and entrepreneurial. According to Wilson, the Clean Air Act of 1970 was not the result of interest group politics, but rather the entrepreneurial politics of Ralph Nader.[104] Wilson's explanation is con-

101. Comment, *Implementation of the Clean Air Act: Should NEPA Apply to the Environmental Protection Agency?*, 3 ECOLOGY L.Q. 597, 602 (1973) [hereinafter *Should NEPA Apply*]; Comment, Kalur v. Resor, *Water Quality and NEPA's Application to EPA*, 2 ENVTL. L. REP. 10,025, 10,029 (1972) [hereinafter *Water Quality*]. For a seemingly contrary view, see Liroff, who suggests that "[w]hile the Senators' disagreements were largely based on jurisdictional jealousies, they derived as well from a fundamental difference in outlook concerning the manner in which protection for environmental values should be provided in federal decision making." R. LIROFF, A NATIONAL POLICY FOR THE ENVIRONMENT 11 (1976). It would seem, however, that this 'fundamental difference' related to the efficacy of policing NEPA, and not to the need for integrated environmental evaluation and action. *Id.* at 18-20.

102. Wilson, *The Politics of Regulation*, in SOCIAL RESPONSIBILITY AND THE BUSINESS PREDICAMENT 145 (J. McKie ed. 1974).

103. A. MARCUS, *supra* note 52, at 53-85; ACIR, PROTECTING THE ENVIRONMENT, *supra* note 10, at 23-24; Elliot, Ackerman & Millian, *Toward a Theory of Statutory Evolution: The Federalization of Environmental Law*, 2 J. L. ECON. & ORGANIZATION 313 (1985).

104. Traditional interest group politics sees legislation as the outcome of a competitive struggle among groups with differing interests. *See supra* note 72. However, Wilson's persuasive analysis limits the application of interest group politics to situations in which the public at large do not see themselves being affected by a regulation. *See supra* note 74. A regulation attracting interest group politics will typically benefit a small group at the expense of a comparable small group. Each side has a strong incentive to organize and exercise political influence. *Majoritarian politics* is found where the costs and benefits of a contemplated action are widely distributed and most of society is expected to gain or pay. Interest groups have little incentive to form around such issues because no small, definable segment of society, such as an industry, occupation or locality, can expect to capture a disproportionate share of the benefits. Where costs and benefits are narrowly concentrated, conditions are ripe for *interest group politics*. Where the benefits of a prospective policy are concentrated, but the costs widely distributed, *client politics* is likely to result. Some small, easily organized group will benefit, and thus have a powerful incentive to organize and lobby. Since the costs of the benefit are distributed at a low per capita rate over a large number of

sistent with an arresting theory of the "prisoner's dilemma" offered by Elliot, Ackerman and Millian.[105] They argue that the Clean Air Act was enacted at a time when environmentalists were not well organized as an interest group in Washington. Accordingly, interest group politics as usually understood did not operate. However, there did exist unrestrained competition between two presidential aspirants—President Nixon and Senator Muskie[106]—for credit from legislation assuring the public of a cleaner world. In 1970, Muskie was vulnerable not only because he was a presidential candidate, but also because the 1967 Air Quality Act, which he had drafted, was not working satisfactorily.[107] Elliot, Ackerman and Millian's theory appears to be well substantiated by the sequence of events leading to the Clean Air Act. On December 10, 1969, Muskie introduced a bill which sought little more than an incremental change to the law controlling air pollution.[108] Two months later, Nixon submitted his own proposals to Congress calling for a far more substantial change in the law, necessitating a major structural change in existing federal air pollution statutes.[109] Three weeks after Nixon's proposal, Nader's task force published their report harshly criticizing Muskie and alleging that he was soft on industry.[110] In August, Muskie's subcommittee reported out a revised bill which essentially followed Nixon's proposals but was even tougher. That tougher and more stringent law—the 1970 Clean Air Act—was subsequently signed into law by Nixon, despite his grave reservations over its exact-

people, there is little incentive to organize in opposition. Finally, where a policy is proposed that will confer general but small benefits at a cost to be borne chiefly by a small segment of society, we witness *entrepreneurial politics*. Where this is the case, the incentive to organize is strong for opponents of the policy, but weak for the beneficiaries while the political system provides many points at which opposition can be registered. In these circumstances, it requires the efforts of a skilled entrepreneur who can mobilize latent public sentiment, associate the legislation with widely shared values, and put the opponents of the plan publicly on the defensive.

105. Elliot, Ackerman & Millian, *supra* note 103.

106. Senator Muskie was chairman of the Subcommittee on Air and Water Pollution of the Senate Committee on Public Works. He had been involved in pollution control for many years and was a frontrunner among the Democratic Party's candidates for president. *See generally* A. MARCUS, *supra* note 52, at 53-82.

107. *Id.*

108. Marcus' characterization of it as a "minor tinkering" with the 1967 law has been endorsed by Elliot, Ackerman & Millian. *Id* at 60; Elliot, Ackerman & Millian, *supra* note 103.

109. "Environmental Quality: The Presidential Message to Congress Recommending a 37 Point Administrative and Legislative Program," WEEKLY COMP. PRES. DOC., 160, 164 (1970). The proposals, though advocating a qualitative change to the existing structure of air pollution by establishing nationwide air quality standards and national emission standards, was still fragmented in its approach and dealt with air, water and solid waste management as if they were independent and separate problems. The message, however, did recognize that federal institutions dealing with the environment and natural resources had developed piecemeal over the years, and it appointed Roy Ash to make a thorough study of the organization of federal environmental, natural resource and oceanographic programs. *Id.* at 171. It was the work of the Ash reorganization study that laid the foundations for EPA. *See generally* A. MARCUS, *supra* note 52, at 31-52.

110. J. ESPOSITO, VANISHING AIR 290-92 (1970).

ing demands on industry. Elliot, Ackerman and Millian's conclusions are that Nader's report, threatening Muskie with the loss of his reputation as Mr. Clean, had the effect of trapping both Nixon and Muskie in a politician's dilemma. The report compounded pressure on both politicians by exploiting the difficulty that the public has in identifying politicians who deserve credit for enacting legislation in response to perceived need. As a result, both were forced to support legislation more stringent than either would have preferred.

Unfortunately, the Nader organization, while executing a remarkable coup, also succeeded in further entrenching the fragmented approach. Though they were scathing critics of the bureaucratic inertia displayed by the National Air Pollution Control Administration (NAPCA) in the Department of Health, Education and Welfare (HEW),[111] Esposito and Nader displayed little awareness of the interrelated nature of the problem of air pollution. They denigrated the difficulties of pollution control caused by the need to relate emission standards to ambient air quality standards. They ridiculed the reliance on experts.[112] Underlying their criticisms was a deep suspicion of the view that the atmosphere should be used to its optimal capacity. This view was seen as the basis on which the environment was exploited and plundered by corporate polluters in city after city.[113] Overall, these criticisms reflected dissatisfaction with bureaucratic implementation and a disillusionment with the New Deal ideal of expert administrators. The Nader answer, insofar as one was offered, appeared to be a visible and simple one: clear national emission standards.[114] That proposal was only partially adopted by the Clean Air Act. Instead, Muskie's subcommittee finally set forth explicit goals accompanied by defined means, clear deadlines and rigorous timetables. In so doing, Muskie's subcommittee sought "handles"[115] on environmental degradation that were fixed to fragmented and incremental solutions to the problems of dirty air.

4. BUREAUCRATIC PREFERENCE

The EPA was created by the Nixon Administration with the specific objective of integrating the various legislative mandates entrusted to it. Nixon's Administration envisioned an EPA that would end much

111. *Id.* at vii-ix (Nader commenting in foreword to the book).

112. *Id.* at 264. Admittedly, the immediate reference was to company experts, but the implications were clearly spelled out. NAPCA experts relied upon the "already well established tyranny of indentured experts." *Id.*

113. *Id.* at 259-98.

114. *Id.* at 307.

115. *See* A. MARCUS, *supra* note 52, at 70-71.

of the fragmentation of environmental policy. Douglas Costle, who later became EPA's administrator, directed the White House task force that handled the transition between congressional approval of the new agency and the actual start of EPA's operations. Costle believed that a reorganization of environmental regulation along functional lines was the desired long-term goal; however, he advocated that an incremental strategy was preferred in the short term.[116]

Costle recommended a three-stage plan. Initially, the five programs dealing with air, water, pesticides, solid waste and radiation, and noise would be preserved. After a period of time, three new assistant administrative offices would be created along functional lines, dealing with planning and management, standards and compliance, and research and monitoring. The five individual programs would, however, retain their separate identity in administrative offices. Finally, after the passage of a reasonable amount of time, the program distinctions were to be eliminated entirely.[117]

There were a number of reasons for Costle's caution in pushing forward with integration. To begin with, the differing policy streams leading to the creation of EPA and the passage of the 1970 Clean Air Act, proceeded along parallel paths.[118] The White House's vision of comprehensive environmental management leading to the creation of EPA was not a vision shared by Congress or embodied in the Clean Air Act of 1970. Consequently, EPA mirrored a curious policy division. On the one hand, it housed those loyal to the original philosophy of NEPA and EPA, while on the other, it was staffed by those committed to a programmatic administration based on fragmented policies. EPA was unprecedented in terms of the number and size of disparate agencies brought under a new organizational roof.[119] In many cases, the agencies had been rivals who enjoyed substantial autonomy. Costle reasoned that there would be resistance and disruption if integration were attempted immediately.[120] Most bureaucrats within EPA had a program perspective. They were tied to specific legislation, functions and

116. *Id.* at 104.

117. *Id.*

118. *Id.* at 54-57.

119. There were 10 major administrative units in all. The Federal Water Quality Administration from the Interior Department was the largest with 2670 employees and a budget of over $1 billion. NAPCA from HEW was second largest with 1100 employees and a budget of $110 million. Other major units included the Pesticides Regulation Division from the Agriculture Department with 425 employees, the Bureau of Radiological Health from HEW with 350 employees, and the Office of Pesticides Research from HEW with 275 employees. Cohen, *EPA: A Qualified Success*, in CONTROVERSIES IN ENVIRONMENTAL POLICY 179 (S. Kamieniecki, R. O'Brien & M. Clarke eds. 1986).

120. A. MARCUS, *supra* note 52, at 103-04; J. DAVIES & B. DAVIES, *supra* note 95, at 107-12; ACIR, PROTECTING THE ENVIRONMENT, *supra* note 10, at 22.

appropriations. They took their cues from Congress and reflected the pragmatic, fragmented policies of that body.[121]

Second, Costle feared that the agency would undergo a period of confusion and even chaos while its programmatic inheritance was broken down and rebuilt along functional lines.[122] The resulting confusion would prevent it from meeting the obligations of its legislative mandates and particularly the inflexible demands of the Clean Air Act. He feared the agency would come out badly injured after such a baptism of fire. This difficulty was compounded by the fear that managers of EPA's program sections would not go along with a fully integrated plan.

William Ruckelshaus, EPA's first administrator, appeared to be even more apprehensive than Costle. He accepted and carried out the first two phases of Costle's plan, but not the third phase which was to fully integrate EPA.[123] The primary reason for this was that even the limited division of duties in the second phase had led to conflict and restlessness. Apart from being nervous about their position and prospects in a new organization, the bureaucrats he had inherited from other departments and programs were loyal to specific statutes and programs and were unable to view the environment as a whole. These bureaucrats were familiar with, and committed to, these particular legislative mandates, and feared that concrete directives were in danger of being ignored in the move towards integration. They also had access to senators and representatives of congressional committees who had enacted such legislation and continued to supervise its implementation. Faced with the prospect of bureaucratic resistance and congressional criticism, Ruckelshaus decided to play safe.[124] These initial rumblings of discontent, signifying a bureaucratic preference for fragmentation, led to EPA's plea that it be excluded from NEPA, and set the stage for EPA's virtual rejection of an integrated approach.[125]

121. J. DAVIES & B. DAVIES, *supra* note 95, at 108.

122. A. MARCUS, *supra* note 52, at 103.

123. The initial history of the EPA is recounted by Marcus. *Id.* at 85-119; *See also* J. DAVIES & B. DAVIES, *supra* note 95, at 108-18. Today, the Ruckelshaus design remains basically unchanged and "continues to be stuck in the same half-programmatic, half functional pattern." DAVIS, *The United States: Experiment and Fragmentation*, in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA (N. Haigh & F. Irwin eds. 1989) (forthcoming).

124. A. MARCUS, *supra* note 52, at 101-06; Marcus, *Environmental Protection Agency*, in THE POLITICS OF REGULATION 275-77 (J. Wilson ed. 1980).

125. It may be possible to explain Ruckelshaus' behavior on the basis that the crucial concern of any agency head is how to maintain the agency as a viable, credible, steady institution, rather than to make decisions that achieve the agency's prescribed goals. *See, e.g.*, C. BARNARD, THE FUNCTIONS OF THE EXECUTIVE 215, 231-34, 251-57 (1966); J. WILSON, POLITICAL ORGANIZATIONS 9-10, 13 (1973); P. SELZNICK, TVA AND GRASS ROOTS: A STUDY IN THE SOCIOLOGY OF FORMAL ORGANIZATIONS 12-13 (1969).

In several cases in which the issue was raised,[126] EPA insisted that it was not bound by the provisions of NEPA and sought to justify its position on broad policy grounds. The foundation of its policy argument was based on the nature of the objectives and deadlines embodied in the statutes EPA administers, especially the Clean Air and Clean Water Acts. The objectives and deadlines of these acts required rapid and expeditious action that would be delayed by the time involved in complying with NEPA procedures. Further, EPA argued that both acts precluded consideration of the environment as a whole, and by implication, stood in the way of an integrated approach to pollution control. EPA advanced these arguments in *Anaconda Co. v. Ruckelshaus*.[127] In *Anaconda*, the plaintiff industry sought to demonstrate that the control strategy and emission standard for sulfur dioxide proposed by EPA, which referred to state implementation plans, would create an "enormous solid waste disposal problem."[128] On appeal, the district court's holding that EPA should comply with NEPA was vacated. The court of appeals held that EPA's action was not subject to judicial review.[129] The reasoning of the district court in *Anaconda* was rejected as "myopic" in *Portland Cement Ass'n v. Ruckelshaus*,[130] a case dealing with new source performance standards. The plaintiff industries argued, inter alia, that NEPA applied and that EPA should carry out a detailed cost-benefit analysis that evaluated pollution reduction levels against incremental increases in industry expenditure.[131] The court decided that it was not necessary to reach the broad question of NEPA's applicability to EPA because section 111 of the Clean Air Act constituted a narrow exemption from NEPA.[132] Judge Leventhal resolved that any determination of the "best system of emission reduction" which took

126. Appalachian Power Co. v. EPA, 477 F.2d 495 (4th Cir. 1973); Buckeye Power Inc., v. EPA, 481 F.2d 162 (6th Cir. 1973), *cert. denied sub nom.* Big Rivers Elec. Corp. v. Environmental Protection Agency, 425 U.S. 934 (1976); Duquesne Light Co. v. EPA, 481 F.2d 1 (3d Cir. 1973), *vacated and remanded*, 427 U.S. 902 (1976); Essex Chem. Corp. v. Ruckelshaus, 486 F.2d 427 (D.C. Cir. 1973); Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974); Anaconda Co. v. Ruckelshaus, 352 F. Supp. 697 (D. Colo. 1972), *rev'd*, 482 F.2d 1301 (10th Cir. 1973); Getty Oil Co. v. Ruckelshaus, 342 F. Supp. 1006 (D. Del. 1972), *aff'd*, 467 F.2d 349 (3d Cir. 1972), *cert. denied*, 409 U.S. 1125 (1973); Environmental Defense Fund v. EPA, 489 F.2d 1247 (D.C. Cir. 1973); Wyoming v. Hathaway, 525 F.2d 66 (10th Cir. 1975), *cert. denied*, 426 U.S. 906 (1976); Maryland v. Train, 415 F. Supp. 116 (D.Md. 1976).

127. *See supra* note 126; *Should NEPA Apply*, *supra* note 101, at 622.

128. *Id.* (citing Brief for Anaconda Co. at 38, Anaconda Co. v. Ruckelshaus, 352 F. Supp. 697 (D. Colo. 1972) (No. C-4362)).

129. *Anaconda*, 482 F.2d at 1301. First, because Congress had made the court of appeals the exclusive forum, and second, because the proposed regulation had not yet been adopted. *Id.* at 1304-05.

130. 486 F.2d 375.

131. *Should NEPA Apply*, *supra* note 101, at 617 (citing Brief for Portland Cement Ass'n at 35, Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375 (D.C. Cir. 1973) (No. 72-1073)).

132. *Portland Cement*, 486 F.2d at 384.

"into account the cost of achieving such reduction"[133] constrained the Administrator to consider counterproductive environmental effects, as well as the cost to industry.[134] Together with a statement of reasons, these factors constituted the "functional equivalent" of a NEPA impact statement and exempted EPA from the stricter requirements of NEPA.[135] The fact that the time involved in complying with NEPA, as interpreted by the courts, would have prevented EPA from meeting the rigorous and inflexible time schedules set out in the Clean Air Act was regarded as a "substantial," even if it was not a decisive, consideration.[136]

A similar decision was reached in *Essex Chemical Corp. v. Ruckelshaus*,[137] a case consolidated with *Appalachian Power Co. v. EPA*.[138] The petitioner corporation maintained, inter alia, that in promulgating standards for sulfuric acid, EPA had failed to consider the adverse impact on water caused by tail gas scrubbers which the new source performance standards required.[139] The corporation argued that EPA should have complied with NEPA. EPA admitted in response that the setting of standards might involve other environmental impacts. However, because the language establishing NEPA was general and the provisions of the Clean Air Acts were specific, the specific provisions should prevail.[140] EPA argued that strict time limits were set for compliance because the Clean Air Act was based on the premise that air pollution was at crisis levels.[141] The application of NEPA would be inconsistent with the time constraints central to the Clean Air Act. The court found no reason to divert from or expand on the logic of the *Portland Cement* decision, and held that NEPA impact statements were not a condition to making section 111 determinations.[142]

The court in *Kalur v. Resor*[143] went against the tide, and held that the Army Corps of Engineers was fully subject to NEPA in exercising its powers under the Refuse Act Permit Program. The Corps of Engineers could not delegate its statutory authority under the Refuse Act to EPA.[144] Congress responded by exempting EPA from that responsibility. The Clean Water Act does not require EPA to prepare impact state-

133. *Id.* at 385.

134. *Id.*

135. *Id.* at 384.

136. *Id.* at 381.

137. 486 F.2d 427 (D.C. Cir 1973), *cert. denied*, 416 U.S. 969 (1974).

138. *Id.*

139. *Id.* at 439.

140. Brief for EPA at 21, Appalachian Power Co. v. EPA, 486 F.2d 427 (D.C. Cir. 1973) (No. 72-1079).

141. *Id.* at 15. *See also Should NEPA Apply*, *supra* note 101, at 606.

142. *Appalachian Power*, 486 F.2d at 431.

143. 335 F. Supp. 1 (D.D.C. 1971).

144. *Id.* at 14-15.

ments to accompany its actions except when dealing with grants to municipalities for waste treatment facilities or with permits for discharges from new sources.[145] Similarly, the Energy Supply and Environmental Co-ordination Act of 1974 provided that no action taken by EPA under the Clean Air Act required an environmental impact statement.[146] Furthermore, EPA determined that regulations under the Resource Conservation and Recovery Act of 1976, the Toxic Substances Control Act of 1976, the Safe Drinking Water Act, and the Noise Control Act are exempt from NEPA.[147]

As a result, while policies and laws based on integrated perspectives did exist, they were swamped by a confluence of policies and politics. Those policies and politics, as we have seen, included dissatisfaction with New Deal administration, incrementalism, the competition for environmental credit between President Nixon and Senators Muskie and Jackson, rivalry between congressional committees, and the preference of bureaucrats for programmatic administration.

III. An Integrated Approach

A. Towards a Concept of Integration

The sheer magnitude and complexity of an integrated analysis does pose serious problems for its practical application. Lindblom has an important point to make in his criticism of the rational model of administration when pointing out that a comprehensive evaluation of how a given decision might affect all other decisions can be quite unrealistic.[148] The need to be realistic affords one good reason for distinguishing environmental integration from economic models of decision-making and regulatory reform that are based upon comprehensive studies of all risks.[149] This still leaves us with questions about the principles upon which an integrated approach should proceed.

This section will discuss the frameworks within which an integrated approach could be structured. The reference to an integrated approach to pollution control should not obscure the fact that a multitude of forms are implied by such an approach. An integrated approach can be applied in a myriad of ways and assume a variety of patterns. The principles of an integrated approach lend themselves to diverse combinations and permutations that can be applied in variegated cir-

145. Clean Water Act of 1977, 33 U.S.C. § 1371(c)(1) (1982).

146. 15 U.S.C. § 793(c)(1) (1982).

147. 44 Fed. Reg. 64,174 (1979).

148. Lindblom, *Muddling*, *supra* note 91; Pfiffner, *Administrative Rationality*, 20 Pub. Admin. Rev. 125 (1960). *See also supra* text accompanying notes 91-94.

149. *See infra* text accompanying notes 178-221.

cumstances. The manner and form of integration could, therefore, differ from case to case.

1. Strategic Principles

The first principle underlying an integrated approach is that pollution control should be based upon an holistic, rather than a discrete or segmented, view of the environment. The environment should not be artificially divided into separate areas of air, water and land. A necessary corollary of this premise is that administrative structures dealing with environmental protection should be capable of dealing with the environment as a whole.[150]

Secondly, an integrated approach requires that the major deficiencies of a fragmented approach be corrected. Both inputs and final products must be considered, and systematic environmental assessments should be made across all three media—a "longitudinal" analysis. Finally, cross-media pollution controls based on integrated analysis should be adopted.[151] These principles appear attractive and worthy of praise. They could be accepted and acclaimed rather like motherhood and blueberry pie. The real difficulty lies in applying them. While the exact manner of their application is beyond the compass of this Article, an appreciation of the core problem of implementation will be considered in this discussion.

2. Comparative Lessons

The environment in which we live cannot be encapsulated within national boundaries. The bio-physical problems caused by pollution in different parts of the world are often identical and can resist independent national solutions. An exposure to, and a study of, comparative experiences may shed light on possible solutions.[152] The difficulties encountered by fragmented controls figure significantly among the shared environmental problems of the international community. A transnational perspective offers a vantage point from which to gain some impression of how others perceive the problems arising out of fragmented controls, as well as the nature of any integrated responses to those

150. National Academy of Public Administration, Steps Toward a Stable Future 5, 7, 15, 17 (1986) [hereinafter Stable Future].

151. *See supra*, Diagram A.

152. While problems found in other areas of law such as tort, contract, administration, property, corporations and criminal law have varying degrees of similarity and encourage comparative inquiry, the unique, obvious and inescapable commonality of environmental problems make comparisons between environmental regimes in different countries a more rewarding subject of study. For the international dimensions of cross-media pollution, see Teclaff & Teclaff, *International Control of Cross-Media Pollution—An Ecosystems Approach*, 27 Nat. Res. J. 21 (1987).

problems. In addition to the United Kingdom,[153] the Commission of the European Communities,[154] Sweden[155] and the Netherlands[156] have taken some steps towards integrated pollution controls.

The United Kingdom has a long history of pollution control legislation. This legislation initially dealt with public health[157] and now boasts an extensive corpus of laws, policies, and agencies spanning land use planning and the control of pollution in general.[158] These laws and

153. *See infra* text accompanying notes 157-64.

154. *Resolution on the Continuation and Implementaion of an Action Programme For The Period 1987-1992*, 30 O.J. EUR. COMM. No.C. 289 3 (1987) (resolution of the Council of the European Communities adopted October 19, 1987). The text of the Action Programme is found in Commission of the European Communities, *Draft for a Resolution of the Fourth Action Programme*, 30 O.J. EUR. COMM. NO.C. 70 3-45 (1987) [hereinafter *Action Programme*]. Action programs are the instruments by which the Commission of the European Communities outlines its legislative intentions. There have been four such programs in the last 15 years, and they provide a policy framework within which European Community environmental laws will be made. They are not legislative schedules, but incorporate broad formulations of policy. Not all the policies set out in action programs are the subject of legislation. These action programs, nonetheless, offer good evidence of the direction of European Community policy and law. *See* N. HAIGH, EEC ENVIRONMENTAL POLICY AND BRITAIN 9-11 (2d ed. 1987).

155. In Sweden, the Environment Protection Act of 1969 laid the foundations for cross-media pollution control by providing that pollution should be controlled at its source. This act replaced the existing sectoral control by providing that pollution "from land, buildings or installations," whether it be caused by water, air or land or take the form of noise, should come within its jurisdiction. The authority to grant permits to major polluting sources is placed in the hands of the National Franchise Board. One permit covers discharges to air, water and land. In deciding what the permissible limits of pollution should be, Sweden does not rely upon predetermined standards, whether they be ambient or source related, but on the best practicable technological means. Even though major pollutants are regulated according to the environmental medium of release, each waste stream is ultimately assessed according to its contribution to the totality of pollution. Hinrichson, *Integrated Permitting and Inspection in Sweden* (ch. 7), in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA, *supra* note 123.

156. The Netherlands boasts of a comprehensive body of environmental law and policy which is being adapted to incorporate a cross-media approach. Prior to 1984, a permit system operated in the differing media, and the granting of permits was influenced by broad policy declarations called "indicative multi-year programmes." By the late 1970s, the limitations inherent in dividing environmental protection into separate compartments became clear, and work began on transforming the entire system into an integrated regime. In order to effect this transformation, much of the existing legislation will be superseded by a broad framework act, granting power to control pollution at the source. Law and policy under the framework act, together with strategic and operational plans and environmental impact assessments, will constitute the foundations for cross-media pollution control. The structure of environmental administration which is built along single medium lines will, however, remain unchanged. *See* J. DE GRAFFE & J. POLACK, THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE NETHERLANDS (1977); Bennett, *Policy Planning in the Netherlands* (ch. 6), in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA, *supra* note 123.

157. The legislation is at least traceable to the Benthamite-inspired reforms of Chadwick during the middle of the nineteenth century. *See, e.g.*, the Public Health Acts, 1848, 1872 and 1875. *See also* Dicey, *The Debt of Collectivism to Benthamism*, in LAW AND PUBLIC OPINION IN ENGLAND (2d ed. 1962).

158. The legal regime controlling water pollution will soon change (in 1989) with the privatization of the Regional Water Authorities. Some changes in air pollution law may also take place to bring the law of the United Kingdom into harmony with European Community law.

policies, together with the bureaucracies created by them, are encompassed within a legal and political tradition characterized by pragmatism and incrementalism. Legislation has in general attempted to locate, contain and control the diverse problems of pollution within just one of the media of land, air or water, with apparent disregard of cross-media implications.

The concept of integration was introduced to the United Kingdom by the Royal Commission on Environmental Pollution (RCEP) in 1973.[159] Initially, the RCEP addressed only questions of cross-media pollution and argued that pollution or wastes generated by an industrial activity could potentially affect water and land, as well as air. In deciding where pollution should occur, it was sensible that the form and medium of disposal of pollution should be such as to cause the least environmental damage overall. A new integrating concept was mooted. Decisions should be aimed at securing the best practicable environmental option (BPEO). Such an approach, however, did not find support in law or administration.[160] The RCEP recommended the creation of a new, unified inspectorate that would undertake an integrated approach to difficult industrial problems. The RCEP returned to the theme of BPEO in its tenth and eleventh reports.[161] In its twelfth report,[162] it

What is being described in this note is the present law. In brief, serious (usually noncombustible) air pollution is controlled under the Health and Safety at Work Act of 1974, together with the Alkali etc. Works Regulation Act of 1906. Less serious pollution (usually combustible) is governed by the Clean Air Acts of 1956 and 1968. Emissions from motor vehicles come within the purview of the Road Traffic Act of 1972, and the sulfur content of oil fuel used in furnaces is restricted by the Control of Pollution Act of 1974. Prior to the establishment of Her Majesty's Inspectorate of Pollution (HMIP) in 1987, the administration of the laws dealing with serious air pollution was vested in Her Majesty's Industrial Air Pollution Inspectorate (HMIAPI); they have now been absorbed into HMIP. Noncombustible sources continue to be regulated by local authorities. Water pollution is regulated under the Control of Pollution Act of 1974 (COPA). This act is administered by statutorily created regional water authorities. The disposal of waste on land is controlled under the Control of Pollution Act of 1974 and is administered by waste disposal authorities. The Radioactive Substances Act controls use and disposal of radioactive waste. It was administered and enforced by a separate inspectorate, now absorbed into HMIP. Commercial nuclear installations are governed by the Nuclear Installations Act of 1965 and the Nuclear Installations Inspectorate. Planning controls under the Town and Country Planning Act of 1971 are carried out by local planning authorities. *See* THE CONTROL OF POLLUTION ENCYCLOPEDIA (J. Garner ed. 1976 & Supp. 1989); ENCYCLOPEDIA OF PLANNING LAW AND PRACTICE (D. Heap ed. 1982 & Supp. 1988); J. MCLOUGHLIN & M. FORSTER, THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE UNITED KINGDOM (2d ed. 1982); U.K. DEP'T ENV'T, POLLUTION PAPER NO. 9, CONTROL OF POLLUTION IN THE UNITED KINGDOM: HOW IT WORKS (1978); A. WALKER, LAW OF INDUSTRIAL POLLUTION CONTROL (1980); A. WISDOM, THE LAW OF RIVERS AND WATERCOURSES (4th ed. 1979).

159. RCEP, No. 5, *supra* note 1. The RCEP is a prestigious, permanent, national, bipartisan body which was appointed in 1971 to advise the government of the United Kingdom on questions of environmental pollution. It has made 12 reports to date, and many of its recommendations have been adopted.

160. *Id.* at ¶ 264 (by the government of the day).

161. RCEP, Nos. 10 & 11, *supra* note 1.

162. RCEP, No. 12, *supra* note 1.

widened the scope of recommended integration. The concern with cross-media pollution and industrial process was enlarged in principle to include products, inputs, strategic planning and even national and international policy.[163] The extent to which BPEOs should include wider strategic considerations was not specified. The recommendations of the RCEP have been only partially adopted by the British government.[164]

3. THE INTEGRATIVE COMPASS

For our purposes, the British formulation of an integrated approach (BPEO) raises two important and interconnected questions that need to be restated before the concept of integration can be satisfactorily implemented. The first concerns the meaning of integration.[165] It is one thing to accept the principle of cross-media pollution, but altogether another to define it. While accepting BPEO in principle, the United Kingdom made no legislative attempt to define the concept. The second question, which to a considerable degree subsumes the first, involves the application of the principle. As a concept that seeks to address the source rather than the effects of pollution, it is possible to conceive of integration as extending from treatment and process to products, and even to grand strategic decisionmaking.

Diagram A[166] illustrates the problem. Suppose that the plant and process (a point source) consists of a coal burning electric generator, and that the generator discharges unacceptable levels of sulphur dioxide. The plant management proposes to implement flue gas desulphurization to deal with the problem. One of the desulphurization technologies envisaged is the application of pulverized limestone which

163. *Id.* at ¶¶ 2.15, 3.3.

164. After first rejecting it, the Thatcher government in 1987 accepted the proposal for an unified inspectorate of pollution and named it Her Majesty's Inspectorate of Pollution (HMIP). HMIP, however, does not encompass all existing inspectorates and is not based upon a fresh legislative mandate. U.K. DEP'T ENV'T, HER MAJESTY'S INSPECTORATE OF POLLUTION (1987). It was superimposed upon the existing statutory overlay and brought together HMIAPI, the Radiochemical and Hazardous Waste inspectorates, but did not embrace the environmental functions of the Ministry of Agriculture, Fisheries and Food, the Health and Safety at Work Executive, or the Department of Energy. Neither does HMIP include certain other inspectorates. Most importantly, it has hardly any control over water pollution. *See also* RCEP, No. 12, *supra* note 1, at ¶ 4.6. Furthermore, HMIP is structured around the separate inspectorates that it has absorbed. This lack of integration was EPA's problem. The RCEP points out, with characteristic British understatement, "current experience of a multi-media approach to pollution control is limited." *Id.* at ¶ 4.7.

165. This is almost a universal question. For instance, the Commission of the European Community, which accepts the need for an integrated approach to pollution control in certain circumstances, is confronting the difficulties of formulating a concept that could be applied to achieve its goal. *Action Programme*, *supra* note 154, at 3.4.4.

166. *See supra* Diagram A.

results in the creation of gypsum-rich sludge waste. Large quantities of such waste are envisaged. How might the concept of integration be applied in such a situation? At the strictly operational level, an integrated approach would accept the fact of such residuals or wastes, and seek to find the optimal balance for disposing of them, whether to air, land or water, by the use of a coordinated permit. An extended version of the approach would evaluate the decision to undertake flue gas desulphurization within a broader context. Such an inquiry would involve an investigation of the environmental effects of limestone quarrying. What effect would this have on the area from which it is removed, particularly if limestone is found, say, in a national park? In England, it is found in areas designated as being of "outstanding natural beauty." Furthermore, what are the effects of transporting limestone across the rural countryside, and what are the environmental consequences of having to store limestone in large quantities? Finally, what is the environmental impact of disposing of the sludge created by this particular technology?

After assessing the environmental impact of the proposed changes, this version of integration would consider whether a case could be made for a different method of desulphurization based on an alternative technology. Although the British government favors the narrow operational approach, the RCEP seems to favor a broader approach.[167] Integration arguably should go further and consider the broader socioeconomic question as to the acceptability of coal fired generators and to balance this against alternative power sources, such as nuclear, solar or wind. Alternatively, it could be asked if generators are necessary at all, when better energy conservation would reduce the need for electric energy.[168] This line of thinking could be extended much further. Most human activities result in the creation of residuals or wastes, and most social and economic activities could, therefore, have environmental and ecological repercussions. From this perspective, anything less than comprehensive planning which totally integrates environmental factors into the decisionmaking and which is based upon environmental considerations, would be inadequate.[169]

The case for an integrated environmental resource strategy has been cogently argued in the *World Conservation Strategy* (WCS).[170]

167. U.K. DEP'T ENV'T, *supra* note 164; RCEP, No. 12, *supra* note 1, at ¶ 2.1.

168. This was the argument in Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc., 435 U.S. 519 (1978).

169. *See* J. FORRESTER, WORLD DYNAMICS 123-28 (1981); Norton, *Towards a Concept of Strategic Resource Planning*, 4 INT'L J. OF ENVTL. STUD. 189 (1973).

170. International Union for Conservation of Nature and Natural Resources-United Nations Environment Programme-World Wildlife Fund, *World Conservation Strategy*, in 23 INTERNATIONAL PROTECTION OF THE ENVIRONMENT (B. Ruster & B. Simms eds. 1981).

Put starkly, WCS warns that an increasing pollution burden, together with the depletion of vital natural resources and the destruction of critical ecosystems, cannot continue unabated. It argues that further development and progress will depend on how society faces up to the frightening fact that natural resources and ecological processes are being appropriated for consumption at the same time that they are being damaged by pollution resulting from the burden of residuals. Any satisfactory answer to these problems can only be found within the parameters of a strategy which seeks (1) to manage and conserve natural resources so as to extend and prolong their life cycle, (2) to preserve ecosystems and genetic diversity, and (3) to minimize the impact of pollutants and wastes. The WCS reasons that all of these undertakings should form part of an integrated strategy.

4. PRACTICAL APPLICATION

It is essential that difficulties about scope and definition, real though they be, should not be allowed to deflect and delay the implementation of an integrated approach. The question that confronts us at this stage is how to arrive at a starting point from which integrated decisionmaking can commence. What constitutes a sensible beginning when confronted with so complicated a problem? Since the seemingly obvious starting points of air, water or land have been rejected, from where does one start? In applying the principles discussed, there is no definitive and preordained point from which to begin, but a promising response is offered by the Conservation Foundation's Draft Environmental Protection Act.[171] The Second Draft divides the sources of pollution into mobile sources, point sources, nonpoint sources and substances and articles. Point sources include the plant and process capable of producing air, water and solid waste pollution which may hitherto have been treated separately under air, water and solid waste laws. For heuristic purposes, point sources offer a good starting point for testing the practicability and applicability of an integrated analysis. First, the point sources could be divided according to type of plant—steel and rolling mills, pulp and paper mills, sugar cane extracting mills, etc. Second, a single permit would be issued for each such point source. This single coordinated permit contrasts with the present practice of issuing different permits for air, water and solid waste. In setting standards, EPA would abide by those standards already established under present

legislation, and then try to ensure a balance that would secure the best practicable environmental option.

The RCEP has proposed an insightful and instructive "procedure" for the practical implementation of an integrated approach. This "procedure" will be adapted and developed, as a functional approach, in the analysis that follows. The advantage of a functional approach to integration is that it begins with a proposed activity and allows an integrative analysis to be pursued as far as the investigator wants to go. The integrative bubble placed around the activity can be confined to a point source. On the other hand, it could be extended to product and input, and even further to strategic planning and macro socioeconomic policy.

The analysis starts by focusing on the objective of an activity. Since the objective of most industrial activities is the production of goods, it seems sensible to begin with the nature of the final product and raise questions about possible alternatives that might be less polluting. For example, if the activity is coal-fired generation of electricity, questions may be raised about the options to the generation of extra electricity. Does a need for more electricity actually exist where better insulation and more careful use of energy could achieve savings equivalent to the electricity that is to be generated? If the activity is the manufacture of bright paper that causes considerable pollution, the option of manufacturing less bright, non-bleached paper which causes much less pollution should be considered. An obvious constraint that arises in this context is the extent to which pollution control laws allow for inquiries of this kind. If the laws do not, attention would shift to the controlling of process and inputs.

A further objective of an industrial plant or process is the disposal of the residuals. Such an objective is formulated in the light of, and within the limits laid down by legal, technical and economic factors. It is important that further analysis of the objectives pertaining to the method of disposal precede any final decision. For example, where residuals consisting of heavy metals, or sludge from crude oil tanks, need to be disposed of, the objective would be to dispose of residuals in the most efficient manner within the law rather than to design, locate and operate a high-temperature incinerator. Such residuals could be disposed of on land or incinerated. A decision as to the method of disposal should depend upon the analysis being described. Such an analysis may reveal that incineration is the most satisfactory method of disposal, but this should not be prejudged.

The next stage lies in generating options. Such options would be-

most efficient answer to pollution caused by the generation of liquid residuals containing mercury in the chlor-alkali industry does not lie in the use of end-of-pipe technologies that attempt to remove the mercury from waste water. Instead, it is found in employing a different method of production—a diaphragm, rather than a mercury cell, in the manufacturing process.[172]

The third stage involves an environmental impact assessment of a short list of options generated by stages one and two. There is a rich history of experience, literature and case law on section 102(2)(c) of NEPA[173] setting out the requirements of environmental impact evaluations, but these will not be replicated here. What is important for the purposes of this discussion is that any environmental impact assessment should take the cross-media pollution transfers into account. The nature of cross-media transfers has already been discussed.[174]

During the fourth stage, ways of reducing the environmental impact of the short list of options will be considered. They will involve a consideration, inter alia, of (1) the importance of inputs,[175] (2) the possibilities of reclamation of residuals and recycling,[176] and (3) changes to production process in order to reduce waste.[177] Finally, an overall

172. RCEP, No. 12, *supra* note 1, at ¶ 3.8.

173. 42 U.S.C. § 4332(2)(C) (1982). *See* COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL IMPACT ASSESSMENTS: AN ANALYSIS OF 6 YEARS EXPERIENCE BY SEVENTY FEDERAL AGENCIES (1976); COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL QUALITY-1981 (1982); F. ANDERSON, NEPA IN THE COURTS (1973); W. RODGERS, *supra* note 7, at 697-834; J. BATTLE, ENVIRONMENTAL DECISIONMAKING AND NEPA (1986).

174. *See supra* notes 1-50 and accompanying text.

175. This aspect of the matter has already been referred to in the context of the coal electric industry. *See supra* notes 34-35 and accompanying text. The same holds true in many other activities, for example, the steel industry, where the use of raw coke plant liquor causes significant problems of air pollution. A. KNEESE & B. BOWER, *supra* note 26, at 93.

176. The British were fortunate in discovering the virtues of recycling. When the first Alkali Act was enacted in 1863, hydrogen chloride was being emitted into the atmosphere and was causing extensive damage to the countryside. It was found that hydrogen chloride could be converted into commercial bleach. Polluton control was thereby achieved while the industry was steered into a profitable venture. Hill, *The Role of the British Alkali and Clean Air Inspectorate in Air Pollution Control*, in INTERNATIONAL COMPARISONS IN IMPLEMENTING POLLUTION LAWS 89 (1983). United States industrial history also presents numerous examples of successful by-product development from reclaimed residuals. A few of these include the transformation of slaughterhouse residuals into valuable raw material for the pharmaceutical industry, the developments of silvi-chemicals based upon materials contained in wood pulping residuals, the production of animal foods from brewery, distillery and food processing residuals, the use of power plant residuals of ash in building materials, the use of textile residuals in paper manufacture, and the production of farm fertilizer from ammonium chloride. Similarly, materials in finished goods have been re-cycled. They include the recovery of lead from batteries, the re-cycling of beer and soda cans, and, to some degree, the recycling of virtually all metals. Some of these developments are summarized in A. KNEESE & B. BOWER, *supra* note 26, at 45-48; RCEP, No. 12, *supra* note 1, at ¶ 3.11.

177. For example, in steel production, the basic oxygen process results in more than twice as many particulates per ton as the open hearth and electric arc processes, while also generating more residuals in general. The introduction of continuous casting on a broad scale will result in a decrease of residuals. A. KNEESE & B. BOWER, *supra* note 26, at 85-92.

evaluation of the options is undertaken, and the one best befitting an integrated approach is adopted. The same analysis can be extended to cover input and strategic planning.

B. Integration and Regulatory Reform

To the extent that integrated thinking converges with the criticism of "command and control"[178] regulation by "regulatory reformers,"[179] it may be prudent at this juncture to point out that an adventitious convergence of views does not lead to any confluence of conclusions. The indictment of the present system of "command and control" legislation by regulatory reformers is familiar. It has been argued with skill and cogency by eminent scholars such as Bruce Ackerman, Stephen Breyer and Richard Stewart.[180] This Article does not propose to

178. Stewart, *Regulation, Innovation and Administrative Law: A Conceptual Framework*, 69 CALIF. L. REV. 1256, 1264 (1981) (describing "command and control" legislation as that which requires or proscribes specific conduct by regulated firms; this is contrasted with a system of regulation based on economic incentives and price mechanisms).

179. The parent stock of economic analysis has given rise to two interrelated theories, one doctrinaire, the other pragmatic. The doctrinaire theorists of deregulation argue first that no regulatory process can ever be responsive enough to replicate the efficiency of the market, and second that, in any event, efficient regulation is impossible because regulatory agencies are colonized by those who pursue their self interest. These doctrinaire theorists conclude, therefore, that administrative regulation is either completely ineffective or a waste of resources, and they call for deregulation, the abolition of agencies, and a return to the market. *See* Stigler and Friedland, *What Can Regulators Regulate? The Case of Electricity*, 5 J.L. & ECON. 1 (1962); Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971); G. STIGLER & M. COHEN, CAN REGULATORY AGENCIES PROTECT THE CONSUMER? 1-17 (1971); M. DERTHICK & P. QUIRK, THE POLITICS OF DEREGULATION 9 (1985). The more pragmatic regulatory reformers (*e.g.*, S. BREYER, REGULATION AND ITS REFORM 15-35 (1982)) concede that the unregulated price of goods does not reflect the true cost to society of producing their goods. The difference between true social costs and unregulated price arises, for example, when a manufacturer makes use of the air or water to get rid of residuals, thereby causing harm to others, without paying for the use of such air or water. While problems of this kind may theoretically be dealt with through private liability rules, the difficulties and drawbacks of such a scheme have elicited the concession that centralized and specialized administrative direction may be necessary in dealing with problems of environmental pollution. But such regulation should be market supporting rather than market supplanting. Winter, *Economic Regulation and Competition: Ralph Nader and Creeping Capitalism*, 82 YALE L.J. 890 (1973). The goal of regulation should be to correct market failure and formulate agency rules which mimic, as far as possible, the allocation of goods and services that would be produced in a perfectly competitive market. For an excellent resume and critique of the arguments based on deregulation and regulatory reform, see Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1669, 1689-93, 1702-11 (1975). *See also* Hirshman, *Postmodern Jurisprudence and the Problem of Administrative Discretion*, 82 NW. U.L. REV. 646, 646-55 (1988); Sunstein, *supra* note 76, at 446-52.

180. *See* Stewart, *supra* note 178, at 1264; Breyer, *Analyzing Regulatory Failure: Mismatches, Less Restrictive Alternatives and Reform*, 92 HARV. L. REV. 547, 595-97 (1979); B. ACKERMAN, S. ROSE-ACKERMAN, J. SAWYER & D. HENDERSON, THE UNCERTAIN SEARCH FOR ENVIRONMENTAL QUALITY 165-207 (1974) [hereinafter UNCERTAIN SEARCH]; Rose-Ackerman, *Market Models for Water Pollution Control: Their Strengths and Weaknesses*, 25 PUB. POL'Y 383 (1977); R. CRANDALL, CONTROLLING INDUSTRIAL POLLUTION: THE ECONOMICS AND POLITICS OF CLEAN AIR 32-80 (1983); T. TIETENBERG, EMISSIONS TRADING: AN EXERCISE IN REFORMING POLLUTION POLICY

review their arguments or those advanced in defense of the present regime in any detailed or systematic fashion. However, a quick distillation of the central themes of their argument is necessary to demonstrate that the case for integration is distinct from and independent of the case made by the regulatory reformers.

To begin with, regulatory reformers often adopt arguments based on an economic analysis which would have the effect of relaxing the present controls and allowing market forces to play a key role in environmental policy.[181] Those arguments contend that the present controls impose billions of dollars in compliance costs[182] and lead to decreases in productivity, technological innovation and market competition.[183] They argue that the present uniform standards governing pollution do not achieve environmental protection at the lowest cost. Some polluters may have lower abatement costs than others because of their technological superiority or their favorable physical and geographical location. These polluters should contribute more towards achieving a required environmental quality because they could do so at the least cost. Uniform emission standards apply indiscriminately across the board and do not differentiate between varying cost capabilities. Therefore, these standards cannot achieve the desired levels of environmental protection at the lowest cost.[184] Further, such standards do not consider the true social cost of environmental legislation. The true social costs will include not only the costs involved in installation, maintenance and management of pollution controls, but also the "opportunity costs" incurred in not deploying the resources required for pollution control in other profitable ventures such as streamlining the plant or extending it. Any opportunities for such beneficial investment are forgone as a result of having to set up pollution controls.[185] Finally, the regulatory reformers fail to provide incentives to improve antipollution devices. Where a polluter has complied with existing controls, she has no incentive to further reduce pollution. Indeed, it would be against her interest to try to do any better. The cure for these deficiencies, urge the regulatory reformers, lies in more flexible strategies which would achieve environmental protection on a lowest cost basis and at the same time provide adequate incentives for improved performance. They also

(1985) (providing bibliographies at the end of each chapter). The development of the reformist critique is traced in ENVIRONMENTAL POLICY UNDER REAGAN'S EXECUTIVE ORDER 1-40 (V. Smith ed. 1984); B. ACKERMAN & W. HASSLER, *supra* note 50.

181. *See* Stewart, *supra* note 178.

182. *See* A. KNEESE & C. SCHULTZE, *supra* note 50, at 69-84.

183. *See, e.g., id.* at 59-60, 81-82; S. BREYER, REGULATION AND ITS REFORM 115-16, 269-70 (1982); Stewart, *supra* note 178, at 1259-60, 1279-1306.

184. *See* S. BREYER, *supra* note 183, at 264; *see also* A. KNEESE & C. SCHULTZE, *supra* note 50.

185. *See* UNCERTAIN SEARCH, *supra* note 180.

urge a system of environmental protection based upon charges and marketable permits.[186] Such strategies would require paying attention to the particular circumstances of the polluter and adopting a "fine tuning" approach to regulation.[187]

It is indeed difficult to read the criticisms and proposals of these reformers without being impressed by the extent to which their views coalesce with those of the Reagan Administration, which was intent on deregulating and dismantling environmental controls. Many of these critics propose reforming methodologies which involve a quantification of the costs and benefits of proposed action. It is precisely such an approach that President Reagan's executive orders formalized by requiring a cost-benefit analysis to the extent permitted by law.[188] This Article adopts the positions taken in an impressive and important rejoinder to the regulatory reformers by Professor Howard Latin. He points out that after Congress proved unwilling to repeal regulatory legislation, the Reagan Administration changed tack and argued for a strategy which was substantially the same as that of the regulatory reformers. Premised on the grounds of efficiency, that strategy included "fine tuning" and expanded reliance on cost-benefit analysis.[189] Latin warned that the Administration was well aware that "fine tuning" would seldom work in practice and used "fine tuning" as a means to achieve sub rosa deregulation. He also demonstrates that the reformers' excessive preoccupation with ideal or theoretical efficiency blinds them to the truth that in a "second best" world, the critical issue is not ideal efficiency but actual effectiveness.[190] It is worth mentioning in this context that the uniform national standards presently applicable to air and water were adopted only after the more flexible and relaxed approach to pollution control proved ineffective.[191]

186. J. BONINE & T. MCGARITY, THE LAW OF ENVIRONMENTAL PROTECTION 637-38 (1984).

187. Stewart, *supra* note 178, at 1266.

188. Exec. Order No. 12,291, 3 C.F.R. 127 (1982), *reprinted in* 5 U.S.C. § 601 app. at 431-34 (1982); Exec. Order No. 12,498, 3 C.F.R. 323 (1986), *reprinted in* 5 U.S.C. § 601 app. at 138-39 (Supp. V 1985).

189. *See* Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267, 1271-72 (1985).

190. *Id.*

191. For example, the statutory regimes of national air pollution control carried over from the Air Pollution Control Act of 1955 to the Air Quality Act of 1967 left the control of air pollution in state hands. The Air Pollution Control Act of 1955, Pub. L. No. 84-159, 69 Stat. 322 (1955), declared that air pollution control responsibility rested primarily with the states. The federal role was confined to research. The Clean Air Act of 1963, Pub. L. No. 88-206, 77 Stat. 392 (1963), declared that its aim was to achieve the prevention and control of air pollution, but left it virtually to the states to determine what the nature and content of such control should be. Federal intervention was possible only where air pollution resulted in interstate consequences (*id.* § 5 (f)), and required complicated conference procedures (*id.* § 5), together with a court order based upon physical and economic feasibility (*id.* § 5 (g)). The 1963 act left pollution control in state hands.

The regulatory reformers are, therefore, seeking to turn the clock back and return to the discredited and demonstrably ineffective kinds of controls that have been supplanted. Moreover, the bureaucratic quagmire that would be created by any scheme of charges or transferable pollution rights has been clearly demonstrated.[192]

A central theme common to a number of the reformer proposals[193] appears to coalesce with one which lies at the heart of cross-media pollution control. The regulatory reformers contend that decisionmakers should consider *all* economic, environmental and control strategies before devising an efficient system. In order to arrive at the optimal solution to any environmental problem, they argue, it is necessary to obtain full information about *all* environmental, economic and social circumstances, together with full consideration of all possible strategies.[194] Latin points out that this may be feasible in an ideal world, but not in the real "second best" world we inhabit. Obtaining such information involves both time and money, and time is not something readily available when there is a need for expeditious action. In many environmental situations, the consequences of postponing action until all information becomes available could be very damaging. Risk assessment is notoriously difficult, and postponing a decision or making no decision for the reason that the issue is indeterminate promotes interests which benefit polluters.[195] In many cases, the kind of evaluation demanded by these reformers is a prescription for procrastination. Interrelated to their call for full information and investigation is the demand for more rigorous risk assessment. They require not only that a particular pollutant be linked with specified harm or injury, but also

The Air Quality Act of 1967, Pub. L. No. 90-148, 81 Stat. 485 (1967), probably represents the kind of regime favored by the regulatory reformers. It provided, inter alia, for HEW to create atmospheric areas and air quality regions (*id.* §§ 107 (a)(1) & 107 (a)(2)) and to issue criteria documents and reports on pollution control techniques (*id.* § 107 (b) & (c)). It then required states to adopt ambient air standards consistent with the criteria and control technique reports (*id.* § 108 (c)(1)). The nature or scope of such standards was not specified. States were then expected to develop plans to implement the ambient air quality standards. Such plans would contain emission standards and timetables for compliance (*id.* §§ 107 & 108).

Such a statutory scheme gave ample opportunity for market forces and fine tuning. But they just did not work. The verdict on these efforts is aptly summarized by Rodgers. ". . .[T]hey were tried and found wanting. . . ." W. RODGERS, *supra* note 5, at 245. *See also* R. Melnick, *supra* note 2, at 28; R. TOBIN, *supra* note 7; J. DAVIES & B. DAVIES, THE POLITICS OF POLLUTION (1975). It was precisely because of the failure of these earlier legislative schemes that Congress resorted to national ambient air quality standards under the Clean Air Act amendments of 1970 and 1977. Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (1970); Clean Air Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685 (1977). *See also Should NEPA Apply*, *supra* note 101, at 623.

192. Wolozin, *The Economics of Air Pollution: Central Problems*, 33 LAW & CONTEMP. PROB. 227, 233-37 (1968).

193. B. ACKERMAN & W. HASSLER, *supra* note 50, at 72-73.

194. *Id.* at 60-103; UNCERTAIN SEARCH, *supra* note 180, at 9-78.

195. Latin, *Good Science, Bad Regulation, and Toxic Risk Assessment*, 5 YALE J. ON REG. 89, 92 (1988).

that particular levels of the implicated pollutant be correlated with marginal environmental and health effects.[196] This kind of risk assessment is a Gargantuan task requiring almost limitless time and resources. It is almost incapable of fulfillment in a "second best" world.[197]

The regulation of pollutants confronts at least four types of uncertainty which stand in the way of scientific certainty or proof.[198] They are data uncertainty,[199] indeterminacy,[200] nonrecurring and nonrepli-

196. *See, e.g.*, R. STEWART & J. KRIER, *supra* note 29, at 360-61; L. LAVE & E. SESKIN, AIR POLLUTION AND HUMAN HEALTH (1978); V. SMITH, THE ECONOMIC CONSEQUENCES OF AIR POLLUTION 174 (1976). In their rejoinder to Latin's article, Ackerman and Stewart claim that they "have never advocated such an utopian scheme." They go on to propose that Congress, and not administrators, should specify the rates of reduction, in percentile terms, of existing pollutants. They admit that this would require Congress to "guess about countless contestable matters." Ackerman & Stewart, *supra* note 100, at 1352-55. It is difficult to see how guessing by Congress, which does not possess any special expertise in these matters, could be preferred to that of EPA, which would be in a far superior position to undertake such a task. The crux of the matter is that the reformers object to the "unguided" decisions of EPA precisely because they are not based upon sufficient information and satisfactory risk evaluation. That criticism is clearly blunted by their admission that the decisions they would now leave to Congress would be equally "unguided." Specialized agencies were created because Congress lacked the kind of expertise demanded to implement the reformers proposals. Indeed, Stewart himself has questioned whether "a legislature is likely in many instances to generate more responsible decisions on questions of policy than agencies," arguing that while administrative agencies have been criticized as unduly responsive to wealth and to organized interests, such criticisms might equally be applied to Congress. Stewart, *supra* note 179, at 1696. The position now taken by Ackerman and Stewart is a major concession to the impracticability of the kind of risk evaluation they espouse.

197. Latin, *supra* note 189, at 1274; Gamse, *Economic Analysis and Environmental Regulations*, in ECONOMIC EFFECTS OF GOVERNMENT MANDATED COSTS 134-36 (R. Lanzillotti ed. 1978).

198. *See* Rodgers, *Guerilla Decisionmaking: Judicial Review of Risk Assessments*, 15 J. HAZARDOUS MATERIALS 205, 206-10 (1987) (Rogers describing the four types of uncertainty).

199. The decisionmaker lacks the facts to make a considered decision. The data shortages include unknowns about groups exposed, routes of exposure, patterns and practices of uses, behavior of chemicals within the environment, and their effects on human beings.

200. Indeterminacy arises out of attempts to answer questions that have no answer. Indeterminate questions include the shape of the dose-response curve, the relevance of animal studies, the relationship of exposures to effects observed in epidemiological studies, and even whether there are safe threshold levels for exposures to given substances. For example, EPA has stated that no reliable threshold above zero can be identified for carcinogenic risk. National Emission Standards for Hazardous Air Pollutants; Policy and Procedure for Identifying, Assessing and Regulating Airborne Substances Posing a Risk of Cancer, 44 Fed. Reg. 58,642, 58,660 (1979). And further, the agency has stated that "in every quantitative risk estimation . . . the results are uncertain." Guidelines for Carcinogenic Risk Assessment, 51 Fed. Reg. 33,992, 33,997 (1986). These conclusions flow from the fact that the causal relationship between a chemical and cancer is often difficult to establish, partly because of incomplete knowledge concerning the manner in which a chemical carcinogen acts on human cells and also because there is uncertainty as to whether the human body has some defensive mechanism against the carcinogenic reaction. Evidence of carcinogenesis in humans usually arises from epidemiological studies of occupational groups that have high exposure to a given chemical. However, extrapolations to the general public from this data are unreliable because humans are exposed to a variety of other substances at low levels. To try and overcome this difficulty, rodents are used in laboratory testing. Unfortunately, small risks are difficult to detect in rodents, and assumptions that the dose-response relationships in rodents apply equally to humans is fiercely contested. Because carcinogenic dose-response relationships cannot be directly determined at low exposure levels either by epidemiologic studies or studies on animals, numerous

cable events,[201] and transcientific policy questions.[202] Eventually, these uncertainties can be combatted only by policy choices[203] based upon the psychological, political and legal acceptability of a given risk,[204] rather than upon alleged scientific judgment. The fallacies behind the view that the risk-assessment process is a scientific activity have been strikingly and cogently exposed.[205] Latin has demonstrated how inadequate scientific knowledge and inadequate data usually prevent derivation of risk estimates based on reliable science, while the illusion that risk assessment is a purely scientific activity hides the political and policy judgments on which such risk assessment is based.[206] It is quite clear that an integrated approach does require some form of risk evaluation, but the crucial point that needs emphasis is that such risk evaluation is too important and too uncertain to be left exclusively to risk assessors who hide their policies and politics behind a facade of science.[207]

mathematical models have been developed to extrapolate from high to low dosages. Alas, no single mathematical procedure is recognized as the most appropriate for low-dose extrapolation in carcinogenesis. *Id.*; Bond, *Causality of a Given Cancer After Known Radiation Exposure*, in HAZARDS: TECHNOLOGY AND FAIRNESS 24 (National Academy of Engineering 1986). *See generally* Latin, *The Significance of Toxic Health Risks: An Essay on Legal Decisionmaking Under Uncertainty*, 10 ECOLOGY L.Q. 339 (1982); Latin, *The Feasibility of Occupational Health Standards: An Essay on Legal Decisionmaking Under Uncertainty*, 78 NW. U.L. REV. 583 (1983); Latin, *supra* note 195; Note, *Toward Sensible Regulation of Hazardous Air Pollutants Under Section 112 of the Clean Air Act*, 63 N.Y.U. L. REV. 612 (1988).

201. Predicting nonrecurring events introduces us to the realm of the indeterminate. Apart from indeterminacies, there are information barriers unique to understanding events that come around but once. For example, the chemistry and impact of the mixtures at many of the waste disposal sites are not duplicable, and they leave in their wake unanswerable questions about causes and effects. *See generally* S. EPSTEIN, L. BROWN & C. POPE, HAZARDOUS WASTES IN AMERICA (1982).

202. These are high policy questions that may be asked of science, but are not answerable by science. *See* Weinberg, *Science and its Limits: The Regulator's Dilemma*, in HAZARDS: TECHNOLOGY AND FAIRNESS, *supra* note 200, at 9.

203. Latin, *supra* note 195, at 133-34.

204. Rodgers lists these controlling considerations as including voluntariness, catastrophic nature, comparability to natural risks, universality (e.g., the widespread dissemination of PCBs, DDT and lead), government sponsorship (e.g., swine flu), vulnerability of the target group, necessity (e.g., fluorocarbon), familiarity of the risk, and immediacy of anticipated effects and de minimis nature. He points out that these indicators may be in conflict at times, but they offer surprisingly convincing explanations of a number of well-known policy decisions. Rodgers, *supra* note 198, at 210.

205. Latin, *supra* note 195; Rodgers, *supra* note 198.

206. Latin, *supra* note 195, at 89-95.

207. *Id.* at 90. In what one hopes will not prove to be a regressive move, the Integrated Environmental Management Program (IEMP) of EPA has pioneered the use of quantitative risk analysis as an integrating methodology and has, according to Davis, "educated a large number of people about risk assessment and risk management." Davis, *The United States: Experimentation and Fragmentation* (ch. 3), in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA *supra* note 123. The kind of risk assessment ostensibly based on good science which estimates health hazards at varying exposure levels is now embodied in EPA's guidelines for estimating carcinogenic hazards. Guidelines for Carcinogen Risk Assessment, *supra* note 200. Risk assessment is seen as anterior to and supposedly independent of the political activity of risk management which balances competing interests and values to determine whether identified toxic risks should be considered acceptable or tolerable.

Accordingly, the integrative analysis of risk advocated in this Article is intended to encourage and induce tighter and more effective environmental controls to remedy the defects of existing regimes. Since it is based on the premise that those controls already in place will remain intact, it is not a vehicle for avoiding or relaxing existing controls, though there is the possibility that the nature and wisdom of some of the existing controls may need to be reconsidered. The integrative analysis advocated here is based upon several grounds. First, the failure scientifically to find or prove an effect cannot lead to the conclusion that there is no effect.[208] Latin has pointed out, and Ackerman and Stewart have accepted,[209] that the costs of obtaining all relevant information about all possible effects of pollutants are prohibitive. Second, risk assessment is as much a political as a scientific evaluation.[210] The primary purpose of a regulatory agency is to achieve the goals set out in its statute, and an agency's mission should not be paralyzed by the complexities of scientific uncertainty. Latin points out that Congress has often recognized the uncertainty associated with toxic hazards and nonetheless required agencies to impose effective regulatory controls.[211] The position that "a 'political' agency law-making process is more functional and wise in the long run than a 'technocratic' process," and should therefore be preferred to the latter, has a well-established pedigree in administrative law.[212] Not surprisingly, the view that decisions made on the basis of public perception of risk, in the absence of quantifiable scientific proof, are not irrational has been gaining acceptance. It has been firmly endorsed by the British Royal Commission on Environmental Pollution.[213]

208. Page, *A Generic View of Toxic Chemicals and Similar Risks*, 7 ECOLOGY L.Q. 207, 230-33 (1978).

209. *Supra* note 196.

210. *See supra* notes 198-207 and accompanying text. *See also* ROYAL SOCIETY, RISK ASSESSMENT (1983); Slovic, Fischoff & Lichtenstein, *Facts and Fears: Understanding Perceived Risk*, in SOCIETAL RISK ASSESSMENT: HOW SAFE IS SAFE ENOUGH? (R. Shilling & A. Albers eds. 1980); Otway, *The Perception of Technological Risks: A Psychological Perspective*, in TECHNOLOGICAL RISK (M. Dierkes, S. Edwards & R. Coppock eds. 1980); Otway & Thomas, *Reflection on Risk Perception and Policy*, in 2 RISK ANALYSIS 2 (1982); K. SHRADER-FRECHETTE, RISK ANALYSIS AND SCIENTIFIC METHOD (1985).

211. Latin, *The Significance of Toxic Health Risks*, *supra* note 200, at 381-82. For example, the Occupational Safety and Health Act's legislative history recorded that despite scientific uncertainty, "it is not intended that the Secretary be paralyzed by debate surrounding diverse medical opinions." SENATE COMM. ON LABOR AND PUBLIC WELFARE, LEGISLATIVE HEARING ON THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, at 848 (1971).

212. *See, e.g.*, A. BONFIELD, STATE ADMINISTRATIVE RULE MAKING 9 (1986).

213. RCEP, No. 10, *supra* note 1, at 11.

Unfortunately, the regulatory reformers and economic analysts have succeeded in stealing the mantle of "rationality." By giving decisionmakers supposedly objective numbers derived from markets, and a way of using them in cost-benefit analysis, the economic approach appears to be more rational than the subjective values or judgments of administrators.[214] This Article accepts the need to move from "incrementalism" to "comprehensive rationality,"[215] but rejects the view that such a development should be based upon economic analysis.[216] The "comprehensive rationality" advocated in these pages is premised upon the principle that the policymaker must promote only those goals specified by the politically responsible legislature.[217] The objective and purpose of administrative action is to realize these goals in a manner consistent with the publicly articulated purpose of the statute. It is not to re-balance them against the criteria of economic analysis, and emphatically not to substitute the goal of economic efficiency. A number of our environmental laws emphasize ethical over economic values insofar as they aim to protect health, safety and environmental quality, rather than to make markets more efficient or to maximize consumer surplus or social wealth.[218] Consistent with these views, "comprehensive rationality" is seen as the framework within which administrators should seek the public good as embodied in the goals of legislation.[219]

214. For a useful analysis, see Rodgers, *Benefits, Costs and Risks: Oversight of Health and Environmental Decisionmaking*, 4 HARV. ENVTL. L. REV. 191 (1980).

215. Diver, *Policymaking Paradigms in Administrative Law*, 95 HARV. L. REV. 393, 396-99, 409-34 (1981).

216. *See infra* notes 368-72 and accompanying text.

217. Diver, *supra* note 215. *See also* B. CARDOZO, THE NATURE OF THE JUDICIAL PROCESS (1921) (judges should interpret statutes by starting with the language and reaching a decision that applies that language to a particular set of facts in a way consistent with the publicly articulated purpose of the statute; judges ought not to look beyond the legislature's stated purpose in interpreting statutes). Pari passu, the same principles should apply to administrators.

218. Stewart, *Regulation in a Liberal State: The Role of Non-Commodity Values*, 92 YALE L.J. 1537, 1566-90 (1983). According to Stewart, "[m]ost environmental statutes explicitly endorse the promotion of non-commodity values such as wilderness preservation and health protection." *Id.* at 1584. Stewart places his ideas within liberal theory that first asserts the equal right of each individual to pursue his or her own conception of the good, and second, affirms governmental neutrality, and bars government from using its power in a manner so as to advance some citizen's particular concept of the good. Stewart justifies the advancement of non-commodity environmental values on the grounds that liberalism recognizes the need to develop in individuals a critical capability with respect to their preferences that enables them to expand and enrich their existing concepts of the good. Such a critical capability, he argues, is central to the supreme value of individual self-determination; without it, one can hardly be said to choose one's own ends. *Id.* at 1567. He concludes that wealth maximization based on economic analysis is not consistent with liberal principles. "It is instead a form of tyranny that would impose on individuals a partial sectarian concept of the good. Liberal principles demand that regulation cultivate non-commodity values." *Id.* at 1569. *See also* Sagoff, *Where Ickes Went Right* or *Reason and Rationality in Environmental Law*, 14 ECOLOGY L.Q. 265, 272-73 (1987).

219. While it is not intended to canvass theories of administrative decisionmaking, some reference to them is unavoidable. The approach favored by this Article is based upon the "republican" concept of administration and government. The "republican" theory of government argues that legislation should rise above "clashing interests and render them all subservient to the public good." THE FEDERALIST No. 10, at 57 (J. Madison) (S. Mittell ed. 1938). To this limited extent, the Article does not subscribe to "pluralist" theories of government, which support economic analysis. *See* Sunstein, *Interest Groups in American Public Law*, 38 STAN. L. REV. 29 (1985); Reich, *Public Administration and Public Deliberation: An Interpretive Essay*, 94 YALE L.J. 1617 (1985). *See also infra* text accompanying notes 357-72.

The goals embodied in legislation need not necessarily reflect or follow public concern and preference. The legislation can also create and lead public opinion. In so doing, legislation performs a "teaching" function.[220] Professor Joseph Sax highlights the educative role of law when he likens statutes protecting the environment to museums, libraries, public television and education which attempt to improve popular culture and taste.[221] Economic analysis seeks to subvert this teaching function of the law, but "comprehensive rationality" does not. Any move from a fractured and fragmented system to an integrated one should be wedded and faithful to the goals of Congress.

C. Integration Institutionalized

1. THE ECOLOGICAL ROOTS

An integrated approach to environmental problems is deeply embedded in ecological and 'holistic' pathways of thinking which view the environment as an integrated and interconnected whole. A rich vein of literature bears witness to this thinking.[222] It is illustrated forcefully by two books that had an enormous impact on the thinking of an earlier era. In 1962, Rachel Carson's *Silent Spring*[223] showed that pollution is more than an aesthetic problem and constitutes a threat to the complex processes of life. The book was premised upon an holistic understanding of the environment. More important, for the purposes of this discussion, Barry Commoner's apocalyptic *Closing Circle*, published in 1971, made the case for an holistic view of the "ecosphere" even more directly and powerfully. Indeed, his first law of ecology was that

220. W. BAGEHOT, THE ENGLISH CONSTITUTION 133 (2d ed. 1978).

221. J. SAX, MOUNTAINS WITHOUT HANDRAILS 50-52 (1980).

222. *See* E. KORMONDY, CONCEPTS OF ECOLOGY (2d ed. 1976); E. KORMONDY, READINGS IN ECOLOGY (1965); P. EHRLICH & J. HOLDREN, HUMAN ECOLOGY: PROBLEMS AND SOLUTIONS (1973); S. BRUBAKER, TO LIVE ON EARTH: MAN AND HIS ENVIORNMENT IN PERSPECTIVE (1972); C. PURCELL, FROM CONSERVATION TO ECOLOGY (1973); R. NASH, THE AMERICAN ENVIRONMENT: READINGS IN THE HISTORY OF CONSERVATION (1968); L. CALDWELL, ENVIRONMENT: A CHALLENGE TO MODERN SOCIETY (1970); L. CALDWELL, MAN AND HIS ENVIRONMENT: POLICY AND ADMINISTRATION (1975); AMERICA'S CHANGING ENVIRONMENT (R. Revelle & H. Landsberg eds. 1967); W. OPHULS, ECOLOGY AND THE POLITICS OF SCARCITY: PROLOGUE TO A POLITICAL THEORY OF THE STEADY STATE (1977).

223. R. CARSON, SILENT SPRING (1962).

and environmental policy.[228] Then, in 1968, an important report of the Subcommittee on Science, Research, and Development of the House Committee on Science and Astronautics, entitled Managing the Environment, implicated fragmented governmental decisionmaking with the country's environmental problems and recommended that a national policy for the environment be adopted.[229] The need for integration was also reflected in the even more important Congressional White Paper on a National Policy for the Environment.[230]

224. B. COMMONER, *supra* note 8, at 33.

225. *Id.* at 39.

226. *Id.* at 21. One of his examples is every bit as telling today.

> A dry-cell battery containing mercury is purchased, used to the point of exhaustion, and then 'thrown out'. But where does it really go? First it is placed in a container of rubbish; this is collected and taken to an incinerator. Here the mercury is heated; this produces mercury vapor which is emitted by the incinerator stack, and mercury vapor is toxic. The mercury vapor is carried by the wind, eventually brought to earth in rain or snow. Entering a mountain lake, let us say, the mercury condenses and sinks to the bottom. Here it is acted on by bacteria which convert it to methyl mercury. This is soluble and taken up by fish; since it is not metabolized, the mercury accumulates in the organs and flesh of fish. The fish is caught and eaten by a man and the mercury becomes deposited in his organs, where it might be harmful.

Id. at 40.

227. *See* A. FREEMAN, R. HAVEMEN & A. KNEESE, THE ECONOMICS OF ENVIRONMENTAL POLICY (1973); B. BOWER, G. LARSON, A. MICHAELS & W. PHILLIPS, WASTE MANAGEMENT: GENERATION AND DISPOSAL OF SOLID, LIQUID AND GASEOUS WASTE IN THE NEW YORK REGION, A REPORT OF THE SECOND REGIONAL PLAN (1968). This approach was more definitively set out in A. KNEESE & B. BOWER, *supra* note 26.

228. F. ANDERSON, NEPA IN THE COURTS 4 (1973).

229. HOUSE SUBCOMMITTEE ON SCIENCE, RESEARCH, AND DEVELOPMENT, 90th Cong., 2D Sess., MANAGING THE ENVIRONMENT (Comm. Print 1968).

230. SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS AND THE HOUSE COMMITTEE ON SCIENCE AND ASTRONAUTICS, 90th Cong. 2D Sess., CONGRESSIONAL WHITE PAPER ON A NATIONAL POLICY FOR THE ENVIRONMENT (Comm. Print 1968).

[illegible] Natural Resources, and a national land use policy.[236]

Unhappily, the legislative history of NEPA does not all point in the direction of integration. To begin with, although Jackson was clearly impressed with the need for integration, neither his bill[237] nor Dingell's bill[238] mentioned integrated environmental policies or even a national environmental policy. Apparently, both Jackson and Dingell were trying to avert a turf battle over committee jurisdiction. Jackson had to deal with Senator Muskie, chairman of the influential Subcommittee on Air and Water Pollution of the Senate Committee on Public Works, which sponsored air and water pollution legislation. For his part, Dingell had to contend with Congressman Wayne Aspinall, chairman of the House Interior and Insular Affairs Committee, who eventually emerged as one of NEPA's strongest opponents.[239]

231. The tortuous journey involved before a bill becomes law, together with the various procedural steps referred to in parts of this Article, is succinctly discussed in W. KEEFE & M. OGUL, THE AMERICAN LEGISLATIVE PROCESS: CONGRESS AND THE STATES 35 (6th ed. 1985).

232. H.R. 6750, 91st Cong., 1st Sess., 45 CONG. REC. 3415 (1969).

233. S. 1075, 91st Cong., 1st Sess., 45 CONG. REC. 19,008 (1969).

234. In his book ENVIRONMENT: A CHALLENGE TO MODERN SOCIETY, Professor Caldwell has a section entitled "Environmental Management as Applied Science." L. CALDWELL, ENVIRONMENT: A CHALLENGE TO MODERN SOCIETY 163-232 (1970). In it, he argues that there had, until recently, been no perceived need for general or comprehensive policies of environmental administration and control, and that management had extended only to specific aspects of the environment. *Id.* at 163. He notes, however, that an ecologically based environmental policy should be characterized by comprehensiveness of policy and control and operative arrangements. Indeed, his whole book is premised upon the analogue of a "spaceship earth" which depends for its survival upon coordinated and interrelated systems.

235. Jackson, *Environmental Policy and the Congress*, 11 NAT. RES. J. 403, 407 (1971).

236. *Id.* at 411-13.

237. S. 1075, *supra* note 233.

238. H.R. 6750, *supra* note 232.

239. F. ANDERSON, *supra* note 228, at 5. *See also Should NEPA Apply*, *supra* note 101, at 600-02 (discussing NEPA's "nebulous legislative history" in contrast to its "clear statutory directive").

Important amendments made to the Senate bill during its hearings before Jackson's Committee on Interior and Insular Affairs reflect the politics encompassing the bill.[240] Some of the most significant amendments were made because of Caldwell's promptings.[241] These amendments incorporated the concept of environmental impact assessments.[242] For his part, Muskie succeeded in obtaining amendments before the Senate forwarded the bill to a conference committee. The apparent thrust of his amendments was to ensure that air and water standards set under legislation being drafted by his subcommittee, or falling within its jurisdiction, would not be affected by NEPA. Section 104 of NEPA sought to achieve Muskie's objectives.[243] It was ambiguously worded and did not plainly and clearly support Muskie's objective that air and water pollution legislation should be exempted from NEPA.[244] As Judge Leventhal concluded in *Portland Cement Ass'n v. Ruckelshaus*,[245] "[t]here is no express exemption in the language of the Act or Committee Reports."[246] An attempt to remedy this ambiguity had been made at the last minute when the conference report on NEPA reached the Senate floor. Jackson introduced a document interpreting the act into the Congressional Record to exempt environmentally protective federal activities from NEPA obligations.[247] That document stated that section 102[248] was aimed primarily at "those agencies who

240. In the House, the Subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries, reported out a "clean bill" which was practically identical to the original House bill. F. ANDERSON, *supra* note 228, at 6. *See also Environmental Quality: Hearings on H.R. 6750 et al., Before the Subcomm. on Fisheries and Wildlife Conservation of the House Comm. on Merchant Marine and Fisheries*, 91st Cong., 1st Sess. (1969).

241. F. ANDERSON, *supra* note 228, at 6. *See also* J. BONINE & T. MCGARITY, *supra* note 186, at 6-7.

242. Caldwell's testimony lead to inclusion of action-forcing provisions. The bill containing those provisoins was passed on July 10, 1969. F. ANDERSON, *supra* note 228, at 6 (citing 115 Cong. Rec. 19,008-13 (1969)).

243. National Environmental Policy Act of 1969, § 104, 42 U.S.C. § 4334 (1982). "Nothing in Section 102 or 103 shall in any way affect the specific statutory obligations of any Federal agency (1) to comply with criteria or standards of environmental quality, (2) to coordinate or consult with any other Federal or State agency, or (3) to act, or refrain from acting contingent upon the recommendations or certification of any other Federal or State agency."

244. *See* F. ANDERSON, *supra* note 228, at 8 (citing 115 CONG. REC. 29,046-63, 29,066-99, 40,923-28, 116 CONG. REC. 8984). *See also Should NEPA Apply*, *supra* note 101, at 600-02 (discussing NEPA's "nebulous legislative history" in contrast to its "clear statutory directive").

245. 486 F.2d 375, 381 (D.C. Cir. 1973).

246. *Id.* n.20 (citing S. REP. NO. 296, 91st Cong., 1st Sess. (1969); H. REP. NO. 765, 91st Cong., 1st Sess. (1969)).

247. F. ANDERSON, *supra* note 228, at 106. *See also* 115 CONG. REC. 40,417 (1969); Comment, *Landmark Decision on the National Environmental Policy Act in* Calvert Cliff's Coordinating Comm., Inc. v. Atomic Energy Comm'n, 1 ENVTL. L. REP. 10,125 (1971).

248. National Environmental Policy Act of 1969, § 102, 42 U.S.C. § 4332 (1982). Section 102 places a duty on *"all agencies of the Federal Government. . ."* (emphasis added) to prepare environmental impact statements in "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."

now have little or no legislative authority to take environmental considerations into account,"[249] and that section 103[250] "is aimed at those agencies which have little or no authority to consider environmental values."[251] While this may have lent support to Muskie's views, the same document went on to say that section 102 was "clearly designed to assure consideration of environmental matters by all agencies in their planning and decision making."[252] Muskie, commenting on the statement introduced by Jackson, stated that the clear understanding between Jackson and himself was that sections 102 to 105 of NEPA did not change the legislative mandates of agencies having environmental protection duties.[253] Whatever the nature of this understanding between Jackson and Muskie, it was not formalized in any statement in the conference report, and as Senator Allott, a member of the Interior and Conference committees, said, "[O]nly the conference report itself was signed by all the Senate conferees, and therefore, only it was agreed upon and is binding."[254] In like vein, Judge Skelly Wright observed in *Calvert Cliffs Coordinating Comm. v. United States Atomic Energy Comm.*:[255]

> This rather meager legislative history, in our view, cannot radically transform the purport of the plain words of Section 104. Had the Senate sponsors fully intended to allow a total abdication of NEPA responsibilities in water quality matters-rather than a supplementing of them by strict obedience to the specific standards of Water Quality Improvement Act (WQIA)—the language of Section 104 could easily have been changed.[256]

Citing the United States Supreme Court, Judge Skelly Wright also stated that "the legislative history of a statute (particularly such relatively meager and vague history as we have here) cannot radically affect

249. 115 CONG. REC. 40,418 (1969).

250. National Environmental Policy Act of 1969 § 103, 42 U.S.C. § 4333 (1982). Section 103 directs all agencies of the federal government to bring their policies and procedures into full compliance with NEPA.

251. 115 CONG. REC. 40,418 (1969).

252. *Id.* On a subsequent occasion when the amendments to the Federal Water Polluton Control Act were being debated, Jackson concluded that EPA should not be exempt from NEPA. 118 CONG. REC. 33,709 (1972).

253. 115 CONG. REC. 40,423 (1969).

254. *Id.* at 40,422.

255. 449 F.2d 1109 (D.C. Cir. 1971). In this case, petitioners argued that the Atomic Energy Commission (AEC) failed to consider environmental matters to the extent required by NEPA when the AEC had passed new rules. The AEC contended that the rules were within the broad scope of NEPA.

256. *Id.* at 1126.

its interpretation if the language of the statute is clear."[257] Indeed, section 102 states quite explicitly and unambiguously that it applies to "all agencies of the Federal Government."[258]

While it is not proposed to second guess their intentions, the interventions of Jackson and Muskie are perhaps best understood as an attempt to protect the "turf" of committee jurisdiction rather than an attempt to strike at the integrative functions of NEPA.[259] In any event, this legislative history, which was concerned and indeed was confined to the applicability of NEPA to air and water controls, could not have been directed at the then unborn EPA. When it was created, EPA clearly had an authority which extended beyond air and water.

3. THE ENVIRONMENTAL PROTECTION AGENCY

Six months after the enactment of NEPA, President Nixon established two new agencies by executive order. They were EPA[260] and the National Oceanic and Atmospheric Administration (NOAA).[261] In establishing the two agencies, President Nixon made the case for controlling cross-media pollution in a persuasive, succinct and cogent manner. The notion of comprehensive management and integration clearly undergirded the creation of EPA and was based upon the ecological ideas and concepts referred to above.[262] President Nixon observed that since

257. *Id.*

258. National Environmental Policy Act of 1969 § 102(2), 42 U.S.C. § 4332(2) (1982).

259. *See supra* notes 95-115 and accompanying text.

260. For text of plan, see MESSAGE FROM THE PRESIDENT OF THE U.S., REORGANIZATION PLAN NO. 3, H.R. Misc. Doc. No. 364, 91st Cong., 2d Sess. (1970). The five major programs moved to EPA were (1) water pollution, which had formerly been carried out by the Federal Water Pollution Control Administration in the Interior Department; (2) air pollution, formerly executed by the National Air Pollution Control Administration in HEW; (3) solid waste management, drinking water quality and radiological health, also from HEW; (4) pesticides regulation and research from the Food and Drug Administration and the Agriculture Department; and (5) ambient standard setting for radiation from the Atomic Energy Commission. FIRST ANNUAL REPORT, *supra* note 28, at 25.

261. For the text of the plan, see MESSAGE OF THE PRESIDENT OF THE U.S., REORGANIZATION PLAN NO. 4, H.R. MISC. DOC. NO. 365, 91st Cong., 2d Sess. (1970). For further information on the reorganization plans, see MESSAGE FROM THE PRESIDENT OF THE UNITED STATES, RELATIVE TO REORGANIZATION PLANS 3 and 4 of 1970, H.R. Misc. Doc. No. 366, 91st Cong., 2d Sess. (1970); COMMITTEE ON GOVERNMENT OPERATIONS, APPROVING REORGANIZATION PLAN NO. 3 OF 1970, H.R. REP. NO. 1464, 91st Cong., 2d Sess. (1970); COMMITTEE ON GOVERNMENT OPERATIONS, APPROVING REORGANIZATION PLAN NO. 4 OF 1970, 91st Cong., 2d Sess. (1970); *Reorganization Plans Nos. 3 and 4 of 1970, Hearings Before Subcomm. on Executive Reorganization and Government Research*, 91st Cong., 2d Sess. (1970).

262. *See supra* text accompanying notes 222-30. While Nixon's commitment to environmental protection may be open to some doubt, it seems reasonably clear that his approach towards integration was consistent with his beliefs. He believed that government should be organized around functions (overriding existing divisions) rather than around programs (based on existing sectoral legislation). His Administration made efforts to coordinate programs in a number of policy areas. *See* Palmer, *The Evolution of Grant Policies*, in THE CHANGING POLITICS OF FEDERAL GRANTS 5, 24-25 (L. Brown, K. Palmer & J. Fosset eds. 1984); Whitaker, *Striking a Balance: Environment and Natural Resource Policy*, in THE NIXON-FORD YEARS 46 (1976). *See also* B. RABE, *supra* note 1, at 15.

Moreover, during congressional hearings on NEPA, Nixon had issued an executive order establishing an interagency Council on Environmental Quality, which had broad responsibilities for coordinating federal environmental policy. *See* Exec. Order No. 11,472, 34 Fed. Reg. 8693 (1969); *amended by*, Exec. Order No. 11,514, 35 Fed. Reg. 4247 (1970); Exec. Order No. 12,007, 42 Fed. Reg. 42,839 (1977), *reprinted in* 42 U.S.C. § 4321, app. at 507 (1982). Alfred Marcus has concluded that the Nixon Administration's commitment to administrative integration was in fact based upon ecological thinking. A. MARCUS, *supra* note 52, at 31-32.

environmental problems should be "perceived as a single, interrelated system," the then existing piecemeal federal efforts were inappropriate.[263] A consolidation of anti-pollution activities into one agency, therefore, "would help assure that we do not create new environmental problems in the process of controlling existing ones."[264] He hoped that by combining under one roof programs previously housed in several separate agencies, the government would be able to "mount an effectively coordinated campaign against environmental degradation in all of its many forms."[265] Furthermore, President Nixon noted that

> despite its complexity, for pollution control purposes the environment must be perceived as a single interrelated system. . . . A single source may pollute the air with smoke and chemicals, the land with solid wastes, and a river or lake with chemicals and other wastes. Control of the air pollution may produce more solid wastes which then pollute the land or water. Control of the water-polluting effluent may convert it into solid wastes which must be disposed of on land. . . . A far more effective approach to pollution control would: [i]dentify pollutants; [t]race them through the entire ecological chain, observing and recording changes in form as they occur; [d]etermine the total exposure of man and his environment; [e]xamine interactions among forms of pollution; and [i]dentify where in the ecological chain interdiction would be most appropriate.[266]

He returned to this theme in his first report to Congress on the state of the nation's environment, stressing how the setting up of EPA would consolidate the fragmented responsibilities of various pollution control agencies. He emphasized again that "[a]ir pollution, water pollution and solid wastes are different forms of a single problem" and that it was

263. Environmental Protection Agency and National Oceanic and Atmospheric Administration, The President's Message to the Congress Upon Transmitting Reorganization Plans to Establish the Two Agencies, July 9, 1970, 6 WEEKLY COMP. PRES. DOC. 908 (JULY 13, 1970).

264. *Id.* at 911.

265. *Id.* at 912.

266. Message of the President Relative to Reorganization Plans Nos. 3 and 4 of 1970, July 9, 1970, *reprinted in* FIRST ANNUAL REPORT, *supra* note 28, at 295.

evident that a different approach was necessary. He felt that reorganization under EPA together with the Council on Environmental Quality (CEQ), which the President charged with coordinating all environmental quality programs,[267] would now make this possible.[268]

Unfortunately, as we have seen,[269] EPA has not lived up to its expectations. It has not yet become an integrated agency, remaining half programmatic and half functional, and has been unable to adopt or implement an integrated approach.

IV. The Next Steps

We see an emerging picture in which promising integrative initiatives have been smothered by a variety of forces. The reasons for the dominance of fragmentation over integration, as we have noted,[270] included disillusionment with administrative expertise and management that gave rise to rule-specific statutes such as the Clean Air Act and the Clean Water Act. We also observed the perceived need to act quickly and effectively when confronted with an urgent problem without waiting for more comprehensive analysis, together with congressional and presidential politics, and bureaucratic and organizational difficulties. Despite these difficulties, the need for an integrated approach has become unquestionably stronger in light of the environmental problems confronting us. Not surprisingly, a number of influential and concerned voices have been calling for an integrated approach.

Integrated controls have been advocated by academic commentators,[271] governmental organizations, non-governmental organizations and even by EPA. The Council on Environmental Quality, which was established by NEPA to develop and advise the president on national environmental policy[272] and to oversee federal action subject to NEPA,[273] has advocated the concept in recent reports. In a 1983 report, CEQ stated: "Perhaps the most disturbing weakness of the environmental programs of the 1970s was their piecemeal approach to environmental protection, an approach that failed to recognize that the environment, by definition, is an integrated whole that must be protected comprehensively."[274] A later CEQ report reiterated the theme that "[a]ll parts of the environment are in some way connected, and it follows that the control of pollution should be integrated across program and disciplinary lines, so as to increase the efficiency of control from a whole-environment perspective and to prevent the unwanted transfer of pollutants from medium to medium."[275] In the course of formulating a basis for a more effective and efficient environmental policy, the first principle adopted by CEQ was that "[e]nvironmental protection policy must recognize the interconnectedness of the environment and emphasize multimedia approaches to pollution control."[276]

EPA, too, has begun to move towards an integrated approach.[277] The immediate past administrator, Lee Thomas, expressed his commitment to the concept unequivocally:

> Surely that is what is needed. Surely that is what environmentalists want. If the Environmental Protection Agency is ever going to live up to its name in the fullest sense, if it is ever

267. The CEQ also stressed the need for integration and coordination in its first report. *Id.* at 24-27.

268. *Id.* at viii.

269. *See supra* text accompanying notes 116-47.

270. *See supra* Part II.

271. *See* Rehbinder & Stewart, *Environmental Protection Policy*, in 2 Integration Through Law 1-13 (M. Cappelletti, M. Seccombe & J. Weiler eds. 1985); B. Rabe, *supra* note 1. General support from a different analytical perspective and with different objectives from those being offered in this Article, is found among a wide variety of writers sharing an economic perspective. *See supra* note 180.

272. National Environmental Policy Act of 1969, § 204(1), 42 U.S.C. § 4344(1) (1982).

273. *Id.* §§ 202, 204(3), 42 U.S.C. §§ 4342, 4344(3).

274. Council on Environmental Quality, 14th Annual Report of the Council on Environmental Quality 7 (1983).

275. Council on Environmental Quality, 16th Annual Report of the Council on Environmental Quality 12 (1985).

276. *Id.* at 20.

277. The first significant step in the direction of integration was taken in 1978 when Administrator Costle appointed a "Task Force on EPA Permits Consolidation." The Task Force cryptically accepted that its long range and ultimate goal was that of "regulating pollutants of concern through all phases of air, water and solid waste cycles," but concluded that such a task was beyond its scope. C. Sellars, The Rise and Fall of the Consolidated Permit Program—A Case Study of Reform Within the EPA (1984) (unpublished paper submitted to the Conservation Foundation). Costle's initiative led to a consolidated permit program that was later deconsolidated by the Reagan Administration. Administrator Costle took a second step in 1980 when he created a new Integrated Environmental Management Program (IEMP) in the Office of Policy Planning and Evaluation. In mid-1981, IEMP submitted a report to the new Administrator, Anne Gorsuch. Anne Gorsuch is notorious for her virulent anti-regulatory position. Taking over what was generally recognized as a comparatively efficient organization in May, 1981, she departed EPA in 1983 after an acrimonious tenure, leaving EPA, in the words of incoming Administrator Ruckelshaus, "on the verge of spinning out of control." Davies, *Environmental Institutions and the Reagan Administration* in Environmental Policy in the 1980s: Reagan's New Agenda 143-60 (N. Vig & M. Kraft eds. 1984). The IEMP report recommended the institutionalization of toxics integration. The report was rejected by Gorsuch, and IEMP lay moribund until the end of 1982. It was then resurrected to undertake integrated studies of pollution control applicable to particular industries and particular geographic areas. The industry studies produced a "few interesting results" but for the most part failed to change EPA policy. The geographic studies are still ongoing. The focus of these studies is no longer to change the way EPA thinks so much as to educate state and local pollution control officials. A relatively new stimulus to an integrated approach was provided in the mid 1980s by the focus on waste reduction, and in 1988 EPA established an Office of Pollution Prevention separated from existing media programs. It is too early to evaluate the effect of this office on an integrated approach to pollution control. *See generally* Davis, *The United States: Experiment and Fragmentation*, in Integrated Pollution Control in Europe and North America, *supra* note 123. *See also* Alm, *The EPA's Approach to Cross-media Problems*, in New Perspectives, *supra* note 1, at 7-13 (1985) (discussing proceedings of a conference held at Washington, D.C., Nov. 13, 1984).

> going to become more than a holding company for single medium programs, we are going to have to re-examine the roots of environmental policy.[278]

The appointment of William Reilly as administrator of EPA by President Bush may indicate a striking new development for that agency. Reilly is the immediate past president of the Conservation Foundation, whose proposal for an integrated environmental act may assume even greater significance. This section will first consider the Conservation Foundation proposal and then moot a different, less ambitious, but arguably more practical strategy for implementing an integrated approach.

A. The Conservation Foundation Proposal

The Conservation Foundation has been prominent among nongovernmental, environmental organizations in making a case for cross-media pollution control.[279] It has occupied the vanguard in the move towards environmental integration and, together with other commentators,[280] believes that the objective of integration should be embodied in new legislation. Pursuant to a cooperative agreement,[281] the Conservation Foundation has submitted to EPA the final draft of an Environmental Integration and Information Act (Draft Act).[282] The Draft Act,

278. Letter from Conservation Foundation to Hank Schilling of EPA (Mar. 13, 1987) (accompanying the final draft of the Environmental Integration and Reformation Act).

279. *See supra* note 1. The Conservation Foundation has also drafted an "Environmental Integration and Information Act" aimed at encouraging program integration, research and monitoring, and is presently drafting another more comprehensive "Environmental Protection Act" which is intended to be an integrated pollution control law. These two draft statutes are research tools which examine and probe the opportunities and problems of a more integrated approach to pollution control. Conservative Foundation, News Release (Feb. 10, 1988). A second draft of the "Environmental Protection Act" (Second Draft) has just become available. Unfortunately, it cannot be considered in any detail. The Conservation Foundation is also engaged in a third project on "Integrated Pollution Control in Europe and North America," the purpose of which is to provide an opportunity for Europeans and North Americans to build a common understanding of the nature of the cross-media problem. *Id.*

280. *See* A. MARCUS, *supra* note 52, at xv; NATIONAL RESEARCH COUNCIL, PERSPECTIVES ON TECHNICAL INFORMATION FOR ENVIRONMENTAL PROTECTION (1977). STABLE FUTURE, *supra* note 150, at 5 (1984).

281. *See* Letter, *supra* note 278.

282. *Id.* The Draft Act (to be distinguished from the Second Draft referred to in notes 171 and 279) is being treated as a proposal for new legislation and not as a codification of ideas, though there is some ambivalence about it. The Letter, *supra* note 278, states that "the goal of the project was not to draft legislation per se but rather to generate ideas, explore problems, and suggest solutions." EPA is exploring the extent to which the ideas contained in the integration bill could be implemented administratively. *Id.* Despite this assertion, it is clear that the Draft Act is being presented as prospective legislation. It is difficult to explain why else the Draft Act should propose to repeal existing legislation and urge the creation of another new statutory body (the National Commission on Environmental Strategy) in section 801 of the Draft Act. Furthermore, the obligation to carry out cross-media pollution control is set out in new provisions, and are not derived from existing legislation. *Id.*; Draft Act § 401(a) & (b). In fact, the Draft Act clearly aspires to be more than a statement of ideas. This is further borne out by the Conservation Foundation's strong aversion to the complexity of existing law. They assert that "the environmental statutes have become so detailed and complex that neither Congress nor EPA any longer understands what the total approach to environmental protection is." Letter, *supra* note 278, at 2.

283. W. KEEFE & M. OGUL, *supra* note 231, at 1-36; D. LOCKARD, THE PERVERTED PRIORITIES OF AMERICAN POLITICS 123-67 (1971); W. ESKRIDGE & P. FRICKEY, LEGISLATION 1-36 (1987). *See supra* notes 95-115 and accompanying text.

284. One State Department liaison officer is said to have observed that "It used to be that all one had to do was to contact the chairman and a few ranking members of a committee, now all 435 members and 100 senators have to be contacted." Davidson, *supra* note 97, at 130 (citing D. Mulhollan & A. Stevens, Congressional Liaison and the Rise of Informal Groups in Congress (1979) (unpublished manuscript presented at the 1979 annual meeting of the Western Political Science Association).

285. *Id.* at 128-31.

286. D. LOCKARD, *supra* note 283, at 123.

and the ideas embodied in it, are important and merit scrutiny for a number of reasons. To begin with, the Draft Act represents the distilled conclusions of an organization which, more than any other, has labored to advance the concept of cross-media pollution. Secondly, it has attracted the serious attention of EPA and consequently could point to new directions in environmental thinking. Finally, it may actually form the basis for new legislation if the reasoning adopted by it gains currency.

Although there is an unquestionable need for integrating norms that will countervail the effect of the existing norms of fragmentation, the quest of the Conservation Foundation for new legislation is misconceived and futile. It is futile because the difficulties in the way of new legislation are almost insurmountable. It is misconceived because countervailing norms are to be found in existing legislation.

1. NEW LEGISLATION

The difficulties in enacting new legislation are truly formidable.[283] Interest groups seeking legislation need to have access either to the executive or to subcommittees. While lawmaking and policymaking may no longer be confined to closed networks or "iron triangles" between congressional subcommittees, executive agencies and outside clientele groups, the difficulties of breaking into the system are formidable. A bill needs a sponsor, and getting sponsorship for the Draft Act can be problematic[284] as congressmen and senators hear a bewildering array of lobbyists and face a confusion of voices.[285] Even where a sponsor is found, the conservatism and caution of the legislature makes progress very problematic. Congress is ". . . devoted inordinately to the prevention of action [and is] . . . so well equipped to stop legislation. . . ."[286] And what it does not stop, it alters. Compromise is the order of the day.

Any proposal for legislation requires major and marginal compromise in caucus, in committee, on the floor, and in negotiations with the executive.[287]

Subcommittees are the leading initiators and drafters of legislative measures and reports; thus if the Draft Act is to succeed, it needs to emanate from a subcommittee.[288] There are to date, at least thirty subcommittees exercising jurisdiction over environmental statutes.[289] Subcommittee power extends beyond drafting initial legislation and embraces amendments. Consequently, bills are drafted in a manner that calls for referral to specific committees and subcommittees.

Any legislation seeking overall integration is bound to fail as it runs the gauntlet of the committee system. Because it will impinge on the territories of at least thirty committees, a bill based on the Draft Act cannot succeed. Such an integration bill may be referred to a hostile committee and quietly pigeonholed, or it may never be placed on a committee agenda because of the chairperson's opposition. Or, having passed through a standing committee, the bill may fail to win clearance from the rules committee and thereby be lost. Even if placed on the calendar, it may never be called for consideration. Finally, it may be killed by recommitting it to committee for further study or emasculated by an amendment which alters its purposes.[290] The history surrounding both NEPA and EPA only reaffirms the high likelihood of failure. Even if the Conservation Foundation's proposals go forward in their present form, there is every possibility that they will emerge out of the legislative process in unrecognizable form.[291] Moreover, there is the danger of stirring up a hornets nest of opposition to integration within Congress. Given the importance of subcommittee jurisdiction and power, attempts at new legislation may succeed only in aborting any move to implement integration through the administrative process. Any effort to introduce new legislation is therefore misconceived.

2. COUNTERVAILING NORMS

A move to introduce fresh legislation needs to be examined from another perspective. The Conservation Foundation has quite justifiably complained about the byzantine complexity and uncertainty of the existing statutory maze. This complexity phenomenon is not a new one, and, in fact, is endemic to any corpus of law dealing with a complex

287. W. KEEFE & M. OGUL, *supra* note 231, at 15-16.

288. Davidson, *supra* note 97, at 114.

289. Kenski & Kenski, *Congress Against the President: The Struggle Over the Environment*, in ENVIRONMENTAL POLICY IN THE 1980s, *supra* note 277, at 111.

290. W. KEEFE & M. OGUL, *supra* note 231, at 6.

291. W. ESKRIDGE & P. FRICKEY, *supra* note 283, at 237.

subject.[292] The settled path of reform lies in ascertaining the defects of the existing system before prescribing what should be. Jurisprudential lineage to such a line of thinking can be traced to Jeremy Bentham, who pointed out that before the law could be reformed by legislation, the nature and shortcomings of the existing law needed to be described and identified. Before legislation is attempted, therefore, it is customary to grapple with the complexities of the existing law to determine just what its defects might be.[293] To rush to legislation, without first discovering the relevant attributes of existing law, may prove to be a fruitless pursuit.[294]

The heart of the Draft Act's objective lies in a two-sided provision. One side states that the regulating agency shall consider all significant health and environmental effects of its actions, especially if such effects may affect the ability of other agencies to fulfill their goals. The other side states that no action shall be taken by the agency to control one type of environmental hazard if such action is likely to lead to more than offsetting damage from cross-media transfers.[295] The controlling impact of this provision is offset by a different section which provides that no action taken by the agency should delay the deadlines established in any statute.[296]

292. A committee consisting of the most eminent and illustrious lawyers of the day was set up to address precisely this issue in 1923. In their first report, which recommended the creation of an American Law Institute (ALI) which could respond to this challenge, they stated: "Two chief defects in American Law are its uncertainty and its complexity. These defects cause useless litigation . . . and when litigation is begun, create delay and expense." *Proceedings*, 1 A.L.I. 6 (1923). These difficulties were typically experienced in the common law, but they also arose out of "conflicting and badly drawn statutory provisions." The problems encountered in statute law were enumerated to include lack of clarity in language, lack of agreement or clear statement of principles, doubts as to whether prior statutes are repealed, collateral applications of specific provisions, and the possible application of the provisions of the statute to conditions wholly apart from those which gave rise to the demand for legislation. *Id.* at 69. While the ALI, in general, rejected new codification as a solution to the problem, preferring instead "restatements" of the law, they did prepare a draft code to resolve some of the complexities arising out of tax laws. *See* ALI, Federal Income, Estate and Gift Tax Statute (Tent. Draft No. 9, 1954); *see also* Goodrich, *The Story of the American Law Institute*, 1951 WASH. U.L.Q. 283 (1951). Such restatements and draft statutes are based upon the fundamental premise that law as it "is" should be determined before proceeding to what the law "ought" to be.

293. Bentham called the description of the legal system as it is, "expository" jurisprudence, and the criticism of the law in terms of its ends, "censorial" jurisprudence or the "art of legislation." H. HART & J. BURNS, AN INTRODUCTION TO THE PRINCIPLES OF MORALS AND LEGISLATION 293-95 (1970).

294. Duplication and re-enactment of existing concepts could well be the final result. Curiously, the Conservation Foundation has not even made a preliminary examination of the existing statutory regime.

295. *See supra* note 278 (Draft Act § 401(a), (b)).

296. *Id.* (Draft Act § 401(d)). The Administrator of EPA is further authorized to approve up to 10 demonstration projects to show the advantages of taking a more integrated approach to dealing with environmental problems and to test methods for implementing more integrated approaches. He or she is authorized to exempt these demonstration projects from all or any parts of

B. Integration Through Existing Legislation

The Conservation Foundation's proposal to use integrating goals to counter the sectoral and single medium goals of existing legislation has substantial merit. The argument of this paper is that such goals can be reached through existing legislation. The rightful call in this situation is for an exhaustive and definitive analysis of every statutory provision dealing with pollution control to ascertain if any of these permit or authorize integration. It would then be necessary to ascertain the extent to which these provisions could be woven together to form a pattern of law, policy and administration supporting an integrated approach. Such an endeavor is beyond the scope of this Article. As an example, however, this Article will present a preliminary analysis arising from a synoptic view of the existing statutory regimes by dealing with the control of chemicals, which present the greatest contemporary danger.[297] An aerial view of the present statutory landscape spanning chemicals offers one good example of a statute, the Toxic Substances Control Act of 1976 (TSCA), that takes an integrated approach. There are, of course, other statutes dealing with the control of toxic substances,[298] but TSCA is being chosen for analysis because of its special attributes.[299] When meshed with the integrating principles already institutionalized by NEPA and EPA, TSCA presents a viable baseline from which to move towards the administrative implementation of an integrated approach. Even provisions of statutes such as the Clean Air Act could be telescoped into TSCA and, consequently, strengthen an integrated approach. An eagle's view of the broad sweep of statutes should be the prelude to a painstaking 'fly's eye' scrutiny of all relevant statutes. What is now being attempted represents no more than a first step towards such a comprehensive analysis.

any statute. *Id.* (Draft Act § 402(e)). The Draft Act also contemplates repealing a cluster of provisions in existing pollution legislation dealing with research and grants for research. *Id.* (Draft Act § 605). Finally, it contemplates the setting up of a National Commission on Environmental Strategy, a sunset commission, with a lifetime of no more than three years, to draw up a unified national strategic environmental plan. *Id.* (Draft Act § 801).

297. COUNCIL FOR ENVIRONMENTAL QUALITY, *supra* note 275, at 12-13; B. RABE, *supra* note 1, at 3-22, 143-62.

298. *See* Federal Insecticide, Fungicide, and Rodenticide Act of 1972, Pub. L. No. 92-516, 86 Stat. 973, 7 U.S.C. §§ 136-136y (1982); Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6991i (1982); Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §§ 9601-9675 (1982); Clean Air Act, § 112, 42 U.S.C. 7412 (1982); Clean Water Act § 307, 33 U.S.C. § 1317 (1982).

299. *See infra* notes 300-51 and accompanying text.

1. THE TOXIC SUBSTANCES CONTROL ACT OF 1976[300]

In 1971, President Nixon submitted to Congress a bill which sought to integrate the ways in which toxic substances were controlled. CEQ, which had researched and drafted the bill, set out their reasoning and conclusions in an influential report on toxic substances.[301] The report argued that most toxic substances do not exclusively pollute air or water, they are found in varying quantities in air, water, soil, food and industrial and consumer products. The multiplicity of ways by which society is exposed to toxics makes it difficult for the media-oriented authorities to consider the *total* exposure of an individual to a given substance, a consideration necessary for the establishment of adequate environmental standards. In terms of human health, the *total* exposure of a human being to a given substance from all parts of environment—air, water and food—must be considered. Furthermore, the interaction of these substances both within and outside the body must be evaluated. Similar consideration must be given to other living organisms. Since no agency had considered itself completely responsible for all such substances in all media, CEQ recommended that a new legal authority, EPA, should take over that function.[302]

The Toxic Substances Control Act (TSCA) was passed in 1976. Its passage was marked by disagreements between the House and Senate.[303] What is important for the purposes of this Article is that the disagreement between House and Senate did not turn on the need for or relevance of integration; that seemed to be a given.[304] In fact, on the key provisions broadly defining the "environment,"[305] there was no disagreement.[306] Nor were there any significant differences on the need for the collection of information that would reveal the total exposure to a chemical and would monitor its total effect on health and environ-

300. 15 U.S.C. §§ 2601-2654 (1982) [hereinafter TSCA].

301. COUNCIL ON ENVIRONMENTAL QUALITY, TOXIC SUBSTANCES (1971).

302. *Id.* at v-vi.

303. H.R. REP. No. 1341, 94th Cong., 2d Sess., at 7-8 (1976). *See* HOUSE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE, LEGISLATIVE HISTORY OF THE TOXIC SUBSTANCES CONTROL ACT (Comm. Print 1976) [hereinafter LEGISLATIVE HISTORY]; R. DRULEY & G. ORDWAY, THE TOXIC SUBSTANCES CONTROL ACT 9-26 (1981); Gaynor, *The Toxic Substances Control Act: A Regulatory Morass* 30 VAND. L. REV. 1149, 1149-52 (1977); R. FINDLEY & D. FARBER, ENVIRONMENTAL LAW 445 (2d ed. 1985).

304. The Senate favored a restrictive approach to the marketing of chemicals based upon preregistration similar to that contained in the Federal Insecticide, Fungicide and Rodenticide Act. The House desired that all new chemicals be marketed without notification or registration, unless the EPA administrator had already placed such new chemicals on a "black list." The compromise eventually reflected in TSCA rejects a rigid preregistration regulatory scheme found in pesticide and drug laws, and favors a system of notice and selective interdiction. *See* W. RODGERS, *supra* note 5, at 898-901.

305. TSCA, § 3(5), 15 U.S.C. § 2602(5) (1982).

306. R. DRULEY & G. ORDWAY, *supra* note 303, at 9-25.

ment.[307] There was also agreement on the critical provisions (of section 9) dealing with the relationship of TSCA to other laws.

The TSCA has three objectives.[308] One objective is to prevent unreasonable risks of injury to health or the environment and to take action on imminent hazards from the specified chemicals[309] without unduly impeding technological innovation.[310] It could be argued that the concern over unreasonable risk is negated by the requirement for restraint in regulating such chemicals, thus emasculating the act and rendering it ineffective. Even if this is true, the import of the act in establishing an integrated approach to pollution control is very substantial.

The second objective of TSCA is to have the industry in question test chemical substances—where there is insufficient data to determine their effects—if the administrator finds that (1) they may present an unreasonable risk of injury to health or the environment, (2) they will be produced in substantial quantities and enter the environment in substantial quantities, or (3) they will be produced in substantial quantities and result in significant or substantial human exposure. The purpose of the testing is to determine whether the manufacture, distribution in commerce, processing, use, or disposal of the substance presents an unreasonable risk of injury to health or the environment.[311] The third objective TSCA required was the establishment of an Interagency Testing Committee,[312] to screen chemicals for potential "significant risk of serious and widespread harm" and to recommend a list of chemicals that should be tested further. TSCA defines the term "environment" to include "water, air, land and the interrelationship which exists among and between water, air and land and all living things."[313] Manufacturers are required to give notice to the administrator of EPA before manufacturing a new chemical substance or putting an old substance to a significant new use.[314] TSCA also empowers the administrator to delay or restrict the manufacture of a new chemical,[315] to adopt rules to prohibit manufacture and processing,[316] and to obtain injunctive relief.[317]

TSCA has institutionalized an integrated approach to the control of chemicals. It embraces the entire environment, together with total

307. *Id.*
308. TSCA, § 2(b), 15 U.S.C. § 2601(b) (1982).
309. *Id.* §§ 5(f), 6, 7, 15 U.S.C. §§ 2604(f), 2605, 2606.
310. *Id.* § 6(a), 15 U.S.C. § 2605(a).
311. *Id.* § 4, 15 U.S.C. § 2604.
312. *Id.* § 4(e), 15 U.S.C. § 2603(e). The members of the Committee came from the principal federal agencies having statutory obligations with respect to chemical health risks: the National Institute of Health, the National Cancer Institute, and National Science Foundation.
313. TSCA, § 3(5), 15 U.S.C. § 2602(5) (1982).
314. *Id.* § 5, 15 U.S.C. § 2604.
315. *Id.* § 5(e)(1)(A), 15 U.S.C. § 2604(e)(1)(A).
316. *Id.* § 5(f)(2), 15 U.S.C. § 2604(f)(3)(A).
317. *Id.* § 5(f)(2), 15 U.S.C. § 2604(f)(3)(B).

human exposure, and is not confined to the usual divisions between air, land and water, or to particular routes of exposure. Integration is crystallized by section 9 of TSCA, dealing with the act's relationship to other laws. When available information leads to the conclusion that there is an unreasonable risk of injury to health or the environment from an activity not controlled by other federal laws, section 9 authorizes the administrator to require other agencies to help abate the activity in question.[318]

Even more significant is the provision of section 9[319] dealing with laws administered by EPA. It provides:

> The Administrator shall coordinate actions taken under this chapter with actions taken under other Federal laws. . . . If the Administrator determines that a risk to health or the environment . . . could be eliminated or reduced to a sufficient extent by actions taken under the authorities contained in such other Federal laws, the Administrator shall use such authorities to protect against such risk unless the Administrator determines, in the Administrator's discretion, that it is in the public interest to protect against such risk by actions under this chapter. . . .[320]

The section commands the administrator to coordinate an integrated approach to pollution control established by TSCA with the segmented approaches of the other legislation. The administrator is instructed to consider whether the powers granted under those other acts could be used to control the risks defined in TSCA. If they can, the existing body of pollution control legislation, insofar as it concerned chemicals, would need to be interpreted in the light of the integrating and holistic policies embodied in TSCA. Because the section stipulates that the administrator shall use the powers under those acts rather than TSCA, the case for a reinterpretation of existing legislation is considerably strengthened. In sum, TSCA institutionalizes a countervailing norm of integration. Many of the provisions of apparently single medium statutes can now be interpreted from a different perspective. In the light of TSCA's provisions, it would be very difficult to ignore the applicability of an integrated approach to pollution control in the administration of other legislation.

318. *Id.* § 9(a)(1), 15 U.S.C. § 2608(a)(1).
319. *Id.* § 9(b), 15 U.S.C. § 2608(b).
320. *Id.*

2. THE CLEAN AIR ACT

In order to execute TSCA's mandate that the Administrator of EPA determine if the "authorities" or powers contained in other laws could be used to further an integrated approach to the control of chemicals, it is necessary to find out if any of those powers could be used in this way. TSCA refers only to chemicals, but chemicals reach into every medium and constitute the greatest threat to the environment today. Chemicals include conventional pollutants[321] as well as hazardous substances that, even at relatively low levels, present risks to human health. When non-integrated protective action against chemicals is taken in one medium, such as air, risks can be transferred to other media.[322] TSCA addresses this problem, and the way in which the integrating principles embodied in TSCA could drive other legislation is illustrated by the Clean Air Act.

In controlling air pollution, the Clean Air Act draws a distinction between conventional or "criteria" pollutants for which national ambient air quality standards are to be set,[323] and the more dangerous "hazardous" pollutants that could cause serious harm even in small quantities. Emission and performance standards are to be set for these "hazardous" pollutants.[324] The provisions of the Clean Air Act applicable to hazardous chemicals have been excruciatingly difficult to administer.[325] This analysis will consider how chemicals may be dealt with under the less onerous provisions dealing with "criteria" pollutants.

Section 4 of TSCA, which triggers the rest of the act, applies to chemical substances in two different situations. The first of these occurs where there is an "unreasonable risk of injury to health and the environment."[326] The other arises when a chemical substance is produced in substantial quantities and may reasonably be anticipated to enter the environment in substantial quantities or cause significant or substantial

321. "Criteria" pollutants under the Clean Air Act such as sulfur dioxide, particulate matter, carbon monoxide, photochemical oxidants, hydrocarbons and nitrogen dioxide are examples of conventional pollutants.

322. COUNCIL FOR ENVIRONMENTAL QUALITY, *supra* note 275, at 12-13.

323. Clean Air Act, §§ 108, 109, 42 U.S.C. §§ 7408, 7409 (1982).

324. *Id.* § 112, 42 U.S.C. § 7412. In contrast to the primary ambient air quality standards for "criteria" pollutants, which are established at levels that provide an "adequate" margin of safety to protect the public health, the emission levels for hazardous pollutants provide for an "ample" margin of safety.

325. Section 112(b)(1)(B) of the Clean Air Act stipulates that emission standards should be prescribed within 180 days of the publication of the list of hazardous pollutants. Clean Air Act, § 112(b)(1)(B), 42 U.S.C. § 7412(b)(1)(B) (1982). EPA has not found it possible to do so. Moreover, it is arguable that an "ample margin" of safety when dealing with hazardous chemicals is tantamount to zero emissions, effectuating a closedown of sources of pollution. EPA has been unwilling to do this. J. TOPPING & A. HELM, CLEAN AIR HANDBOOK 76-90 (1987).

326. TSCA, § 4(a)(1)(A), 15 U.S.C. § 2603(a)(1)(A) (1982).

human exposure to such substances.[327] The rationale for this distinction seems to be that a danger from chemical substances could arise from small quantities of highly dangerous chemicals or large quantities of less dangerous substances. As we have seen, section 9 of TSCA refers to "a risk to health or the environment associated with a chemical substance or mixture." Section 9 seems to stipulate that where the Administrator determines the presence of a risk which does not amount to an "unreasonable" one, and such substance "could be eliminated or reduced to a sufficient extent . . ." by powers under other federal laws, the administrator should as a rule use such laws to control that risk. While the interdiction of unreasonable risk would proceed under the more stringent provisions of TSCA, ordinary risk which could be reduced to a "sufficient" extent under a different statute should be dealt with under that other statute.[328] Accordingly, the hazardous substances causing "unreasonable" risk referred to under section 4 of TSCA would not be subject to control under other laws, while the less dangerous substances giving rise to ordinary risk would be so controlled.

The Clean Air Act controls air pollutants resulting from diverse mobile or stationary sources "that may reasonably be anticipated to endanger public health or welfare."[329] This closely resembles the risk from "substantial human exposure"[330] and the "risk to health or the environment"[331] from chemicals referred to by TSCA, and is the kind of situation governed by section 9 of TSCA. Where it is determined that section 9 applies, the provisions of the Clean Air Act do lend themselves to an integrated approach.

In controlling criteria pollutants, the Clean Air Act retains the concept of an "atmospheric area" introduced by the Air Quality Act of 1967.[332] Within these areas, air quality regions[333] have been established. The relationship of environmental quality to a cross-media approach is quite significant. When dealing with generalized pollution (i.e., pollution which cannot be attributed to just one source of air pollution), air quality objectives can only be achieved after controlling pollution from all sources and pathways. If sewerage works and landfills are sources of pollution, they would need to be assessed in addition to

327. *Id.* § 4(a)(1)(B), 15 U.S.C. § 2603(a)(1)(B)(i).

328. Section 9 provides the administrator with extraordinary power to deal with such a case under TSCA itself, but he would need to justify such a course of action as being in the public interest. *Id.* § 9, 15 U.S.C. § 2608.

329. Clean Air Act, § 108(a)(1)(A) & (B), 42 U.S.C. § 7408(a)(1)(A) & (B) (1982). Welfare is defined as including effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility and climate. *Id.* § 301(h), 42 U.S.C. § 7602(h) (1982).

330. TSCA, § 4(a)(1)(B), 15 U.S.C. § 2603(a)(1)(B)(i)(1982).

331. *Id.* § 9(b), 15 U.S.C. § 2608(b).

332. Clean Air Act, § 107(a), 42 U.S.C. § 7407(a) (1982). There are 10 atmospheric areas.

333. *Id.* § 107(e), 42 U.S.C. § 7407(e). There are 247 such regions.

direct emissions into the atmosphere. Conceptually, environmental quality objectives call for a consideration of all possible sources of air pollution which may affect the objectives in question. Having arrived at the point where all sources and pathways of a pollutant become relevant, it is not difficult to move onto the next step of considering the impact and distribution of pollutants from a given source. The Clean Air Act makes it possible to do just this.

An integrated approach is reinforced by other provisions of the Clean Air Act. Human health is, of course, affected by more than air pollution. A cross-media approach is almost a necessary corollary to any satisfactory regime for the protection of human health. Harm to human health can be caused in three ways: inhalation, ingestion through food or water, and absorption through the skin. While the regulation of air emissions may control ill health caused by inhalation, it is possible that a pollutant could still reach its human target through its presence in water. Polluted water, for example, could be used for drinking, bathing or washing, and fish which had absorbed the pollutant could be eaten, leading to the bio-accumulation of the pollutant in humans.

Numerous provisions of the Clean Air Act dealing with air quality criteria and control techniques are open to integrating interconnections. Section 108(a)(2) requires that air quality criteria shall draw attention to "all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air. . . ." The air quality criteria issued by the administrator under TSCA are to include information about variables and other pollutants which, of themselves or in combination with others, may produce adverse effects on public health or welfare.[334] The information the administrator is to provide shall include data about environmental impacts of emission control technology[335] and shall state how processes or procedures for reducing criteria pollutants may increase the emission or formation of other pollutants.[336] The present sparse list of six criteria pollutants could to be expanded on the basis of a cross-media evaluation. The fact that section 108 of the Clean Air Act sets out an uncompromising, even absolutist, demand that human health should be protected at any cost,[337] should not be allowed to avert the wider application of the Clean Air Act. Arguments about the wisdom of such standards or the need to take account of technological and economic considerations

334. *Id.* § 108(a)(2)(A)(C), 42 U.S.C. § 7408(a)(2)(A)-(C) (1982).
335. *Id.* § 108(b)(1), 42 U.S.C. § 7408(b)(1).
336. *Id.* § 108(f)(1)(D), 42 U.S.C § 7408(f)(1)(D).
337. Lead Indus. Ass'n, Inc. v. EPA, 647 F.2d 1130, 1148-56 (D.C. Cir. 1980), *cert. denied*, 449 U.S. 1042 (1980); American Petroleum Inst. v. Costle, 665 F.2d 1176, 1190 (D.C. Cir. 1981), *cert. denied*, 455 U.S. 1034 (1982).

should be addressed to Congress. In any event, the measures contemplated by the Clean Air Act, when dealing with criteria pollutants, are substantially less stringent than those contemplated under TSCA.

The Clean Air Act's state implementation plans (SIPs) provide for the "implementation, maintenance, and enforcement" of both primary and secondary ambient standards.[338] It is, of course, vital that these SIPs should also adopt a cross-media approach, and sections 110(a)(2)(A) and (B) of the act enable this to be done. These sections state that the administrator shall approve such a plan if it provides for the attainment of primary and secondary ambient air quality standards[339] and if "it includes emission limitations, schedules, and timetables for compliance with such limitations, and such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standard. . . ."[340] These provisions dovetail into others dealing with new and existing stationary sources of pollution.[341] In setting standards for them, the administrator is obliged to take into consideration "any nonair quality health and environmental impact and energy requirements."[342]

TSCA drives the implementation of pollution legislation in other ways. We have seen that section 9 compels the administrator of EPA to coordinate actions under TSCA with actions under other laws. This means that, for example, the control of hazardous pollutants under the Clean Air Act and Clean Water Act would need to be coordinated with TSCA. At present, there is little coordination between the setting of emission standards for hazardous air pollutants[343] and discharge standards for hazardous water pollutants[344] and even less coordination between the three statutes.

The opportunities for integration are made more promising by another development. As noted in Part II, EPA resisted the application of NEPA to its own regulatory activities, and EPA was exempted from complying with the more exacting conditions of NEPA because the Clean Air Act demanded the "functional equivalent" of a NEPA impact assessment. In holding that EPA should undertake the functional equivalent of a NEPA impact assessment when setting standards for new sources under section 111 of the Clean Air Act, the court of appeals in *Portland Cement* opened the door to similar interpretations not only of other provisions of the Clean Air Act, but also of all other acts ad-

338. Clean Air Act, § 110(a)(1), 42 U.S.C. § 7410(a)(1) (1982).
339. *Id.* § 110(a)(2)(A), 42 U.S.C. § 7410(a)(2)(A) (1982).
340. *Id.* § 110(a)(2)(B), 42 U.S.C. § 7410(a)(2)(B) (1982).
341. *Id.* § 110, 42 U.S.C. § 7411 (1982).
342. *Id.* § 110, 42 U.S.C. § 7411(a)(1) (1982).
343. *Id.* § 112, 42 U.S.C. § 7412 (1982).
344. Clean Water Act, § 307, 33 U.S.C. § 1317 (1982).

ministered by EPA. The decision certainly was a factor behind EPA's decision to take what has been described as the "giant practical step"[345] of issuing a policy statement declaring that it would voluntarily prepare environmental impact statements in connection with certain major regulatory activities.[346] There apparently were other reasons that led to this decision. The question whether EPA should be bound by NEPA had already been examined by an internal EPA task force[347] that had recognized that at least one part of the rationale for EPA's creation was to promote a coordinated, multi-faceted approach to the solution of environmental problems.[348] This internal recognition of the need to undertake wide environmental assessment made it difficult for EPA to insist that it lacked integrative functions. Further, EPA had been urged by the House to prepare impact assessments,[349] and, $5 million was appropriated to EPA for the preparation of environmental impact statements.[350] Up until now, the majority of EPA's voluntary preparation of impact statements has been restricted to treatment plant construction grants and Clean Water Act section 208 area-wide planning grants,[351] but there is no reason why it should be so restricted. The preparation of impact analysis prior to its regulatory activities dealing with chemicals would indeed constitute a major step towards the integration envisioned by TSCA.

C. Possible Constraints

A further concomitant of an integrated approach is the reliance placed on the expertise of administrators. Decisions as to how integration should be achieved in the particular circumstances of a case cannot be dictated in advance. To the extent that integration does not lend itself to specific legislative prescription, it calls for a renewal and reaffirmation of belief in New Deal expertise. This does present the danger of a possible recurrence of those problems which led to the eschewing of

345. Comment, *Coordinating the EPA, NEPA, and the Clean Air Act*, 52 TEX. L. REV. 527, 529 (1974).

346. 39 Fed. Reg. 16,186-87 (1974).

347. TASK FORCE REPORT, *supra* note 63.

348. The task force noted, however, that some statutory mandates may prevent EPA from undertaking the wider investigation demanded by NEPA. *Id.* at 46. It also drew attention to major unanswerable questions about the scope of impact statements under NEPA to which EPA might be subject. The questions included the extent to which EPA should consider effects not commanded by or inconsistent with specific statutory mandates; whether a broad scale cost-benefit analysis is permissible or required; whether a final statement should be issued prior to proposing regulations. *Id.* at 48.

349. H.R. REP. No. 520, 93d Cong., 1st Sess. 18-19 (1973).

350. Agriculture — Environmental and Consumer Appropriation Act, 1974, Pub. L. No. 93-135, 87 Stat. 468, 482 (1973).

351. J. BATTLE, ENVIRONMENTAL DECISIONMAKING AND NEPA 113 (1986).

expertise.[352] It will be argued that there is little possibility of "capture" where there are vigilant "watchdog" groups. Environmental groups manifest their presence, and their impact is felt in no uncertain terms, thereby making agency surrender to industry quite unlikely. Moreover, reasonable safeguards against administrative malaise can be provided. Finally, the risks of maladministration are justified by the benefits of an integrated system as against a fragmented one. Furthermore, it might be argued that the countervailing goal presented by TSCA will only confuse EPA, as the agency will be torn between the competing pressures of differing goals. Competing pressures, however, are among the normal problems facing administrators. The traditional model of administrative law which conceives of the agency as a mere transmission belt for implementing specific and defined legislative directives often mocks reality. Instead, statutes create broad and indefinite goals, while granting agencies wide discretion to implement those inchoate goals. In carrying out their legislative mandate, the agencies are constrained to act as surrogate legislatures and adopt procedures designed to reconcile the competing goals of legislation and adjust the claims of those affected by those goals.[353] This view of the administrative process was developed by political scientists and is now widely shared by judges, legislators, practitioners and legal commentators.[354] In some cases, the goals mentioned in the law merely comprised a "laundry list" that leaves gaping uncertainties concerning the mission of the program.[355] In others, the multiplicity of goals may render more than one of them incapable of fulfillment.[356]

EPA should choose to implement the clear integrating norms embodied in existing legislation such as TSCA and NEPA.[357] In order to do so, EPA would need to establish rules that detail the manner in

352. *See supra* text accompanying notes 75-89. The views advanced in this Article draw support from J. WILSON (*see supra* notes 74 and 104) and Sabatier, *Social Movements and Regulatory Agencies: Toward a More Adequate—and Less Pessimistic—Theory of "Clientele Capture,"* 6 POL'Y SCI. 301 (1975).

353. Stewart, *supra* note 179, at 1671-88; A. BONFIELD, *supra* note 212, at 8-10.

354. Stewart, *supra* note 179, at 1683 n.64.

355. F. THOMPSON, HEALTH POLICY AND THE BUREAUCRACY: POLITICS AND IMPLEMENTATION 47-48 (1981).

356. R. PIERCE, S. SHAPIRO & P. VERKUIL, ADMINISTRATIVE LAW AND PROCESS 44-45 (1985) (describing the telling example of the Emergency Petroleum Allocation Act, which required the president to promulgate a regulation for the mandatory allocation of petroleum products which was to protect the public health, maintain public services and agricultural operations, preserve a sound and competitive petroleum industry, allocate crude oil to refiners to permit them to operate at full capacity, result in an equitable distribution of supplies to all parts of the country, promote economic efficiency, and minimize economic distortion). The regulation was codified at 15 U.S.C. § 753(b)(1) (1982).

357. *See supra* note 219 and accompanying text. Integrating norms are being treated as public-regarding norms. *See* Macey, *Promoting Public-Regarding Legislation Through Statutory Interpretation: An Interest Group Model*, 86 COLUM. L. REV. 223, 250-51 (1986).

which the agency would resolve the pulls of differing goals and competing claims in its move towards integration. This is clearly a "political" process,[358] and there is a danger that EPA in responding to interest group politics, as well as to the currents of thinking leading to the adoption of a fragmented approach,[359] will be steered away from integration. Both practical and theoretical considerations suggest otherwise.

At a practical level, environmental interest groups are not generally motivated by incremental thinking to the degree evident in the late 1960s and early 1970s. This is borne out by EPA's striking move towards integration in the early 1980s, when it adopted the consolidated permit regulations, which it was hoped would synthesize the separate single-medium permit systems to provide a more comprehensive environmental evaluation of industrial projects.[360] The regulations were an initiative of the Carter Administration aimed at governing the hazardous waste management program under the Resource Conservation and Recovery Act,[361] the Underground Injection Control program of the Safe Drinking Water Act,[362] the National Pollutant Discharge Elimination System, and State Dredge or Fill programs under the Clean Water Act,[363] and the Prevention of Significant Deterioration program under the Clean Air Act.[364] The consolidated regulations were clearly integrating[365] in intent. Several environmentalist and industry petitioners challenged these regulations in court,[366] but the environmentalist groups did not challenge the need for a comprehensive approach. The main challenge to the regulations came from industry groups that claimed that the regulations imposed additional burdens.[367]

358. A. BONFIELD, *supra* note 212, at 8-9.

359. *See supra* text accompanying notes 51-147.

360. 45 Fed. Reg. 33,290 (1980). C. Sellers, in The Rise and Fall of the Consolidated Permit Program—A Case Study of a Reform Effort Within the EPA 9-11 (unpublished paper submitted to Conservation Foundation Aug. 14, 1984), argues that the Consolidated Permit Program foundered because the original environmental objective of integrating all phases of air, water and solid waste cycles was lost in the effort to justify the program on efficiency and paper reduction grounds.

361. Renamed as the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6991i (1982 & Supp. IV 1986).

362. Renamed as the Public Health Service Act, 42 U.S.C. §§ 300(f)-300(j)(11) (1982 & Supp. IV 1986).

363. 33 U.S.C. §§ 1251-1376 (1982).

364. 42 U.S.C. §§ 7401-7642 (1982 & Supp. IV 1986).

365. The most important environmental benefit was listed as the "more comprehensive management and control of wastes." 45 Fed. Reg. 33,291 (1980).

366. Natural Resources Defense Council, Inc. v. EPA, 673 F.2d 392 (D.C. Cir. 1980). *See* C. Sellers, *supra* note 360.

367. Under the Reagan Administration, the regulations were "de-consolidated" (effectively repealed) in response to the President's Task Force on Regulatory Relief. 13 Envtl. Rep. 2205 (BNA) (1983).

Even if interest groups behave differently and exert pressure on EPA to desist from integrating policies, it is submitted that EPA is entitled to resist such pressures. It is the EPA's duty to interpret and execute the goals embodied in legislation, in what it considers to be the best public interest. A "republican" theory of government[368] and a "public interest" or Weberian model of administration[369] offer strong theoretical justification for the view that Congress mandates and empowers the agency to determine what constitutes the public interest and public good. It is the responsibility of the legislature to reconcile competing groups and render clashing interests subservient to the public good.[370] Where this has been done and legislative goals are clear, the policymaker must promote only those goals specified by the politically responsible legislature.[371] Where they are not clear, or there are competing goals, the agency takes on the mantle of a surrogate legislature. The agency's task, however, is not to mediate in a struggle between self-interested groups who impress their preferences on the agency, but rather to determine the public interest and the public good. It is envisioned that the private interests of the citizens and interest groups will be subordinated to the public good,[372] as determined by the agency.

A "republican" view of government and a "public interest" model of administration are supported by evidence of a general movement from incrementalism to comprehensive rationality. It is a movement that represents an historical and logical progression of ideas and institutions. We have taken note of Lindblom's criticism of the rational model of decision making.[373] Lindblom's alternative of an incremental approach is open to criticism on a number of grounds. It is premised on the view that the results of present policies must, on the whole, be satisfactory.[374] If the present policies are manifestly inadequate or wrong, it would be folly to persist in variations of them. Furthermore, incrementalist strategy almost by definition does not apply to fundamental

368. D. EPSTEIN, THE POLITICAL THEORY OF THE FEDERALIST 93-99 (1984); Bessette, *Deliberative Democracy: The Majority Principle in Republican Government*, in HOW DEMOCRATIC IS THE CONSTITUTION? 102 (R. Goldwin & W. Schabbra eds. 1980). Sunstein, *supra* note 219; Reich, *supra* note 219.

369. Michelman, *Political Markets and Community Self-Determination: Competing Judicial Models of Local Government Legitimacy*, 53 IND. L.J. 145, 149 (1977-1978); Mashaw, *Mirrored Ambivalence: A Sometimes Curmudgeonly Comment on the Relationship Between Organization Theory and Administrative Law*, 33 J. OF LEGAL EDUC. 24, 29 (1983).

370. THE FEDERALIST No. 10, at 57 (J. Madison) (S. Mittell ed. 1938).

371. Diver, *supra* note 215, at 398-99.

372. Sunstein, *supra* note 219, at 31. This view also draws support from Macey, who maintains that courts should construe statutes according to their public-regarding goals and principles. Macey, *supra* note 357, at 250-56. On a parity of reasoning, agencies should act likewise.

373. *See supra* notes 91-94 and accompanying text.

374. Dror, *Governmental Decision Making: Muddling Through—"Science" or Inertia?*, 24 PUB. ADMIN. REV. 153, 154 (1964).

decisions,[375] and fundamental decisions set the context and lay the foundations for incremental decisions.[376] Incremental decisions may lead to and follow upon fundamental decisions but cannot be understood without them. Decisionmaking, therefore, is a dynamic consisting of some fundamental decisions and a number of incremental decisions which modify, build upon and/or alter those fundamental decisions. To arrive at such fundamental decisions, however, it is necessary to step outside the incremental model in order to gain a wider conceptual horizon. The move towards an integrated strategy is being advocated as a fundamental decision which can substantially alter the whole course of environmental policy. It has been argued cogently that incremental processes which serve at an early stage of a policy initiative should, in a number of cases, evolve into a more rational analysis. "[T]his transformation can best be understood as a movement from an 'incrementalist' model of policymaking to one of 'comprehensive rationality.' "[377] The thrust of such a conclusion has been endorsed by prominent administrative lawyers, both specifically and generally,[378] and by political scientists.[379]

It is possible to use an evolutionary model of jurisprudence[380] and to view comprehensive rationality as evolving from incrementalism. Evolutionary theories in jurisprudence are more than merely theories that the law changes. They are theories contained in a much larger paradigm that describes how the world changes and ought to respond in the face of resource scarcity and natural selection. It is tradition with a rich jurisprudential lineage that extends from historical jurists like Savigny[381] and Maine,[382] to others like Wigmore and Kocourek,[383] to

375. D. BRAYBROOKE & C. LINDBLOM, *supra* note 90, at 66-69.

376. Etzioni, *Mixed-Scanning: A "Third" Approach to Decision-Making*, 27 PUB. ADMIN. REV. 385, 387 (1967).

377. Diver, *supra* note 215, at 394-95.

378. Specifically with regard to pollution control, see Rehbinder & Stewart, *supra* note 271, at 1-13; more generally see A. BONFIELD, *supra* note 212, at 3-11.

379. *E.g.*, RABE, *supra* note 1, at 156-60.

380. See Hovenkamp, *Evolutionary Models in Jurisprudence*, 64 TEX. L. REV. 645 (1985), and Elliott, *The Evolutionary Tradition in Jurisprudence*, 85 COLUM. L. REV. 38 (1985), for illuminating reviews of the literature dealing with the American tradition of legal evolution. See also P. STEIN, LEGAL EVOLUTION: THE STORY OF AN IDEA (1980), which deals with theories of legal evolution in eighteenth- and nineteenth-century European jurisprudence, and describes the ideas of jurists such as Bentham, Savigny and Maine. Stein, however, concludes that theories of evolution were nineteenth-century phenomena and did not survive the end of the century. *Id.* at 122.

381. F.VON SAVIGNY, ON THE VOCATION OF OUR AGE FOR LEGISLATION AND JURISPRUDENCE (A. Hayward trans. London 1831 and Arno Press reprint 1975). Savigny suggests that law is not the intentional creation of governors, but evolves out of the common spirit of the people.

382. H. MAINE, ANCIENT LAW: ITS CONNECTION WITH THE EARLY HISTORY OF SOCIETY AND ITS RELATION TO MODERN IDEAS (Beacon Ed. 1963). Maine identifies three successive stages in the evolution of progressive societies.

383. EVOLUTION OF LAW: SELECT READINGS ON THE ORIGIN AND DEVELOPMENT OF LEGAL INSTITUTIONS (J. Wigmore & A. Kocourek eds. 1915-1918) (three volumes). In the third volume, titled FORMATIVE INFLUENCES OF LEGAL DEVELOPMENT, the authors develop a comprehensive theory of legal evolution.

pragmatic instrumentalists like Holmes[384] and Pound,[385] and includes Clark[386] and Rodgers.[387] It is not proposed, however, to explain the theoretical underpinnings for a move from incrementalism to integration in terms of Darwinian or other socio-biological theories of evolution.[388] What is being offered is a more practical explanation of incrementalism as a passing stage in the development or evolution of environmental policies. The winds of change are blowing the present fragmented policies stranded in incrementalism towards those of integration based on comprehensive rationality. Rather than view the implementation of cross-media policies as another difficulty, EPA should see their task as an opportunity for shaping and reforming public values, and for contributing to the community's understanding of this problem.[389]

V. CONCLUSION

We have seen how ecological streams of thinking based on integration arose at a time of general disillusionment with New Deal idealism. A suspicion of administrative expertise shaped the environmental perspective and resulted in calls for clear, precise and easily followed legislative mandates. Such demands converged with incrementalist models of administration and resulted in the institutionalization of fragmenta-

384. O. HOLMES, THE COMMON LAW (1946). In a celebrated passage, Holmes began:

> The life of the law has not been logic: it has been experience. The felt necessities of the time, the prevalent moral and political theories, intuitions of public policy, avowed or unconscious, even the prejudices which judges share with their fellow-men, have had a good deal more to do than the syllogism in determining the rules by which men should be governed.

Id. at 1. As Elliot remarks, Holmes' claim that legal doctrines evolve in response to changes in the social environment has become virtually a canon of faith for American lawyers. Elliot, *supra* note 380, at 51.

385. R. POUND, LAW AND MORALS (1924); R. POUND, SOCIAL CONTROL THROUGH LAW (1942). Pound believed that jurisprudence developed historically through three evolutionary stages. *See* LAW AND MORALS, at 29-33.

386. Clark, *The Morphogenesis of Subchapter C: An Essay in Statutory Evolution and Reform*, 87 YALE L.J. 90 (1977); Clark, *The Interdisciplinary Study of Legal Evolution*, 90 YALE L.J. 1238 (1981).

387. Rodgers, *Bringing People Back: Towards a Comprehensive Theory of Taking in Natural Resources Law*, 10 ECOLOGY L.Q. 205 (1982).

388. Elliot, for example, considers theories about the nature and sources of law to be evolutionary if they propose that the law is shaped by its environment in a way that is analogized explicitly to Darwin's theory of evolution in biology. Elliot, *supra* note 380, at 39. Darwin suggested that the forms of living things are shaped by environmental conditions and not the design choices of a creator. But as Hovenkamp points out, jurisprudence was evolutionary long before Darwin and will continue to be evolutionary. Hovenkamp, *supra* note 380, at 645.

389. Administrator Ruckelshaus of the EPA faced up to similar challenges. Reich, *supra* note 219, at 1632-40.

tion. The new confluence of fragmented thought swamped even integrating developments, such as NEPA and EPA, and obstructed the implementation of others, such as TSCA. After some remarkable successes, fragmented policies have resulted in equally conspicuous failures, and these failures call for a review and re-examination of existing policies, and demand fresh initiatives. A re-examination of the foundations of environmental thought, law and policy reveals the extent to which the answers to contemporary problems can be shaped by a rediscovery of existing integrative norms. Existing integrative norms are rendered even more important in the light of a different convergence of thoughtways. Incrementalism is giving way to comprehensive rationality, and comprehensive rationality admirably complements the pursuit of integration. This Article has suggested how the ecological thinking which gave birth to NEPA, EPA and TSCA could be meshed with comprehensive rationality in order to meet the challenge of the 1990s and the twenty-first century.

The most promising way out of the present impasse is for EPA to restructure itself along functional lines, abolish its programmatic divisions, and take a fresh look at the statutes it administers. It may be a difficult undertaking, but it is not anything as exacting as trying to persuade Congress to disengage itself from the existing legislation. Significantly, Administrator Reilly,[390] together with many others within EPA,[391] have acknowledged the critical importance of an integrated approach and the need to change direction. By moving from an incremental, program-based approach to one that is functional and rational, EPA will be reclaiming its integrating mandate, while simultaneously rediscovering its ecological roots. Perhaps there may be a happy ending to the story.

* * * * *

In the face of losses and setbacks, the Great Agency decided to review its earlier position and reconsider the philosophy underlying its creation. This led to the re-opening of the minds of many important officers of the Great Agency who soon realized the folly of their ways. They decided to reform the Agency by breaking down the programmatic barriers which had been the principal cause of many of its failures, and by implementing forgotten mandates. It was no easy task. The walls separating air, water and land pollution, unlike those of Jericho, did not crumble before a trumpet blast, and those within the walls resisted stubbornly. But the reformers persisted and finally prevailed. Following upon the removal of the walls and the abolition of single-medium programs, a new strategy of cross-media pollution control replaced single-medium campaigns. Since then, there have been dramatic changes in the war against the Hydra. Its true identity and nature are better understood, and its many heads are recognized as different manifestations of the same creature. The Great Agency is able to integrate and coordinate its attacks against the Hydra, and many battles have been won. The war still goes on, but the character and weaknesses of the Hydra are understood, and a better organized and equipped Great Agency is confident of the final outcome.

390. *See supra* notes 277-80 and accompanying text.

391. Alm, *The EPA's Approach to Cross-Media Problems*, in NEW PERSPECTIVES, *supra* note 1; Schmandt, *Managing Comprehensive Rule Making: EPA's Plan for Integrated Environmental Management*, 45 PUB. ADMIN. REV. 309 (1985).

From Reaction to Proaction: The 1990 Pollution Prevention Act

Stephen M. Johnson*

I. INTRODUCTION

> "From a policy perspective, the next twenty years will require a fairly fundamental shift in our approach — from the acute to the systemic, from local to global, from exploitation to stewardship, from reaction to proaction. We cannot afford to continue orienting our funds and efforts towards trying to mitigate the consequences of our mistakes; we must start *preventing* the mistakes."
>
> John Atcheson, Office of Pollution Prevention,
> United States Environmental Protection Agency[1]

At the heart of the pollution prevention idea is the simple notion that avoiding the creation of pollution is economically and environmentally preferable to cleaning up and controlling it. Historically, environmental protection legislation and regulations have focused on "pollution control" rather than "pollution prevention."[2] The legislative and administrative response to pollution issues has been to set acceptable pollution levels and to

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1. John Atcheson, *Where We've Been, What's Ahead*, POLLUTION PREVENTION NEWS, Nov.-Dec. 1990, at 1, 8.

2. Traditional "pollution control" regulation attempts to minimize the adverse environmental impacts of pollution by imposing controls on the release of pollutants into the environment *after* the pollution has been generated. For instance, the Clean Air Act sets limits on the emissions of various air pollutants into the atmosphere, 42 U.S.C. §§ 7409-12 (1988), and the Clean Water Act limits the amounts of various pollutants that can be discharged into the water, 33 U.S.C. § 1311 (1988). "Pollution prevention" regulation, on the other hand, attempts to prevent the generation of pollution in the first place. EXECUTIVE OFFICE OF THE PRESIDENT, COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL QUALITY: 21ST ANNUAL REPORT 79 (1990) [hereinafter CEQ].

* Johnson, Stephen M. "From Reaction to Proaction: The 1990 Pollution Prevention Act." *Columbia Journal of Environmental Law* 17, no. 1 (1992):153-204.

require treatment of pollutants with various technologies to reach those levels.[3]

The pollution control approach has serious economic and environmental drawbacks. First, pollution control measures generally focus on specific environmental problems without addressing the cross-media impact that the measures will have on other segments of the environment.[4] Pollution control measures usually target the problems of a single environmental medium (*i.e.*, air, water, or land), and impose restrictions on pollution that encourage the transfer of pollution to an unregulated medium.[5] However, the media are not neatly divided, and degradation of one medium eventually impacts others.[6]

Second, pollution control measures have generally focused on controlling only the large individual sources of pollution.[7] Often, however, the pollution caused by unregulated sources exceeds that caused by the regulated sources.

A third drawback of the pollution control approach is that it accepts a fixed level of pollution. By doing so, it fails to encourage reductions in pollution beyond "acceptable" levels.[8] Studies performed by EPA and the Congressional Office of Technology Assessment ("OTA") indicate that there are significant

3. Fred Hansen, *Pollution Prevention Planning: A New Mandate for Oregon's Environment*, ENVTL. FORUM, Sept.-Oct. 1989, at 30. *See also* U.S. ENVIRONMENTAL PROTECTION AGENCY, SCIENCE ADVISORY BOARD, REDUCING RISK: SETTING PRIORITIES AND STRATEGIES FOR ENVIRONMENTAL PROTECTION 1 (1990).

4. Hansen, *supra* note 3, at 30. *See also* NATIONAL ENVIRONMENTAL LAW CENTER AND CENTER FOR POLICY ALTERNATIVES, AN OUNCE OF TOXIC POLLUTION PREVENTION 4 (1991) [hereinafter NELC].

5. 56 Fed. Reg. 7849, 7853 (1991). For instance, the Clean Air Act sets limits on the emissions of various air pollutants into the atmosphere. 42 U.S.C. §§ 7409-12 (1988). In order to meet those limits, industries often install air pollution control devices to filter out the pollutants. However, the air pollution control devices accumulate the filtered pollutants in a toxic ash, which is generally disposed of on the land. 56 Fed. Reg. at 7853. Similarly, the Clean Water Act limits the amounts of various pollutants that can be discharged into the water by, among other sources, wastewater treatment plants. 33 U.S.C. § 1311 (1988). In order to meet those discharge limits, wastewater treatment plants use a variety of chemical and biological technologies to remove pollutants from the water to be discharged, and accumulate the pollutants in a sludge, which is then generally disposed of on the land. 56 Fed. Reg. at 7853.

6. For example, disposal of waste on land can lead to groundwater contamination. 56 Fed. Reg. at 7853. Similarly, evaporation of waste that is stored in ponds can lead to air pollution problems. *Id.*

7. *Id.*

8. NELC, *supra* note 4, at 4.

opportunities for reductions in pollution through pollution prevention technology presently available to industry.[9]

Fourth, the pollution control approach encourages inefficient environmental spending by industry.[10] Legislation and regulations encourage firms to invest hundreds of millions of dollars in pollution control technologies rather than to explore improvements in feedstocks or production methods, plant maintenance, or other pollution prevention techniques that would cost less to implement and would achieve higher levels of environmental protection.

The clearest evidence that the pollution control approach is inadequate lies in the data regarding the emission of toxic pollutants that has been collected under the Emergency Planning and Community Right to Know Act ("SARA Title III").[11] According

9. In a 1986 report to Congress, EPA estimated that it was possible to reduce substantially the amount of hazardous waste generated in the United States by using pollution prevention methods. U.S. ENVIRONMENTAL PROTECTION AGENCY, REPORT TO CONGRESS: MINIMIZATION OF HAZARDOUS WASTE, EXECUTIVE SUMMARY AND FACT SHEET 4 (Oct. 1986) [hereinafter EPA REPORT]. OTA was even more optimistic, predicting in a 1986 report that it was possible to reduce the amount of hazardous waste generated in the United States by 10% per year for the five years following the report. U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, SERIOUS REDUCTION OF HAZARDOUS WASTE 1 (1986) [hereinafter OTA].

10. 56 Fed. Reg. at 7853.

11. 42 U.S.C. §§ 11001-50 (1988). SARA Title III requires the owner or operator of certain types of industrial facilities to complete a toxic chemical release form for each toxic chemical listed in section 313(c) of the Act that was manufactured, processed, or otherwise used by the facility in quantities exceeding threshold levels established for the chemical in section 313(f), and to report quantities of the chemical that were released into the environment in the preceding year to EPA on a toxic chemical release form. 42 U.S.C. § 11023(a) (1988).

A facility is required to submit a toxic chemical release form under section 313(a) if the facility employs 10 or more full-time employees, engages in a manufacturing activity designated by the Standard Industrial Classification Manual Code ("SIC Code") numbers 20 through 39, and manufactures, processes or otherwise uses a toxic chemical listed in section 313(c) in excess of the thresholds established in section 313(f) during the calendar year for which a release form is required. 42 U.S.C. § 11023(b)(1)(a) (1988).

The industries covered by SIC Code numbers 20 through 39 are food and kindred products, tobacco products, textile mill products, apparel and other textile products, lumber and wood products, furniture and fixtures, paper and allied products, printing and publishing, chemicals and allied products, petroleum and coal products, rubber and miscellaneous plastics products, leather and leather products, stone, clay and glass products, primary metal industries, fabricated metal products, industrial machinery and equipment, electronic and other electric equipment, transportation equipment, instruments and related products, and miscellaneous manufacturing industries. EXECUTIVE OFFICE OF THE PRESIDENT, OFFICE OF MANAGEMENT AND BUDGET, STANDARD INDUSTRIAL CLASSIFICATION MANUAL 429-435 (1987). Section 313(b) of the Act authorizes the Administrator of EPA,

to that data, despite the existence of comprehensive pollution control legislation addressing discharges of pollutants into all media, 4.57 billion pounds of toxic chemicals were released directly into the air, water, and land in 1988 by 19,672 industrial plants.[12] Furthermore, since SARA Title III only requires specific *manufacturing* industries to report toxic chemical releases, the SARA Title III data understates the true dimensions of the problem of toxic chemical releases.[13] Despite the existence of comprehensive pollution control legislation, the volume and hazards of toxic chemical releases continue to grow as the United States uses and creates more toxic chemicals.[14]

In response to the drawbacks of the pure pollution control approach outlined above, EPA,[15] industry,[16] and environmental-

in his discretion, to expand the list of SIC Code numbers covered by section 313(a). 42 U.S.C. § 11023(b)(2) (1988).

The toxic chemicals covered by section 313(c) are those chemicals included on the list in Committee Print No. 99-169 of the Senate Committee on Environment and Public Works, including any revised version of the list as may be made pursuant to section 313(d) or (e). 42 U.S.C. § 11023(c) (1988). The list in Committee Print No. 99-169 contains approximately 329 chemicals. STAFF OF SENATE COMM. ON ENV'T AND PUBLIC WORKS, 99TH CONG. 2D SESS., LIST OF TOXIC CHEMICALS SUBJECT TO THE PROVISIONS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986, at 1-3 (Comm. Print 1986).

The thresholds established in section 313(f) require reporting by any facility that uses 10,000 pounds of a section 313(c) toxic chemical during the preceding year. 42 U.S.C. § 11023(f)(1)(a) (1988). Section 313(f) also phases in a reporting requirement for facilities that manufacture or process 75,000 pounds of section 313(c) toxic chemicals during 1988, 50,000 pounds during 1989, or 25,000 pounds during 1990 or any year thereafter. 42 U.S.C. § 11023(f)(1)(b) (1988).

A facility is deemed to "manufacture" a toxic chemical if it produces, prepares, imports or compounds the toxic chemical. 42 U.S.C. § 11023(b)(1)(C)(i) (1988). A facility "processes" a toxic chemical if it prepares the toxic chemical, after its manufacture, for distribution in commerce. 42 U.S.C. § 11023(b)(1)(C)(ii) (1988).

12. S. REP. No. 526, 101st Cong., 2d Sess. 2 (1990). Similarly, 22,650 manufacturing facilities reported releasing 5.7 billion pounds of toxic chemicals directly into the environment during 1989. *Emergency Planning: Releases of Toxic Chemicals in 1989 Reached 5.7 Billion Pounds, EPA Reports*, 22 Env't Rep. (BNA) 223-24 (May 24, 1991).

13. As noted above, SARA Title III only requires reporting by facilities that employ 10 or more full-time employees, engage in a *manufacturing* activity described in SIC codes 20 through 39, and manufacture, process or use listed toxic chemicals in amounts that exceed specified threshold levels. *See supra* note 11. For example, SARA Title III does not require non-manufacturing operations such as agricultural operations (SIC Codes 1,2, and 7), silvicultural operations (SIC Code 8), mining operations (SIC Codes 10, 12 and 14), or oil and gas operations (SIC Code 13) to report toxic chemical releases.

14. In 1940, the entire U.S. economy produced less than one million tons of synthetic organic chemicals. NELC, *supra* note 4, at 3. By 1987, however, the annual production of synthetic organic chemicals in the United States rose to 125 million tons. *Id.*

15. *See supra* note 1.

ists[17] have recently joined forces to call for a fusion of pollution prevention and pollution control measures. These efforts have focused on changing practices to create less pollution.

With regard to manufacturing operations, there are five general categories of activities that are usually described as methods of pollution prevention:[18] (1) changes in process inputs (*i.e.*, substitution of non-toxic materials for toxic chemicals as raw materials),[19] (2) improved plant management or housekeeping (*i.e.*, predictive or preventive maintenance of equipment that encourages efficient clean operation and improved materials handling to prevent spills),[20] (3) changes in process equipment or process technology (*i.e.*, modification and modernization of equipment and technology to encourage clean, efficient operation),[21] (4) recycling and reuse of materials within a process,[22] and (5) changes in the design of end products (*i.e.*, eliminate the need for toxic chemicals in the manufacturing process).[23] These activities generally encourage more efficient manufacturing, reducing the volume and toxicity of pollution generated, and thus are less destructive to the environment.[24]

16. The Council on Environmental Quality's 21st annual report describes several of the aggressive pollution prevention programs that have been implemented by industry. CEQ, *supra* note 2, at 89-92.

17. NATIONAL ENVIRONMENTAL LAW CENTER & U.S. PUBLIC INTEREST RESEARCH GROUP, TOXIC TRUTH AND CONSEQUENCES 3 (1991) [hereinafter USPIRG].

18. S. REP. No. 526, *supra* note 12, at 3; *see also* NELC, *supra* note 4, at 4.

19. S. REP. No. 526, *supra* note 12, at 3. For example, a Union Oil Company chemical plant eliminated the generation of mercury waste at the plant by substituting a mercury-free biocide for the mercury biocide that the facility previously used. H.R. REP. No. 555, 101st Cong., 2d Sess. 4 (1990).

20. H.R. REP. No. 555, *supra* note 19, at 4. For example, an Exxon facility reduced the volume of organic wastes entering its wastewater treatment plant by 75% by implementing a stewardship program, whereby plant employees monitored discharges containing toxic constituents. *Id.*

21. S. REP. No. 526, *supra* note 12, at 3. Atlantic Industries reduced wastewater discharges by 55,000 pounds per year while increasing product yield by 8%, by changing chemical concentrations, lowering chemical reaction temperatures, and using a new method of combining dye components in the manufacturing of dyes. H.R. REP. No. 555, *supra* note 19, at 4.

Similarly, Dow Chemical significantly reduced the volume of hazardous chemical gases that it generated at one of its facilities by substituting a pumping mechanism for the pressurized nitrogen gas that it used to move raw materials from storage tanks into reactor vessels. *Id.*

22. S. REP. No. 526, *supra* note 12, at 3.

23. *Id.*

24. H.R. REP. No. 555, *supra* note 19, at 4.

Pollution prevention also provides economic benefits. The costs borne by a manufacturer to control or manage pollution after it has been generated decrease as the manufacturer produces less pollution. Furthermore, as pollution prevention measures encourage more efficient manufacturing processes, operating costs for manufacturing facilities should decrease.[25]

In recent years support among environmentalists, industry, and government for an infusion of pollution prevention measures into the existing pollution control regime spurred many states to enact pollution prevention legislation. This legislation took two forms: (1) waste reduction legislation and (2) toxic chemical use reduction legislation.[26] Similarly, the federal government enacted pollution prevention legislation in October of 1990.[27] These statutes are not meant to supersede the existing pollution control legislation, but rather to supplement that legislation. In fact, the existence of stringent pollution control requirements often motivates industry to implement pollution prevention measures.[28]

25. *See infra* note 44 and accompanying text.

26. *See e.g.*, CAL. HEALTH & SAFETY CODE §§ 25244.12-.24 (West Supp. 1992) (waste reduction); GA. CODE ANN. §§ 12-8-62 to 12-8-66 (Michie Supp. 1991) (waste reduction); ME. REV. STAT. ANN. tit. 38, §§ 2301-12 (West Supp. 1991) (waste and toxics reduction); MASS. GEN. LAWS ANN. ch. 21I, §§ 1-23 (West Supp. 1991) (toxics reduction); MINN. STAT. ANN. §§ 115D.01-.12 (West Supp. 1991) (toxics reduction); OR. REV. STAT. §§ 465.003-.037 (1990) (waste and toxics reduction); TENN. CODE ANN. §§ 68-46-301 to 68-46-312 (Supp. 1991) (waste reduction); WASH. REV. CODE ANN. §§ 70.95C.000-.240 (West Supp. 1991) (waste reduction). Other states have enacted more modest measures. *See* ILL. ANN. STAT. ch. 111½, para. 7951-57 (Smith-Hurd Supp. 1991) (toxics reduction); IND. CODE ANN. §§ 13-7-27-1 to -7 (Burns 1990)(waste reduction).

The State of New Jersey is exploring a particularly innovative approach to pollution prevention. Under S. 2220, a proposal introduced in the New Jersey General Assembly in 1990, the New Jersey Department of Environmental Protection ("NJDEP") would be required to issue and administer 10 to 15 "facility-wide" permits to industrial facilities as part of a pilot program. N.J. SEN. No. 2220 SCS, 204th Leg. Sess. § 12 (1990). The permits would regulate air, water, and land discharges through a single, integrated permit for the facility based on a pollution prevention plan prepared by the facility, rather than through the conventional system of three separate permits focusing independently on air, water, and waste. *Id.* The integrated permit approach would focus on the overall impact of the facility on the environment, and avoid transferring pollution from one medium to another. *Id.* By early 1990, the NJDEP had negotiated facility-wide permits with three facilities in the State, and was coordinating the development of permits with EPA to ensure compliance with federal requirements. *Id.* S. 2220 was passed by the New Jersey General Assembly and signed into law on August 1, 1991. *Florio Signs Pollution Prevention Bill With Goal to Cut Hazardous Releases by Half*, 22 Env't Rep. (BNA) 1035 (Aug. 9, 1991).

27. Pollution Prevention Act of 1990, Pub. L. No. 101-508, §§ 6601-10, 104 Stat. 1388 (codified at 42 U.S.C.A. §§ 13101-09 (West Supp. 1991)).

28. *See infra* notes 31-34 and accompanying text.

Part II of this article explores the current incentives and disincentives for pollution prevention. Part III examines state and federal legislative, regulatory, and administrative efforts to encourage pollution prevention. Finally, Part IV critiques the 1990 Pollution Prevention Act, and suggests additional measures that Congress could impose to overcome existing disincentives to pollution prevention that the Act does not adequately address.[29]

II. Incentives and Disincentives for Pollution Prevention

It is not unusual to hear environmentalists or government agencies praise pollution prevention due to its environmental benefits, but it is not as apparent why many businesses have joined them.[30] This section explores the various reasons why many firms have developed pollution prevention programs. It then examines the factors that have kept other firms from adopting them.

Several factors encourage industry to explore and implement pollution prevention measures. First, the costs of controlling pollution after it has been generated are rapidly increasing, and industries are realizing that it often costs less to prevent pollution than to control it.[31] Pollution control costs are rising due to the proliferation of federal and state pollution control laws and regulations[32] and the high cost of the pollution control technologies

29. 56 Fed. Reg. 7855 (1991). The Agency has already published a generic waste reduction manual entitled "Waste Minimization Opportunity Assessment Manual." *Reports from EPA: ORD Guidance Manuals Completed*, Pollution Prevention News, Nov.-Dec. 1990, at 2. EPA has also published industry-specific pollution prevention guidance manuals, in conjunction with the California Department of Health Services, for the pesticide formulating industry, the paint manufacturing industry, the fabricated metal products industry, the printed circuit board manufacturing industry, the commercial printing industry, selected hospital waste streams, and research and educational institutions. *Id.* Eleven other industry-specific guidance manuals were planned for publication by EPA and the California Department of Health Services in 1991. *Id.* Part IV of this Article, however, goes beyond the suggestions made in these documents.

30. *See* CEQ, *supra* note 2, at 79.

31. Hansen, *supra* note 3, at 30. *See also* EPA Report, *supra* note 9, at vii; NELC, *supra* note 4, at 6. The President's Council on Environmental Quality estimates that American industries pay almost $115 billion per year to comply with existing pollution control laws. CEQ, *supra* note 2, at 50; NELC, *supra* note 4, at 6. As noted earlier, the high costs of complying with pollution control laws significantly affects the international competitiveness of U.S. industry. U.S. Congress, Office Of Technology Assessment, From Pollution To Prevention: A Progress Report On Waste Reduction 12 (1987) [hereinafter OTA II]. Pollution prevention measures, on the other hand, can improve industrial competitiveness. *Id.*

32. EPA Report, *supra* note 9, at vi-viii.

required for compliance. The administrative burden of complying with a broad spectrum of pollution control requirements provides an additional incentive for industries to explore pollution prevention.[33]

Potential liability is a second factor driving industry to explore and implement pollution prevention measures. Potential liability for harm to public health or the environment caused by pollution continues to increase,[34] while the availability of liability insurance, especially environmental impairment liability insurance (also known as "pollution insurance"), continues to decrease.[35]

A third factor motivating industrial pollution prevention is public opinion. Environmental consciousness is growing among American consumers, who are increasingly taking factors such as an industry's environmental record or the impact of a product on the environment over its lifetime[36] into account when purchasing products.[37] The widespread dissemination of information gathered under SARA Title III regarding emissions of toxic pollutants reinforces accountability of American industry to the public.[38] Since the public holds firms accountable for their production and marketing practices, pollution prevention plays an important role in industrial public relations.[39] Pollution prevention enhances a

33. *Id.* at viii. *See also* OTA II, *supra* note 31, at 12.

34. H.R. REP. No. 555, *supra* note 19, at 5. *See also* Hansen, *supra* note 3, at 30; EPA REPORT, *supra* note 9, at ix; STATE/EPA COMMITTEE ON RCRA REAUTHORIZATION, FINAL RCRA REAUTHORIZATION ISSUE PAPERS 26 (July 31, 1990) [hereinafter STATE/EPA COMMITTEE].

35. EPA REPORT, *supra* note 9, at ix. When environmental impairment liability insurance can be acquired, it is often very expensive. *Id.*

36. EPA is currently conducting research to develop a streamlined lifecycle assessment methodology to analyze a product's impact on the environment from the time of manufacture to the time of disposal. *EPA Says Life-Cycle Analysis May Hold Key to Assessment of True Environmental Costs*, 21 Env't Rep. (BNA) 2222 (Apr. 12, 1991). Environmentalists, though, are skeptical of lifecycle analysis, charging that the data obtained from such analysis can be manipulated to bolster the environmental claims of whichever industry conducts the analysis. *Id.* at 2223.

37. David Kirkpatrick, *Leading the Crusade into Consumer Marketing*, FORTUNE, Feb. 12, 1990, at 44, 50. 77% of Americans questioned in a July 1989 survey indicated that they consider a company's environmental reputation when determining whether to buy products from the company. *Id.*

38. 56 Fed. Reg. 7857 (1991). EPA's Science Advisory Board has found that "public information play[s] a vital role in promoting pollution prevention and reducing risk." *Id.*

39. Corporate marketing strategies are increasingly focusing on the environmental safety of products. Kirkpatrick, *supra* note 37, at 50. For instance, in mid-November 1990, Proctor and Gamble began marketing its "Downy" fabric softener in a 21½ ounce milk carton-type container that is intended to be mixed with water in a reusable plastic bottle of

company's environmental reputation and bolsters its marketing efforts. It may also deflect the public scorn and retaliation that might result if the company emits excessive amounts of toxic pollutants.[40]

Finally, industrial pollution prevention is beginning to thrive because it generally increases the efficiency of industrial processes.[41] As raw materials and operating costs increase, it is essential that industries operate more efficiently. Pollution prevention techniques focus on changes in production processes, materials use, and maintenance to reduce the volume of pollution created and to encourage maximum efficiency.[42]

Due to the interplay of the factors described above, pollution prevention programs are gaining widespread acceptance.[43] In-

"Downy" to make 64 ounces of fabric softener. The carton reads "Better for the Environment . . . Less Packaging To Throw Away." *Id.*

Another company that incorporates environmentalism into its marketing strategies is the Body Shop, a London-based hair and skin care company. The company displays literature on environmental issues in its stores, requires employees to spend ½ day each week doing activist work, and offers discounts to customers that return their old bottles for recycling. The environmental philosophy is working for the Body Shop, which had sales over $90 million and pre-tax profits of about 20% for the year ending in February 1989. *Id.*

In order to validate the environmental claims that companies advance for their products and to protect consumers from false or deceptive marketing practices, several states have passed legislation on "green marketing" or "green labeling." *EPA and FTC Launch Task Force To Regulate Environmental Advertising Claims*, INSIDE EPA WEEKLY REPORT, Mar. 29, 1991, at 10-11. EPA and the Federal Trade Commission have also become involved in overseeing "green marketing." The two agencies have formed a task force to explore the development of guidelines addressing national definitions for terms such as "recyclable," "environmentally friendly," and "ozone friendly." *Id.*

40. EPA REPORT, *supra* note 9, at x; *see also* STATE/EPA COMMITTEE, *supra* note 34, at 26.

41. H.R. REP. No. 555, *supra* note 19, at 5. *See also* Pollution Prevention Act § 6602(a)(2), 42 U.S.C.A. § 13101(a)(2) (West Supp. 1991); *Monsanto*, POLLUTION PREVENTION NEWS, Nov.-Dec. 1990, at 4 [hereinafter *Monsanto*].

42. H.R. REP No. 555, *supra* note 19, at 5.

43. In 1988, for instance, Monsanto Corporation established a voluntary goal to reduce toxic air emissions by 90% by the end of 1992. *Monsanto*, *supra* note 41, at 4. Similarly, Chevron Corporation has established a "SMART" (Save Money And Reduce Toxics) pollution prevention program. 56 Fed. Reg. 7853 (1991). Through the program, Chevron was able to reduce hazardous waste disposal by 44% in 1987. *Id.* Another leader in the pollution prevention movement is 3M Corporation, which began exploring pollution prevention opportunities in 1975. H.R. REP. No. 555, *supra* note 19, at 4. In the first 10 years of 3M's program, the company eliminated the annual discharge of approximately 100,000 tons of air pollutants, 13,000 tons of water pollutants, and 260,000 tons of sludge (including approximately 18,000 tons of sludge identified as hazardous waste), and avoided creating approximately 1.6 billion gallons of wastewater. *Id.*

Pollution prevention efforts are not limited to programs by individual companies. For example, in June 1990, EPA, the Colorado Department of Health, Adolph Coors Com-

dustry has joined forces with government and environmentalists to encourage pollution prevention for the simple reason that pollution prevention makes good business sense.[44]

While economic factors encourage industries to explore and implement pollution prevention opportunities, government agencies and public interest groups have found additional reasons to espouse pollution prevention. Public support for pollution prevention efforts has grown because these efforts generally reduce: (1) the amount of toxic substances present in the environment, (2) worker exposure to toxic substances, (3) the potential for accidents and spills in transporting toxic substances, and (4) the amount of toxic substances present in consumer products.[45]

Government agencies support pollution prevention measures due to the increased environmental protection that they provide. Further, the implementation of these measures by industry increases regulatory compliance and thus may reduce or slow growth in government spending on regulatory programs.[46] In

pany, Martin Marietta Corporation, Hewlett Packard Company, the Public Service Company of Colorado, the Colorado Public Interest Research Group, and the League of Women Voters joined forces in a Pollution Prevention Partnership to explore ways to reduce and eliminate trichloroethane, an industrial solvent that is a suspected carcinogen and has been linked to ozone depletion. *Looking Ahead . . . Pledges, Plans and Programs for Source Reduction in the Coming Years*, POLLUTION PREVENTION NEWS, Nov.-Dec. 1990, at 6. The American Institute of Architects is also getting involved in pollution prevention efforts. *Id.* The institute is currently developing an environmental resource guide to help architects evaluate the environmental consequences of their design decisions. *Id.*

44. 3M's pollution prevention efforts between 1975 and 1985, for example, saved the company $300 million. H.R. REP. No. 555, *supra* note 19, at 4. Chevron's SMART program resulted in a $3.8 million savings in 1987 alone. *Id.*

Dow Chemical's Chlorinated Ethane Products Department in Texas is another example of the cost savings that can be generated by pollution prevention. Dow modified its production process at the plant to eliminate the use of excess ethylene, which was contaminating hydrogen chloride during production. *1990 Success Stories: Dow Chemical's WRAP Winners*, POLLUTION PREVENTION NEWS, Nov.-Dec. 1990, at 3. The plant then began to use idle equipment in the process to use the pure hydrogen chloride to produce hydrochloric acid for other Dow facilities, and improved the separation of a byproduct, vinyl chloride. These efforts resulted in a $2.6 million annual savings for Dow. *Id.*

On a smaller scale, a Clairol plant in Camarillo, California saved $240,000 per year by installing a system that used a foam ball propelled by air through the pipes of the production process to collect excess product, rather than flushing the pipes with water. 56 Fed. Reg. at 7853. Similarly, a Borden Chemical Company plant was able to save $48,000 per year by installing a new filter rinsing and tank cleaning process that reduced the discharge of organic solvents into its wastewater. NELC, *supra* note 4, at 6. Riker Labs in California saves $15,000 per year by using a water-based solvent instead of an organic solvent for the process of coating medicine tablets. *Id.*

45. OTA, *supra* note 9, at 14.

46. OTA II, *supra* note 31, at 15.

addition, since the implementation of pollution prevention may result in increased industrial efficiency, pollution prevention can yield increased tax revenues.[47]

Despite the panoply of incentives for pollution prevention, and notwithstanding its growing acceptance, far greater pollution prevention is possible than has been achieved.[48] The Congressional Office of Technology Assessment ("OTA") argues that greater pollution prevention has not been achieved because many of the so-called "incentives" to pollution prevention are not true incentives.[49] An incentive, OTA stresses, must have the purpose of encouraging a particular desired response.[50] Increased pollution control costs, increased liability, and increased regulatory burdens may tangentially result in pollution prevention, but their purpose is not to encourage pollution prevention.[51] Thus, OTA posits, industry may react to those "incentives" in ways other than implementing pollution prevention.[52] For instance, often companies can comply with increased regulatory requirements and pass the compliance costs on to their customers by increasing the prices of their products.[53] Companies may also relocate in order to avoid increased economic and regulatory burdens.[54] Furthermore, they may violate pollution control laws and regulations and accept fines and penalties as a cost of doing business.[55] Companies often choose such alternatives because a variety of obstacles impede the growth of pollution prevention.

It would be convenient to rationalize that there is a lack of feasible pollution prevention technology, or that government regulations prevent the implementation of such technology, but neither is the case.[56] The primary obstacle to pollution prevention today

47. *Id.*

48. *See supra* note 9 and accompanying text (addressing waste minimization by industrial facilities). Agricultural and mining operations also provide a fertile, and largely untilled, ground for pollution prevention efforts.

49. OTA II, *supra* note 31, at 26.

50. *Id.*

51. *Id.*

52. *Id.*

53. *Id.* at 27.

54. *Id.*

55. *Id.* OTA also suggested that industry could take advantage of loopholes and opportunities in the legal and regulatory system to delay or avoid compliance. *Id.*

56. H.R. REP. No. 555, *supra* note 19, at 5.

appears to be ignorance by industry managers about pollution prevention techniques and technologies currently available.[57]

One aspect of this ignorance is a lack of clear information about the benefits of various pollution prevention techniques and technologies.[58] Corporate decision-making and accounting systems focus on short-term profit, and often fail to consider environmental compliance costs in the production costs of products.[59] By failing to focus on those indirect costs, businesses may lose sight of the economic benefits of pollution prevention. Smaller companies are the least likely to be able or willing to spend the time and money necessary to understand the true benefits of pollution prevention, but they are the most likely to benefit.[60]

The absence of a uniform, reliable system for measuring the effects of pollution prevention also makes it difficult to quantify the benefits of these opportunities.[61] The primary reason why pollution prevention cannot be adequately measured at the present is the absence of precise historical data on pollution generation per unit of production for industrial processes.[62] Without such data, it is difficult to establish a baseline against which to compare the current data on pollution generation. Additional uncertainty in the measurement of pollution prevention is introduced when a pollution prevention technique reduces the generation of one pollutant while increasing the emission of another, less toxic pollutant.[63] Such factors make it hard to measure the

57. S. REP. No. 526, *supra* note 12, at 3. *See also* H.R. REP. No. 555, *supra* note 19, at 5; Hansen, *supra* note 3, at 30. The shortage of information is felt most acutely by small and medium-sized companies. EPA REPORT, *supra* note 9, at xii.

58. OTA II, *supra* note 31, at 1.

59. 56 Fed. Reg. 7855 (1991). *See also* OTA II, *supra* note 31, at 29; STATE/EPA COMMITTEE, *supra* note 34, at 26.

60. OTA II, *supra* note 31, at 1. *See also* Hansen, *supra* note 3, at 30; S. REP. No. 526, *supra* note 12, at 4.

61. STATE/EPA COMMITTEE, *supra* note 34, at 26.

62. The Congressional Office of Technology Assessment notes that data on past waste generation or waste reduction efforts is unreliable. OTA, *supra* note 9, at 21. Furthermore, the data that is obtainable on past waste generation and reduction is too aggregated over processes, plants, companies, and industries to prove or disprove specific levels of waste reduction. *Id.* Since levels of waste generation are affected by dynamic factors such as levels of production, changes in processes, and regulatory changes such as changes in the definition of waste, the only reliable method of measuring waste reduction is to measure and compare waste generation per unit of output from industrial processes. *Id. See* STATE/EPA COMMITTEE, *supra* note 34, at 49.

63. OTA, *supra* note 9, at 22.

benefits of pollution prevention, and therefore serve as obstacles to greater use of pollution prevention techniques.

In some circumstances, cost may also be an obstacle to pollution prevention.[64] While pollution prevention techniques are cost effective in the long run, they sometimes require large initial capital investments.[65] Smaller companies and less competitive companies may be unable to make those initial investments despite the cost savings that the investments will create in the future.

Companies may also be resistant to the incorporation of pollution prevention techniques for fear that any modification in a proven production process may undermine the quality and integrity of their product.[66] Some risk that quality will be adversely impacted is present in any process change.

Finally, the existing regulatory structure[67] and the organization of EPA itself[68] have fostered a pollution control compliance mindset among managers that does not encourage pollution prevention. Companies invest so much time and money into compliance with pollution control requirements that they ignore the potential benefits of pollution prevention.[69] Similarly, as a result of the focus on compliance with pollution control requirements, corporate environmental decisions are often institutionally separated from production decisions.[70] Corporate environmental decision makers are familiar with pollution control technologies yet unfamiliar with production processes.[71] Therefore, they focus on

64. EPA REPORT, *supra* note 9, at x.

65. *Id.* For instance, the forty-seven projects undertaken by Dow Chemical in Louisiana in 1988 and 1989 required investments of over twelve million dollars. CEQ, *supra* note 2, at 89.

66. EPA REPORT, *supra* note 9, at xi. *See also* Hansen, *supra* note 3, at 30.

67. Pollution Prevention Act of 1990, Pub. L. No. 101-508, § 6602(a)(3), 104 Stat. 1388, 1388-321 (codified at 42 U.S.C.A. § 13101(a)(3) (West Supp. 1991)).

68. In its draft pollution prevention strategy, EPA cited the division of the Agency into single-media offices and the lack of a cross-media focus in the organizational structure of the Agency as an obstacle to pollution prevention. 56 Fed. Reg. 7855 (1991).

69. H.R. REP. No. 555, *supra* note 19, at 5. *See also* OTA II, *supra* note 31, at 1; S. REP. No. 526, *supra* note 12, at 4.

The installation of costly pollution control devices also creates obstacles to pollution prevention. OTA II, *supra* note 31, at 11. Once a company has invested large sums of money in pollution control equipment that allows it to continue to operate its process as it has in the past and still comply with pollution control requirements, it has little incentive to change its processes to reduce the amount of pollution that it generates. *Id.*

70. 56 Fed. Reg. at 7855.

71. OTA II, *supra* note 31, at 27.

the implementation of pollution control technologies[72] rather than on changes in production processes,[73] creating additional obstacles to widespread implementation of pollution prevention.[74]

In summary, the many incentives for using pollution prevention indicate that it is preferable to pollution control. The disincentives to pollution prevention result from ignorance, irrationality, a short-term business focus, and lack of economic resources. These disincentives may be overcome through proper education of decisionmakers combined with government assistance.

III. FEDERAL EFFORTS TO ENCOURAGE POLLUTION PREVENTION

Pollution prevention has only recently emerged as a major governmental initiative, but it is not a new concept. The federal government began to encourage pollution prevention in the 1980s. The attempts were not momentous, but they do deserve mention.

A. *Waste Minimization Requirements in RCRA*

In 1984, Congress amended the Resource Conservation and Recovery Act ("RCRA"),[75] the federal law that regulates solid waste management, by adding several provisions that address hazardous waste minimization, a form of pollution prevention.[76] The Hazardous and Solid Waste Amendments of 1984 ("HSWA")[77] added a provision to RCRA that requires generators of hazardous waste that ship their waste off-site to certify: (1) that they have a hazardous waste minimization program in place to reduce the volume and toxicity of their waste "to the degree determined by the generator to be economically practicable" and (2) that the proposed method of treatment, storage, or disposal of their waste is the practicable method of treatment, storage, or disposal "currently available to the generator which minimizes the

72. *Id.*

73. *Id.*

74. NELC, *supra* note 4, at 6. *See also* OTA II, *supra* note 31, at 9.

75. 42 U.S.C. §§ 6901-92(k) (1988).

76. It has been asserted that not all methods of "hazardous waste minimization" constitute pollution prevention since one of the ways to minimize the amount of hazardous waste that is generated by a process is to treat the hazardous waste after it is generated, creating an equivalent or larger amount of non-hazardous waste. *See* OTA II, *supra* note 31, at 20-25; NELC, *supra* note 4, at 5.

77. Pub. L. No. 98-616, 98 Stat. 3221 (1984) (codified in scattered sections of 42 U.S.C.).

present and future threat to human health and the environment."[78] HSWA imposes a similar certification requirement on generators that treat, store, or dispose of their waste at the site of generation. For these hazardous waste management facilities, the certification requirement is a condition of any permit issued.[79]

The generator certification requirements of HSWA are very modest. They only apply to generators of hazardous waste, and only require generators to certify that they have a hazardous waste minimization program in place. HSWA does not specify what must be included in a hazardous waste minimization program.[80] Additionally, generators are not required to certify that their program will achieve a specific, verifiable amount of waste minimization. Rather, they must merely certify that their program will reduce the volume and toxicity of hazardous waste "to the degree determined by the generator to be economically practicable."[81] This certification requirement is not very stringent, especially in light of the fact that HSWA's legislative history counsels that the term "economically practicable" is to be defined

78. 42 U.S.C. § 6922(b) (1988). The certification must be included on the hazardous waste "manifest" that generators of hazardous waste are required to utilize whenever they ship hazardous waste off-site to a treatment, storage, or disposal facility. *Id.* *See also* 40 C.F.R. § 262.20(a) (1990).

Persons who generate between 100 and 1000 kilograms of hazardous waste during a calendar month ("small quantity generators") are subject to a less stringent certification requirement. In accordance with 42 U.S.C.A. § 6921(d) (West Supp. 1991), EPA only requires such generators to certify that they have "made a good faith effort" to minimize waste generation and to select the "best waste minimization method that is available to [the generator] and that [the generator] can afford." 40 C.F.R. § 262 app. (1990).

79. 42 U.S.C. § 6925(h) (1988). The certification must be recorded annually in the operating record of the facility, and maintained in that record until closure of the facility. 40 C.F.R. § 264.73(b)(9) (1990).

80. EPA has, however, proposed non-binding guidance on the elements of a waste minimization program. 54 Fed. Reg. 25,056 (1989). The guidance suggests that a waste minimization program should (a) be institutionalized on a company-wide level through policies, goals, or publicity, (b) include a waste accounting system to trace waste generation, (c) include a system for assessing waste minimization opportunities, (d) factor waste management costs into production costs allocated among the various departments within the company, (e) encourage technology transfer on waste minimization within the company and with outside organizations, and (f) include periodic reviews of the program for effectiveness. *Id.* at 25,057.

81. 42 U.S.C. §§ 6922(b)(1), 6925(h)(1) (1988). As noted above, small quantity generators of hazardous waste are held to a less stringent standard, and are only required to certify that they have made a "good faith effort" to minimize hazardous waste. *See supra* note 78.

and determined by the generator and is not subject to review by EPA.[82]

In addition to adding waste minimization certification requirements to RCRA, HSWA amended the reporting requirements of RCRA to require hazardous waste generators to identify, in biennial reports, the efforts that the generator undertook to reduce the volume and toxicity of hazardous waste that it generated, and the changes in volume and toxicity of hazardous waste generation that it actually achieved.[83] HSWA did not, however, impose affirmative duties on hazardous waste generators to commit to achieving specific degrees of waste minimization, or to using specific waste minimization techniques. Due to their deficiencies, the waste minimization provisions added by HSWA have only had a minor impact on the growth of pollution prevention.[84]

B. *EPA's Pollution Prevention Policy*

Five years after Congress took the modest steps in HSWA, EPA issued a proposed pollution prevention policy statement which details, in broad terms, the Agency's view of the future role of

82. S. REP. No. 284, 98th Cong., 1st Sess. 66 (1983).

83. 42 U.S.C. § 6922(a)(6)(C)-(D) (1988). The statutory requirement is imposed on generators who ship hazardous waste off-site to a treatment, storage, or disposal facility, *see* 40 C.F.R. 262.41(a)(6)-(7) (1990), and on generators who treat, store, or dispose of hazardous waste on-site, *see* 40 C.F.R. 264.75(h)-(i) (1990).

84. EPA analyzed the impact of the HSWA waste minimization provisions in a July 1990 report analyzing the implementation of RCRA. U.S ENVIRONMENTAL PROTECTION AGENCY, THE NATION'S HAZARDOUS WASTE MANAGEMENT PROGRAM AT A CROSSROADS: THE RCRA IMPLEMENTATION STUDY (1990). The report detailed several weaknesses of the waste minimization provisions and EPA's enforcement of those provisions. For instance, the report noted that EPA has consistently viewed enforcement of the generator reporting requirements in RCRA as a low priority. *Id.* at 60. In the report, EPA stressed that the Agency needs to place more emphasis on verifying the receipt and quality of waste minimization reports from generators and needs to take enforcement actions against generators who do not file waste minimization reports or who file clearly erroneous reports. *Id.* at 57.

The report also lamented the Agency's lack of progress in implementing the generator certification requirement in RCRA through treatment, storage, or disposal facility permits. *Id.* at 54. EPA attributed the inaction to the fact that the permit conditions requiring waste minimization programs, and the Agency's guidance on such programs, are so general that it is difficult to distinguish between acceptable and unacceptable waste minimization programs. *Id.* EPA also reported that since generators are not formally required to *implement* waste minimization programs, but only to have them in place, the Agency has been reluctant to proceed with any enforcement action based on possible deficiencies in waste minimization programs. *Id.* To improve the implementation and enforcement of the generator certification requirements, the Agency recommended strengthening the regulatory provisions addressing waste minimization programs and making those provisions more specific and, thus, more enforceable. *Id.*

pollution prevention in environmental protection.[85] The proposed policy is not legally binding,[86] but it is an important milestone in the pollution prevention revolution, signaling a fundamental shift in EPA's regulatory focus from reaction to proaction.

At the outset, the policy acknowledges that there are limits to the degree of environmental protection that can be achieved through pollution control technologies, and that further improvements in environmental quality can be achieved by reducing discharges or emissions through the implementation of source reduction and environmentally sound recycling technologies.[87] The pollution control approach, the policy notes, often transfers pollution from one medium to another, while pollution prevention eliminates pollution in all media by eliminating or reducing the generation of pollution.[88]

With regard to institutional efforts within EPA to encourage pollution prevention, the policy announces the formation of a Pollution Prevention Office in EPA to coordinate the Agency's pollution prevention efforts.[89] The policy also describes EPA's plan to establish a national clearinghouse for technical information and technology transfer regarding pollution prevention and the Agency's goal of working with state and local governments and industries "to effect a cultural change emphasizing the opportunities and benefits of pollution prevention."[90]

With regard to its legal significance, EPA's proposed pollution prevention policy is little more than a press release. However, the policy sets forth the foundation for a fundamental shift in EPA's environmental regulatory policy from a pure pollution control approach to a mixed pollution control and pollution prevention approach, with a strong emphasis on pollution prevention. In that respect, the policy has played a significant role in shaping the pollution prevention efforts upon which EPA and Congress have em-

85. 54 Fed. Reg. 3845 (1989).

86. The policy statement is not a rule, order, or other final agency action subject to judicial review under the Administrative Procedure Act ("APA"), 5 U.S.C. §§ 551-706 (1988).

87. 54 Fed. Reg. at 3845. Some critics argue that recycling is a pollution control technology and does not qualify as a form of pollution prevention. *See* NELC, *supra* note 4, at 5; OTA II, *supra* note 31, at 20-25.

88. 54 Fed. Reg. at 3846.

89. *Id.* at 3847.

90. *Id.*

barked in the 1990s. It is the framework upon which those efforts have been built.

C. *The Pollution Prevention Act of 1990*

The federal government's most aggressive attempt to refocus environmental protection regulation from pollution control to pollution prevention occurred in the waning hours of the 101st Congress, when Congress enacted the Pollution Prevention Act of 1990[91] as part of the Omnibus Budget Reconciliation Act of 1990.[92] Like EPA's pollution prevention policy, though, the Pollution Prevention Act is largely symbolic, and its real power will be to create a legislative framework upon which future pollution prevention efforts can be built. The legislative history of the Act describes it as a "first step" towards accomplishing the pollution prevention objectives of the Act, and notes that "additional steps may be necessary to undertake a comprehensive pollution prevention program."[93]

The central theme of the Pollution Prevention Act ("Act") is that measures are required on the federal level to stimulate voluntary pollution prevention,[94] but that mandatory pollution prevention is neither required nor desirable.[95] The basic policy of the Act is articulated in section 2(b),[96] which establishes pollution prevention through source reduction as the top priority in a na-

91. Pollution Prevention Act of 1990, Pub. L. No. 101-508, §§ 6601-10, 104 Stat. 1388, 1388-321 to 1388-327 (codified at 42 U.S.C.A. §§ 13101-09 (West Supp. 1991)). The Act was originally introduced in both houses of Congress on June 25, 1987, as the Hazardous Waste Reduction Act. *See* S. 1429, 100th Cong., 1st Sess. (1987); H.R. 2800, 100th Cong., 1st Sess. (1987). It was reintroduced in the 101st Congress on March 15, 1989, *see* S. 585, 101st Congress, 1st Sess. (1989), H.R. 1957, 101st Cong., 1st Sess. (1989), and was finally reported out of the Senate Committee on the Environment and Public Works on October 12, 1990. S. REP. No. 526, *supra* note 12, at 2.

92. Pub. L. No. 101-508, 104 Stat. 1388 (1990).

93. S. REP. No. 526, *supra* note 12, at 1-2. The Senate Report for the Act also notes that Congress intends to revisit pollution prevention in the context of RCRA reauthorization. *Id.* Indeed, legislation introduced by Sen. Max Baucus on April 25, 1991, to reauthorize RCRA included pollution prevention provisions to supplement the Pollution Prevention Act. S. 976, 102d Cong., 1st Sess. (1991).

94. S. REP. No. 526, *supra* note 12, at 1.

95. A 1987 report on pollution prevention by the Congressional Office of Technology Assessment suggested that prescriptive measures would be "technically infeasible and administratively impractical." OTA II, *supra* note 31, at 2.

96. Pollution Prevention Act § 6602(b), 42 U.S.C.A. § 13101(b) (West Supp. 1991).

tional pollution management hierarchy.[97] The Act clarifies that source reduction is different from, and preferable to, recycling.[98]

Section 4 of the Act[99] details EPA's responsibilities, which primarily consist of: (1) publicizing and facilitating voluntary pollution prevention, and (2) collecting and analyzing data to develop and refine a comprehensive pollution prevention program. Under this section, EPA must establish an Office of Pollution Prevention within the Agency.[100] Section 4 also requires the Agency to develop a pollution prevention strategy, including measures to: (1) establish standardized methods of measuring source reduction, (2) review the Agency's regulations and coordinate the activities of the Agency and other federal agencies to promote source reduction, (3) develop improved methods of collecting and disseminating data under federal environmental laws, (4) facilitate the adoption of source reduction by businesses through the establishment of a national clearinghouse and through grant pro-

97. Section 2(b) declares it to be national policy that:

> pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

Id.

98. *Id.* The Pollution Prevention Act defines source reduction as "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." Pollution Prevention Act § 6603(5)(A), 42 U.S.C.A. § 13102(5)(A) (West Supp. 1991) (emphasis added).

Under the Act, source reduction "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." *Id.* However, 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 which itself is not integral to and necessary for the production of a product or the providing of a service." *Id.* § 6603(5)(B), 42 U.S.C.A. § 13102 (5)(B) (West Supp. 1991).

The distinction drawn in the Act between source reduction and recycling is significant because EPA's historical use of the terms "source reduction" and "recycling" in its definition of waste minimization implied that the approaches were equivalent forms of pollution management. 54 Fed. Reg. 25,056 (1989).

99. Pollution Prevention Act § 6604, 42 U.S.C.A. § 13103 (West Supp. 1991).

100. As noted above in the discussion of EPA's proposed pollution prevention policy, EPA established an Office of Pollution Prevention within the Agency prior to the enactment of the legislation. *See supra* note 89 and accompanying text.

grams and technical assistance, (5) identify measurable goals for source reduction, (6) identify and make recommendations to Congress regarding ways to eliminate barriers to source reduction, (7) develop, test, and disseminate model source reduction auditing procedures, (8) identify opportunities to use federal procurement to encourage source reduction, and (9) establish an annual award program to recognize companies that operate outstanding or innovative source reduction programs.[101]

Section 5 of the Act establishes a federal grants program, authorizing EPA to make matching grants to states to enable them to establish technical assistance programs to promote source reduction by businesses.[102] Consistent with the general tenor of the Act, the legislative history stresses that the purpose of the grant program is to promote the voluntary use of source reduction technology by businesses.[103] In another move to encourage voluntary source reduction, the Act requires EPA to establish an information clearinghouse on source reduction technology and grant programs, and to make the data in the clearinghouse available for retrieval by any person.[104]

While the central focus of the Act is on voluntary pollution prevention by industry, the Act does include mandatory source reduction reporting requirements.[105] Building on the structure established by SARA Title III,[106] section 7 of the Pollution Prevention Act requires each owner or operator of a facility that is required to file a toxic chemical release form under SARA Title III to include, on that form, information regarding the source reduction and recycling activities undertaken at the facility in the previous year for each toxic chemical for which reporting is required.[107] All of that information is then made available to the

101. Pollution Prevention Act § 6604(b), 42 U.S.C.A. § 13103(b) (West Supp. 1991).

102. *Id.* § 6605, 42 U.S.C.A. § 13104 (West Supp. 1991). However, the federal grant cannot exceed 50% of the cost of the state program. *Id.*

103. H.R. REP. No. 555, *supra* note 19, at 11.

104. Pollution Prevention Act § 6606, 42 U.S.C.A. § 13105 (West Supp. 1991). With regard to funding, the Act authorizes an appropriation of $8 million to EPA for the 1991, 1992, and 1993 fiscal years for the grant program. An additional $8 million is appropriated to EPA for those years to enable the Agency to carry out its other duties under the Act. *Id.* § 6610, 42 U.S.C.A. § 13109 (West Supp. 1991).

105. *Id.* § 6607, 42 U.S.C.A. § 13106 (West Supp. 1991).

106. *See* 42 U.S.C. §§ 11001-50 (1988).

107. The information required to be reported on the toxic chemical release form pursuant to section 7(b) of the Pollution Prevention Act includes: (1) the amount of the chemical entering the waste stream prior to recycling, treatment, or disposal during the year and

public to the same extent as information submitted under SARA Title III.[108] Section 7 of the Act also provides that the civil and administrative penalty and citizen suit provisions of SARA Title III are applicable to the reporting requirements of the Pollution Prevention Act to the same extent as they apply to the reporting requirements of SARA Title III.[109]

Finally, section 8 of the Act requires EPA to provide reports to Congress: (1) analyzing the source reduction achieved on an industry by industry basis, (2) analyzing the usefulness of data collected under the Pollution Prevention Act to measure source reduction trends, (3) identifying barriers to source reduction and suggesting methods of promoting and assisting source reduction, (4) identifying industries and pollutants that require priority assistance in pollution prevention, (5) identifying priorities for research and development, (6) evaluating data collection under federal environmental laws and suggesting ways to improve public access to that data, and (7) evaluating the cost and technical feasi-

the percentage change from the prior year, (2) "the amount of the chemical from the facility which is recycled during the year, the source reduction practices used with respect to the chemical during" the year, the percentage change from the previous year, and the process of recycling used at the facility, (3) the amount of the chemical expected to enter the waste stream and to be recycled in the two years subsequent to the reporting year, and (4) "a ratio of production in the reporting year to production in the previous year, the techniques which were used to identify source reduction opportunities, and information regarding releases into the environment which resulted in a catastrophic event, remedial action, or other one-time event, and is not associated with production processes during the reporting year or treatment of the chemical at the facility and the percentage change from the previous year." Pollution Prevention Act § 6607(b), 42 U.S.C.A. § 13106(b) (West Supp. 1991).

In addition to the information required by section 7(b) of the Act, persons required to file toxic chemical release forms may include additional information on the form regarding source reduction, recycling and other pollution control techniques employed in prior years. *Id.* § 6607(d), 42 U.S.C.A. § 13106(d) (West Supp. 1991).

108. *Id.* § 6607(e), 42 U.S.C.A. § 13106(e) (West Supp. 1991). Section 7(e) of the Act provides that the trade secret provisions of SARA Title III, 42 U.S.C. § 11042 (1988), apply to data collected pursuant to the Pollution Prevention Act. *Id.*

109. Section 7(c) of the Pollution Prevention Act, § 6607(c), 42 U.S.C.A. § 13106(c) (West Supp. 1991), states that the provisions of sections 322, 325(c), and 326 of the Superfund Amendments and Reauthorization Act ("SARA") "apply to the reporting requirements of" the Pollution Prevention Act "in the same manner as to the reports required under section 313" of SARA. Section 325(c) of SARA, 42 U.S.C. § 11045 (1988), provides for civil and administrative penalties for violations of the reporting requirements of that law, while section 326 of SARA, 42 U.S.C. § 11046 (1988), authorizes citizens suits against persons that fail to complete or submit toxic chemical release forms under SARA Title III.

bility, by industry and process, of various source red opportunities.[110]

In early 1991, EPA drafted a comprehensive three-year p conducting research on pollution prevention techniques a proaches.[111] The Agency's Science Advisory Board ("SAB not, however, impressed with the research plan when it reviewed the draft. The SAB indicated that the draft plan better agency direction, clearer definitions, and a strong phasis on ecological impacts.[112]

The Pollution Prevention Act of 1990 is the most comple islative treatment of the pollution prevention issue. Subs treatment of the issue by EPA has added to the foundati ated by Congress in the Act.

D. *Pollution Prevention Strategy*

Shortly after Congress passed the Pollution Preventic EPA published a draft pollution prevention strategy, settin the Agency's agenda for action to implement the Act and t the growth of pollution prevention.[113]

One of the central features of the strategy is EPA's In Toxics Project.[114] Under that initiative, EPA targets sev toxic pollutants[115] generated by manufacturing industrie Agency then contacts the major sources of releases of thos tants in an effort to get the facilities to voluntarily commi ducing the amount of targeted pollutants they rel

110. Pollution Prevention Act § 6608(b), 42 U.S.C.A. § 13107(b) (West Sup

111. *EPA Research—Scientific Panel Faults Five-year Plan for Inconsistency*, INSIDE E VIRONMENTAL POLICY ALERT, April 17, 1991, at 39.

112. *Id.*

113. 56 Fed. Reg. 7849 (1991). EPA's draft pollution prevention strat Agency's first step towards satisfying its duty to develop a pollution preventio pursuant to section 4 of the Pollution Prevention Act. *Id.*

114. *Id.* at 7851.

115. The pollutants were selected from the list of pollutants for which repo quired under SARA Title III. *Id.* The criteria for selection of the pollutants wa present significant risks to human health and the environment and that there h opportunities to reduce the risks through pollution prevention measures. *Id.* teen pollutants chosen by EPA are benzene, cadmium, carbon tetrachloride, c chromium, cyanide, dichloromethane, lead, mercury, methyl ethyl ketone, meth ketone, nickel, tetrachloroethylene, toluene, 1,1,1-trichloroethane, trichloroeth xylene. *EPA Unveils Pollution Prevention Strategy*, POLLUTION PREVENTION NEWS 1991, at 1, 8.

116. EPA identified the major industrial sources through review of the dat under SARA Title III. 56 Fed. Reg. at 7851.

Through the initiative, EPA hopes to reduce aggregate environmental releases of the targeted pollutants by a third from 1988 levels by the end of 1992, and by at least fifty percent from 1988 levels by the end of 1995.[117] The fundamental goal of the initiative is to determine whether voluntary pollution prevention efforts can yield significant reductions in pollution.[118] While the Industrial Toxics Project only focuses on pollution prevention in the manufacturing sector, EPA intends to develop similar initiatives in conjunction with other federal agencies to address pollution prevention in the agriculture, energy, transportation, and municipal water and wastewater sectors, and to address pollution prevention at federal facilities.[119]

EPA's proposed enforcement strategy[120] is noteworthy because it focuses on mandatory, rather than voluntary, pollution prevention. As part of the strategy, EPA anticipates including conditions in administrative and civil settlements of enforcement actions that require firms to adopt pollution prevention practices either as a means of correcting violations of environmental protection laws or in exchange for reduced fines and penalties for violations of those laws.[121]

117. *Id.* Progress toward the reduction goals will be measured through a review of the data submitted by the industrial sources under SARA Title III. *Id.*

118. *Id.*

119. 56 Fed. Reg. at 7850. EPA focused on the manufacturing sector in the Industrial Toxics Project because the Science Advisory Board identified toxic pollutants generated by the manufacturing sector as presenting serious threats to human health and the environment, and because the manufacturing sector is the focus of most of EPA's regulatory activities. *Id.* at 7852.

120. *Id.* at 7859. EPA notes that "enforcement generally creates an environment in which permanent solutions, such as eliminating some pollutants entirely, may be preferred to less reliable approaches to compliance." *Id.*

121. *Id.* As described in the strategy, EPA's Office of Enforcement is developing an interim policy on the inclusion of pollution prevention conditions in enforcement settlements. *Id.* The policy will encourage EPA to include single-media or cross-media pollution prevention conditions in settlements, either to correct violations or as additional conditions of settlements incidental to injunctive relief, "especially when [the conditions] offer the best chance of avoiding recurring or future violations, have no negative cross-media impacts, and technologically and economically feasible options exist." *Id.* The pollution prevention conditions will be included in settlements as additional requirements beyond mandatory civil penalties. *Id.*

EPA has already begun to impose pollution prevention conditions in civil and administrative settlements. For instance, on January 4, 1990, in settling a complaint against Sherex Polymers, Inc., a company charged with manufacturing a chemical substance in violation of section 5 of the Toxic Substances Control Act, 15 U.S.C. §§ 2601-71 (1988) ("TSCA"), EPA reduced the civil penalty that it had proposed to impose on Sherex by 5%

Another interesting aspect of EPA's pollution prevention strategy is the Agency's commitment to encourage voluntary pollution prevention through "regulatory flexibility."[122] One of the ways that the Agency intends to use regulatory flexibility to encourage pollution prevention is to streamline the regulatory and administrative procedures for testing and applying pollution prevention technologies.[123] The Agency will also categorize the rules that it publishes over the next two to three years according to the manufacturing or non-manufacturing sectors that will be affected by the rules, and notify sources in each sector of the proposed rules.[124] Presumably, the early notification and the streamlined process for approval of pollution prevention technologies will encourage industries to invest in pollution prevention technology in order to avoid the expense of treating and controlling pollution in accordance with impending regulations.[125]

As an additional means of encouraging pollution prevention through regulatory flexibility, EPA commits, in the strategy, to examine and utilize flexible approaches to pollution prevention similar to the emissions reduction provisions in the Clean Air Act Amendments of 1990,[126] whenever authorized by law.[127] Under the Clean Air Act amendments, EPA can delay implementation of certain statutory pollution control requirements for facilities that voluntarily commit to reducing emissions of sulfur dioxide by ninety percent.[128]

($42,000) in exchange for a commitment by the company to implement a pollution prevention project at its Lakewood, Florida plant. 56 Fed. Reg. at 7860-61.

Similarly, on August 7, 1990, the Chief Judicial Officer approved a consent agreement and consent order between EPA and 3-V Chemical Corporation in a TSCA administrative enforcement action that imposed pollution prevention responsibilities on 3-V Chemical. *Id.* at 7861. Pursuant to the order, 3-V was required to pay a $300,000 civil penalty and to purchase and install a solvent recycling system at its South Carolina manufacturing facility, to implement a leak detection program for fugitive emissions of the solvents to be recycled, and to report annually to EPA regarding those pollution prevention efforts. *Id.*

122. 56 Fed. Reb. at 7859.

123. *Id.* at 7850.

124. *Id.* at 7859.

125. *Id.*

126. Pub. L. No. 101-549, 104 Stat. 2399 (1990)(codified in scattered sections of 42 U.S.C.A.).

127. 56 Fed. Reg. at 7856.

128. *See* 42 U.S.C.A. § 7651(c) (West Supp. 1991).

The draft document also outlines EPA's research[129] and public participation strategies for pollution prevention,[130] and sets out EPA's plans for institutionalizing pollution prevention within the Agency[131] and working with other federal agencies to institutionalize pollution prevention.[132]

While the draft pollution prevention strategy primarily focuses on EPA's plans for encouraging pollution prevention today and prospectively, it also summarizes the Agency's past efforts. Specifically, the strategy describes the creation of an Office of Pollution Prevention,[133] the establishment of a national pollution preven-

129. 56 Fed. Reg. at 7850-51. The research plan described in the pollution prevention strategy does not address specific research initiatives, but merely sets short and long-term goals. The short-term goal is to focus research on methods of pollution prevention for targeted high priority contaminants in the manufacturing sector. The long-term goal of the strategy is to focus research on addressing social and economic obstacles to prevention and opportunities for prevention in the non-manufacturing sector.

130. *Id.* at 7857-58. The public participation strategy cites studies by *The Economist* and by EPA's Science Advisory Board which illustrate that the dissemination of information on releases of toxic pollutants gathered under SARA Title III fosters public accountability of industry and plays a vital role in promoting pollution prevention by industry. The major goal of EPA's public participation strategy is to improve the quality of, and accessibility to, data on toxic chemical use and releases.

The public participation provisions also commit EPA to working with the Federal Trade Commission, the Office of Consumer Affairs, and other federal agencies to explore the possibility of establishing uniform standards or guidelines on the use of environmental terms in advertising. *Id. See also supra* note 39. Finally, the strategy briefly describes EPA's efforts to test methods of evaluating the environmental consequences of consumer products. 56 Fed. Reg. at 7857. *See also supra* note 36.

131. The strategy describes several methods of institutionalizing pollution prevention within EPA, including the designation of special assistants for pollution prevention in each Assistant Administrator's Office, and the development of incentives and awards to encourage EPA staff to engage in pollution prevention efforts. 56 Fed. Reg. at 7851.

These measures seem rather modest in light of the criticisms expressed in the legislative history of the Pollution Prevention Act regarding lack of institutional support for pollution prevention within EPA. Specifically, OTA testified at hearings that EPA's efforts on pollution prevention were scattered and uncoordinated, lacked permanent institutional support, and remained several layers below the Administrator. S. REP. No. 526, *supra* note 12, at 4. The Senate Environment and Public Works Committee echoed OTA's concerns in its report on the Act. *Id.* at 6. One might have expected a greater effort by EPA to dispel these criticisms.

132. The strategy announces EPA's intention to work with other federal agencies to explore the potential for pollution prevention in federal procurement and to develop initiatives like the Industrial Toxics Project for other non-manufacturing sectors. 56 Fed. Reg. at 7851.

133. *Id.* at 7855. The Office of Pollution Prevention was established in the Agency's Office of Policy, Planning, and Evaluation in 1988. S. REP. No. 526, *supra* note 12, at 4. When Congress, through the Pollution Prevention Act, required EPA to establish an Office of Pollution Prevention, it intended that the Office should be established within the

tion clearinghouse,[134] the development of an Agency-wide competition for innovative pollution prevention projects,[135] the administration of a grant program to support state efforts in pollution prevention,[136] and the development of pollution prevention audit guides for industrial facilities.

EPA's pollution prevention strategy recognizes the central role that pollution prevention has assumed within EPA since William Reilly was appointed Administrator,[137] but it does not establish an aggressive agenda. Like the Pollution Prevention Act, the strategy is non-regulatory and focuses on encouraging and facilitating voluntary pollution prevention, rather than on requiring mandatory pollution prevention. The strategy also stresses the continued importance of mandatory pollution control as a means of encouraging voluntary pollution prevention.[138]

Agency "in a manner to reflect the importance and multi-media significance of the functions of the new office." *Id.* at 6.

Consistent with that vision, on February 28, 1991, Sen. John Glenn and 23 co-sponsors introduced legislation to elevate EPA to a cabinet-level department. S. 533, 102d Cong., 1st Sess. (1991). That bill required the establishment of an Office of Pollution Prevention within the cabinet-level Department of the Environment. The Office would be supervised by an Assistant Secretary for Pollution Prevention, at the same level as the Assistant Secretaries for the Offices for the various media, such as air and water. *Glenn Offers EPA Cabinet Bill With Pared Down Statistical Bureau Provisions*, INSIDE EPA WEEKLY REPORT, March 15, 1991, at 16.

134. The Pollution Prevention Information Clearinghouse consists of a hotline; a repository of texts, manuals, fact sheets, case studies, and legislation; and the Prevention Information Exchange Service, a computerized conduit to databases, information exchange, and document ordering. 56 Fed. Reg. at 7857. The clearinghouse can be reached by calling 1-800-242-9346 or (202) 382-3000.

135. Through the "2% prevention competition," EPA set aside 2% of its 1991 fiscal year contract funds (approximately $12 million) for an intra-agency competition to develop pollution prevention initiatives. *Id.* at 7855. Awards were presented for 25 innovative projects. *Id.*

136. In the 1989 and 1990 fiscal years, EPA awarded $11 million in grants to 40 different states for pollution prevention programs. *Id.* at 7855. The Agency has also established a program to provide pollution prevention grants directly to small businesses. The "Pollution Prevention By and For Small Business Grant Program," administered for EPA by the Center for Hazardous Materials Research at the University of Pittsburgh, awards grants up to $25,000 to assist small businesses in developing and demonstrating new pollution prevention technologies. *Small Business Awards*, POLLUTION PREVENTION NEWS, Nov.-Dec. 1990, at 8.

137. 56 Fed. Reg. at 7852 (indicating that "over the last two years, EPA Administrator William Reilly has made pollution prevention one of the Agency's top priorities").

138. *Id.* at 7850.

IV. Analysis of the Pollution Prevention Act and Federal Pollution Prevention Efforts.

Since 1987, several states have enacted aggressive laws that require industries to prepare and implement pollution prevention plans and meet specific goals for reductions in pollution.[139] Legislation in Massachusetts, for instance, authorizes the State to establish mandatory pollution prevention performance standards for priority industries.[140] State legislatures have provided citizens with central roles in implementation and enforcement of pollution prevention laws by mandating public participation in pollution prevention planning, and by authorizing citizens to file law suits to enforce planning and reporting requirements.[141] In contrast, the federal Pollution Prevention Act is a more modest, almost *laissez-faire*, approach to pollution prevention.

The key aspects of the Act are its definitions, focus on voluntary rather than mandatory compliance, lack of a planning requirement, and minimal reporting requirements. The Act also has many shortcomings, including its failure to: (1) provide adequate funding, (2) provide a specific enforcement role for citizens and employees, (3) establish specific goals, and (4) provide for regulatory incentives whereby EPA could reduce pollution control requirements in exchange for pollution prevention by industry.

A. *Definition*

The success of pollution prevention legislation is intimately tied to the definition of the conduct that the legislation intends to encourage. As explained in this section, pollution prevention takes many forms.

Congress and EPA's early pollution prevention efforts focused on "waste minimization," reduction of the volume or quantity and toxicity of hazardous waste by generators.[142] As interpreted by EPA, waste minimization includes practices designed to eliminate the generation of waste, and all forms of recycling and treatment that occur after waste is generated and that reduce the

139. *See supra* note 26.

140. Mass. Gen. Laws Ann. ch. 211, § 15 (West Supp. 1991).

141. *See, e.g.*, Cal. Health & Safety Code § 25244.21(c) (West Supp. 1991); Me. Rev. Stat. Ann. tit. 38, § 2306 (West Supp. 1990); Mass. Gen. Laws Ann. ch. 211, §§ 5(H), 11(E), 18(B), 18(C) (West Supp. 1991).

142. 42 U.S.C. § 6925(h) (1988).

volume and toxicity of the waste.[143] Since waste minimization requirements can be satisfied through the use of treatment and recycling technologies, waste minimization does not necessarily encourage a reduction in the volume and toxicity of waste that is generated, but could merely lead to a reduction in the volume and toxicity of waste requiring disposal.[144] Because waste treatment and recycling may also create health, safety, and environmental hazards, waste minimization measures often shift the hazards of waste management rather than eliminating them.

Rather than referring to "waste minimization," the Pollution Prevention Act addresses "source reduction."[145] Source reduction consists of practices that reduce the amount of hazardous substances, pollutants, or contaminants entering the waste stream or being released into the environment prior to recycling, treatment, or disposal and that reduce the hazards to public health and the environment associated with the release of such hazardous substances, pollutants, or contaminants.[146] By specifying that recycling, treatment, and disposal are not source reduction practices and by focusing on pollutants and contaminants in general rather than merely on hazardous waste, the definition of "source reduction" is a clear break with the pollution control focus of the past and a shift toward true pollution prevention.[147]

143. OTA II, *supra* note 31, at 1, 6.

144. OTA postulates that the ability of industry to satisfy waste minimization requirements through recycling and treatment may actually inhibit a reduction in the generation of waste. OTA II, *supra* note 31, at 1. The historical record indicates that there is a "tendency in government and industry to opt for post-generation pollution controls instead of prevention." *Id.* at 20.

145. Pollution Prevention Act §§ 6602, 6603(5), 42 U.S.C.A. §§ 13101, 13102(5) (West Supp. 1991).

146. *Id.* § 6603(5)(A), 42 U.S.C.A. § 13102(5)(A) (West Supp. 1991). "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." *Id.*

147. The Act defines "source reduction" in terms of practices that occur *prior* to recycling, treatment, or disposal. *Id.* § 6603(5)(A)(i), 42 U.S.C.A. § 13102(5)(A)(i) (West Supp. 1991). The definition also provides that "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 integral to and necessary for the production of a product or the providing of a service." *Id.* § 6603(5)(B), 42 U.S.C.A. § 13102(5)(B) (West Supp 1991). The term is essentially the same as the term "waste reduction," which OTA described in its 1987 report as consistent with pollution prevention goals. OTA II, *supra* note 31, at 5, 20.

The Pollution Prevention Act does, however, address recycling, citing it as the second most desirable means of managing pollution in a hierarchy of pollution management op-

Some commentators have suggested that legislation mandating both pollution control and pollution prevention requirements sends a mixed signal to industry about the importance of pollution prevention.[148] While this concern is valid, pollution prevention will not eliminate the need for pollution control. No matter how successful pollution prevention measures are, they will never completely eradicate pollution. Therefore, pollution control may be addressed in pollution prevention legislation if the legislation clarifies that pollution control is a last resort. The pollution prevention hierarchy in the Pollution Prevention Act is a good example of the proper way to correlate pollution control with pollution prevention in legislation.[149] This approach is very different from an approach that allows companies to achieve reductions in pollution generation either through pollution control or pollution prevention, in which case the companies can ignore pollution prevention and focus solely on pollution control.

Another form of pollution prevention that is gaining popularity at the state level is "toxics use reduction."[150] Instead of focusing on reducing the volume of waste generated or decreasing the number of releases of pollutants, toxics use reduction concentrates on reducing the use of toxic chemicals in the first place.[151]

tions. Pollution Prevention Act § 6602(b), 42 U.S.C.A. § 13101(b) (West Supp. 1991). The Act also requires persons to provide EPA with reports on recycling activities that they have implemented. *Id.* § 6607, 42 U.S.C.A. § 13106 (West Supp. 1991).

148. *See* NELC, *supra* note 4, at 17. Several of the panelists that participated in the NELC study argued that the success of pollution prevention legislation "relies on a fundamental reorganization of companies and agencies such that production process engineers, workers, and product designers take the lead on environmental protection." *Id.* at 13. Such a reorganization, the panelists argued, is less likely to occur if pollution control is given an important focus at the same time that companies consider pollution prevention options. *Id.*

149. Pollution Prevention Act § 6602(b), 42 U.S.C.A. § 13101(b) (West Supp. 1991).

150. *See, e.g.*, ME. REV. STAT. ANN. tit. 38, § 2301 (West Supp. 1990); MASS. GEN. LAWS ANN. ch. 21I, § 2 (West Supp. 1991); OR. REV. STAT. § 465.003(13) (1989).

151. The National Environmental Law Center and Center for Policy Alternatives ("NELC") developed a model "toxic use reduction" definition as part of its 1990 report on state toxic use reduction laws. NELC, *supra* note 4, at B-1. NELC suggested that the term should be defined as "in-plant changes in production processes or raw materials that reduce, avoid, or eliminate the use of toxic or hazardous substances or the generation of hazardous by-products per unit of product, so as to reduce the risks to the health of workers, consumers or the environment, without shifting risks among workers, consumers or parts of the environment." *Id.* NELC also suggested that "[t]he definition should specify that such changes could be accomplished through input substitution, product reformulation, production process redesign or modification, production process modernization, improved production process operation and maintenance, or in-process recycling, reuse or extended use of toxics by using equipment integral to the production process." *Id.* Fi-

latory efforts.[157] The general conclusion of the EPA and OTA reports, and the basic premise of the Pollution Prevention Act, is that the primary obstacle to pollution prevention is ignorance among industry managers about the benefits of pollution prevention.[158] EPA and OTA argue that increased dissemination of information about pollution prevention opportunities will result in widespread voluntary pollution prevention.[159] To the extent that pollution prevention makes economic sense for companies and firms are ignorant of the pollution prevention opportunities in existence, the voluntary approach of the Pollution Prevention Act may be a sufficient impetus for successful pollution prevention.[160]

Proponents of the voluntary approach to pollution prevention suggest additional reasons why their approach is preferable to mandatory efforts. First, there are presently no standard methods for measuring or quantifying pollution prevention.[161] Without these methods, it is impossible to mandate specific quantitative reductions in the amount of pollution generated by individual polluters. Second, those who support voluntary pollution prevention argue that since EPA does not generally regulate industrial production processes, it lacks the expertise to prescribe mandatory pollution prevention techniques or measures for those processes.[162] Finally, supporters of the voluntary approach argue that mandatory pollution prevention requirements will stifle innovation[163] and could reduce international competitiveness for

157. *See* OTA, *supra* note 9, at 4; OTA II, *supra* note 31, at 3; EPA REPORT, *supra* note 9, at xxvi. OTA and EPA concluded in 1986 reports that the traditional regulatory approach for achieving pollution prevention goals was not practical or feasible. OTA II, *supra* note 31, at 19. Both reports also noted that states and foreign governments had developed and implemented effective pollution prevention programs that were not based on mandatory, regulatory measures. *Id.*

158. *See supra* notes 57-58 and accompanying text.

159. *See supra* notes 57-58.

160. As the OTA noted in its 1986 report, "waste represents inefficiency and . . . to reduce waste is to conserve materials that may be scarce, strategic or expensive." OTA, *supra* note 9, at 12-13.

161. *See supra* notes 61-63 and accompanying text.

162. While EPA, in some sense, regulates industrial production processes under TSCA, *see infra* notes 179-182 and accompanying text, the myriad of industrial processes for which mandatory pollution prevention standards would have to be established as part of a mandatory pollution prevention program could tax EPA's expertise and limited resources. OTA, *supra* note 9, at 4.

163. Opponents of mandatory pollution prevention argue that if mandatory requirements are established, industry will only comply with the mandatory requirements and will not be motivated to reduce their generation of pollution beyond those requirements. STATE/EPA COMMITTEE, *supra* note 34, at 29.

some American industries and products.[164] This argument is untenable, though, assuming the validity of Congress' and EPA's assertions that pollution prevention measures and technologies generally increase the efficiency of processes and the economic efficiency of companies that employ them.[165]

For these and perhaps other reasons, the Pollution Prevention Act does not include mandatory pollution prevention requirements. However, EPA and OTA have not foreclosed the possibility of utilizing mandatory measures to achieve pollution prevention.[166] Compared with voluntary requirements, mandatory pollution prevention requirements provide a greater impetus for companies to find and implement pollution prevention practices.

Several different types of mandatory pollution prevention requirements could be implemented on the federal level.[167] One mandatory measure that has been considered by EPA and OTA is the imposition of performance standards or operating procedures for industrial processes.[168] Under this approach, the standards

164. OTA, *supra* note 9, at 14.

165. *See supra* note 160.

166. *See* OTA, *supra* note 9, at 55; EPA REPORT, *supra* note 9, at xiv - xviii. Both reports focus on mandatory waste reduction, arguably one form of pollution prevention.

167. One recent proposal includes several innovative uses of mandatory requirements. *See* S. 1081, 102d Cong., 1st Sess. (1991). The proposed Clean Water Act reauthorization legislation includes general provisions addressing pollution prevention by all point sources, as well as specific provisions addressing pollution prevention by publicly owned treatment works ("POTWs"). For instance, section 7 of the proposal would require EPA, when establishing certain effluent guidelines and new source performance standards, to "rely upon and require, to the maximum extent practicable, toxic use and waste reduction measures and practices including changes in production processes, products or raw materials that reduce, avoid or eliminate the use of toxic or hazardous byproducts so as to reduce the overall risk of adverse effects to the health of workers and the public and to the environment." *Id.* § 7.

Under section 12 of the proposed legislation, EPA would also be required to rely on toxic use and waste reduction measures and practices in establishing pretreatment standards and limitations. *Id.* § 12. In addition, POTWs serving populations of greater than 50,000 persons would be required to develop "toxic reduction action programs." *Id.* § 14.

Two other sections of the proposal are especially noteworthy. Section 17 would prohibit the issuance of a permit to discharge pollutants under the Act unless the permittee demonstrated "a need to discharge based upon a showing of the maximum use of measures, processes, methods, systems or techniques to eliminate the discharge altogether or reduce the volume and toxicity of pollutants . . . within the economic capability of the owner or operator." *Id.* § 17. Finally, section 25 of the proposal would require any permittee who was required to file a toxic chemical release form under SARA Title III to conduct an environmental audit of its facility. *Id.* § 25.

168. Mandatory performance standards for pollution prevention are fundamentally different from mandatory performance standards in the federal air and water pollution laws.

would be based on the best technology or pollution prevention practices available for the process.[169] Closely related to the mandatory performance standards approach is a proposal that would require industrial processes to achieve specific throughput levels established by EPA.[170] Both of these approaches have been criticized on the ground that EPA lacks the resources or expertise to set such standards.[171] The throughput approach has been further criticized on the ground that the lack of standard measuring methods renders it unenforceable.[172] A final type of mandatory pollution prevention measure that has been explored by EPA and OTA is a prohibition or restriction on the use of certain substances or on the generation of certain wastes.[173]

While it is true that there are obstacles to widespread, successful implementation of the mandatory pollution prevention techniques described above, many of the techniques could be successfully implemented on a small scale by EPA if authorized by narrowly drawn legislation.

A combination of mandatory and voluntary pollution prevention measures might yield greater pollution prevention results than a program based solely on voluntary efforts.[174] For instance, instead of requiring EPA to establish mandatory pollution prevention performance standards for every industrial process by a certain date, Congress could authorize the Agency to establish mandatory standards for processes when it has sufficient information to establish such standards. To the extent that EPA lacked the expertise or resources to set standards, it would not be required to act. However, if a segment of industry were to develop

EPA REPORT, *supra* note 9, at xiv. While a person can comply with the performance standards of the air and water pollution laws by using pollution control technologies or by modifying production processes, a person can only comply with the mandatory performance standard requirements for pollution prevention by modifying production processes. *Id.* Massachusetts' pollution prevention law includes provisions that authorize the State to establish mandatory performance standards for certain industrial processes. MASS. GEN. LAWS ANN. ch. 21I, § 15 (West Supp. 1991).

169. OTA, *supra* note 9, at 55.

170. Mandatory throughput requirements limit the amount of waste or pollution generated by an industrial process per unit of production for the process. OTA, *supra* note 9, at 55.

171. *See* OTA, *supra* note 9, at 55; EPA REPORT, *supra* note 9, at xv.

172. OTA, *supra* note 9, at 55.

173. EPA REPORT, *supra* note 9, at xv. EPA already has some authority under TSCA to prohibit or restrict the use of certain toxic substances. *See infra* notes 179-82 and accompanying text.

174. OTA, *supra* note 9, at 53.

technological modifications or management practices that significantly and effectively reduced pollution generation in a specific process, EPA could require other industries to implement those proven technologies or practices.[175]

Congress could also expand EPA's authority to ban the use of certain toxic chemicals in manufacturing or production processes or to prohibit certain packaging or marketing practices.[176] When required to do so, industry has shown a remarkable ability to phase out toxic components by either replacing those materials with less toxic substitutes or re-engineering manufacturing or production processes.[177] However, substitutes are not always more benign than the substances they replace. The substitute may actually create greater environmental hazards than the original substance.[178]

EPA already has authority under the Toxic Substances Control Act ("TSCA")[179] to prohibit the use of toxic substances if the Administrator makes certain findings regarding the risks to human health or the environment created by the substances.[180] The Agency has begun to use TSCA more aggressively to encourage

175. EPA did not rule out this approach in its 1986 report. EPA REPORT, *supra* note 9, at xxi.

176. A committee of federal and state government officials reviewing legislative options for reauthorization of RCRA specifically endorsed the establishment of selected bans on products or constituents in products as a means of waste reduction. STATE/EPA COMMITTEE, *supra* note 34, at 21. The Committee stressed, however, that the federal government should work with industry in a cooperative, non-regulatory manner to establish such bans. *Id.* Selected bans of products or constituents in products have also been suggested as an important component of future state legislation in a report by the National Environmental Law Center and the Center for Policy Alternatives, NELC, *supra* note 4, at 4, and considered by EPA in its 1986 report to Congress, EPA REPORT, *supra* note 9, at xiv-xv.

177. Industry's response to bans on DDT, PCBs, CFCs, and lead in gasoline are good examples of industry's ability to develop alternatives to the use of toxic substances. NELC, *supra* note 4, at 21.

178. David Lifset & Marian Chertow, *The Politics of Product Bans*, ENVTL. FORUM, Mar.-Apr. 1990, at 13-14.

179. 15 U.S.C. §§ 2601-71 (1988).

180. Section 6(a) of TSCA provides:

> If the Administrator finds that there is a reasonable basis to conclude that the manufacture, processing, distribution in commerce, use or disposal of a chemical substance or mixture, or that any combination of such activities, presents or will present an unreasonable risk of injury to health or the environment, the Administrator shall by rule apply one or more of the following requirements to such substance or mixture to the

bans and phase-outs of certain toxic substances.[181] However, the

extent necessary to protect adequately against such risk using the least burdensome requirements:

(1) A requirement (A) prohibiting the manufacturing, processing, or distribution in commerce of such substance or mixture, or (B) limiting the amount of such substance or mixture which may be manufactured, processed, or distributed in commerce.

(2) A requirement (A) prohibiting the manufacture, processing, or distribution in commerce of such substance or mixture for (i) a particular use or (ii) a particular use in a concentration in excess of a level specified by the Administrator in the rule imposing the requirement, or (B) limiting the amount of such substance or mixture which may be manufactured, processed, or distributed in commerce for (i) a particular use or (ii) a particular use in a concentration in excess of a level specified by the Administrator in the rule imposing the requirement.

(3) A requirement that such substance or mixture or any article containing such substance or mixture be marked with or accompanied by clear and adequate warnings and instructions with respect to its use, distribution in commerce, or disposal or with respect to any combination of such activities. The form and content of such warnings and instructions shall be prescribed by the Administrator . . . .

(5) A requirement prohibiting or otherwise regulating any manner or method of commercial use of such substance or mixture . . . .

15 U.S.C. § 2605(a) (1988). Section 6(c)(1) of TSCA provides:

In promulgating any rule under subsection (a) of this section with respect to a chemical substance or mixture, the Administrator shall consider and publish a statement with respect to—

(A) the effects of such substance or mixture on health and the magnitude of the exposure of human beings to such substance or mixture,

(B) the effects of such substance or mixture on the environment and the magnitude of the exposure of the environment to such substance or mixture,

(C) the benefits of such substance or mixture for various uses and the availability of substitutes for such uses, and

(D) the reasonably ascertainable economic consequences of the rule, after consideration of the effect on the national economy, small business, technological innovation, the environment, and public health.

15 U.S.C. § 2605(c)(1) (1988).

181. EPA has begun to screen existing chemical substances and mixtures to determine which chemicals are essentially harmless, and which chemicals require more extensive review under TSCA. *EPA Targets Chemical Review to Expand Scope of Pollution Prevention*, INSIDE EPA WEEKLY REPORT, Mar. 29, 1991, at 1, 2. Before EPA initiates a more extensive formal review of the environmental and health effects of the substance under TSCA, the Agency gives notice to the companies that use the substance, and suggests that the companies reduce or eliminate their use of the substance. *Id.* EPA includes a "benefits manual" in its notice to the companies, describing methods for determining the total cost of using hazardous chemicals, and including potential disposal and liability costs. *Id.* EPA also suggests substitute chemicals that the Agency has determined to present less risks to health or the environment. *Id.*

In EPA's view, this approach is efficient. If a company is willing to cease using a particular substance voluntarily in response to EPA's notice, the Agency does not have to expend the time or resources necessary to promulgate a rule banning the use of the substance. *Id.* Furthermore, this approach may result in phasing out the use of chemical substances in certain situations where EPA could not ban the use of the substance by rule, either because the Agency lacked sufficient data to support the ban, or because the substance was used so

process for banning the use of a toxic substance under TSCA is slow and fraught with statutory and administrative hurdles.[182] Congress could clearly express its support for EPA's new focus on pollution prevention by streamlining the TSCA process for banning the use of toxic substances, or by investing EPA with broader authority, apart from TSCA, to ban the use of certain chemicals.

Although the Pollution Prevention Act focuses on voluntary pollution prevention efforts, the Act does not foreclose future legislative expansion of EPA's authority to mandate pollution prevention measures.[183] In fact, many of the requirements in the Act provide a strong foundation upon which mandatory requirements could be layered. For instance, improved data collection[184] and the development of a uniform system of measuring pollution prevention[185] could allow EPA to mandate measurable reductions in the amount of pollution generated by industry. Similarly, these improvements in data collection, together with

sparsely that the time and resources necessary to proceed by rule could not be justified. *Id.*

EPA has entrusted this initiative to its Office of Toxic Substances. *Id.* The Office administers the reporting and data collection provisions of TSCA and can evaluate the benefits of substituting one chemical substance for another using its large database on the environmental and health effects of various chemical substances. *Id.* The Office also tracks information regarding toxic chemical releases by industry provided to EPA under SARA Title III and can, thus, prioritize chemical substances for potential regulatory action based on prevalence of use by industry. *Id.*

182. For several examples of substantive and procedural limitations on the Administrator's exercise of the authority to ban the use of certain toxic substances, see *supra* note 180. OTA pointed out another limitation in its 1986 report. According to that document, EPA's ability to determine whether to ban a given toxic substance is hampered by limitations in TSCA on the type of information that can be collected and by the confidential nature of the information that is collected. OTA, *supra* note 9, at 181.

183. As mentioned above, the Senate Report for the Act recognizes that "additional steps may be necessary to undertake a comprehensive pollution prevention program" and indicates that the issue of pollution prevention will be revisited in RCRA reauthorization. S. REP. No. 526, *supra* note 12, at 1-2. Furthermore, the Act requires EPA to submit biennial reports to Congress identifying regulatory and non-regulatory barriers to source reduction and opportunities to use existing regulatory programs and incentives and disincentives to promote and assist source reduction. Pollution Prevention Act § 6608(b)(3), 42 U.S.C.A. § 13107(b)(3) (West Supp. 1991). This information could be useful to Congress in drafting future pollution prevention legislation.

184. The pollution Prevention Act requires EPA to develop improved methods of coordinating, streamlining, and assuring public access to, data collected under federal environmental statutes. *See* Pollution Prevention Act § 6604(b)(4), 42 U.S.C.A. § 13103(b)(4) (West Supp. 1991).

185. *Id.* § 6604(b)(1), 42 U.S.C.A. § 13103(b)(1) (West Supp. 1991).

expanded reporting of pollution prevention practices,[186] and the development of a national source reduction clearinghouse,[187] could refine EPA's expertise in setting mandatory performance standards for industrial processes and establishing bans. Implementation of the Pollution Prevention Act could therefore pave the way towards future legislative expansion of EPA's authority to mandate pollution prevention.

C. *Planning*

One of the fundamental deficiencies of the Pollution Prevention Act is its failure to address pollution prevention planning. Unlike the majority of state pollution prevention laws, the federal Act does not require preparation or implementation of pollution prevention plans.[188]

Mandatory pollution prevention planning is an important component of a comprehensive pollution prevention program for several reasons. First and foremost, planning ensures that persons actually explore and consider opportunities to prevent pollution.[189] By imposing specific procedural requirements for the preparation of plans, mandatory planning provisions force persons to take a closer look at pollution prevention opportunities than if they were merely required to certify that they had explored pollution prevention opportunities.[190] Mandatory pollution prevention planning also stimulates interest in pollution prevention opportunities.[191] For these reasons, OTA and state and EPA officials voiced their support for mandatory planning prior to the enactment of the Pollution Prevention Act.[192] While their support

186. *Id.* § 6607, 42 U.S.C.A. § 13106 (West Supp. 1991).

187. *Id.* § 6606, 42 U.S.C.A. § 13105 (West Supp. 1991).

188. *See infra* note 197 and accompanying text. In their 1991 review of state toxic use reduction laws, the National Environmental Law Center and the Center for Policy Alternatives identified mandatory planning requirements as the second most important component of a toxic use reduction law. NELC, *supra* note 4, at 13. The only component deemed more important to the success of the law than the planning requirement was the definition of "toxic use reduction" used in the law. *Id.*

189. NELC, *supra* note 4, at 7, 17.

190. RCRA currently only requires generators of hazardous waste to certify that they have minimized hazardous waste. *See supra* part III(A).

191. *See* OTA II, *supra* note 31, at 50.

192. In July 1990, a coalition of state and EPA officials identified the need for a federal role to mandate waste reduction and toxic use reduction planning as part of RCRA reauthorization. STATE/EPA COMMITTEE, *supra* note 34, at 51. A federal program was deemed necessary due to the hesitance of many states to adopt environmental measures beyond those required by federal law. *Id.* State waste management directors supported

was not sufficient to convince Congress to include mandatory pollution prevention planning requirements in the Act, Congress has not abandoned mandatory pollution prevention planning. Mandatory planning requirements have been included in legislation proposed in the 102d Congress to reauthorize RCRA.[193]

If mandatory pollution prevention planning were required by federal legislation, difficult questions regarding planning would need to be addressed, including who would be required to prepare plans and for what substances. State pollution prevention legislation may offer answers to these questions. Some states limit mandatory pollution prevention planning requirements to generators of hazardous waste, and only require those generators to plan for the reduction of hazardous waste.[194] Pollution prevention is, however, much broader than mere hazardous waste reduction and should focus on source reduction and toxic use reduction rather than merely reducing the amount of hazardous waste generated.[195] Thus, planning should focus on persons who use or release toxic or hazardous substances in general and not merely on persons who generate hazardous waste.[196]

An alternative approach that has been adopted by many states, and proposed in federal legislation, is to require plans from all

mandatory planning, possibly tied to the permitting process for solid and hazardous waste. *Id.* at 28. OTA indicated its support for waste reduction planning in its 1987 report on pollution prevention. OTA II, *supra* note 31, at 50.

193. *See* S. 976, 102d Cong., 1st Sess. § 202 (1991); S. 761, 102d Cong., 1st Sess. § 5 (1991).

194. *See* CAL. HEALTH & SAFETY CODE §§ 25244.12-.24 (West Supp. 1991); GA. CODE ANN. §§ 12-8-61 to 12-8-66 (Michie Supp. 1991); TENN. CODE ANN. §§ 68-46-301 to 68-46-312 (Supp. 1990).

195. *See supra* part IV(A).

196. Hazardous waste is defined in RCRA as:

> [A] solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may: (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. 42 U.S.C. § 6903(5) (1988). However, hazardous waste is merely one type of hazardous substance that may endanger public health, safety, and the environment. In recognition of that fact, the Federal Superfund law regulates releases of "hazardous substances." *See* 42 U.S.C. § 9601(14) (1988). The Superfund law defines hazardous substances to include hazardous waste and five other categories of substances. *Id.* Similarly, the Federal Emergency Planning and Community Right to Know Act requires companies that use or produce "certain toxic chemicals" to report data on the use and release of those chemicals into the environment. 42 U.S.C. §§ 11001-50 (1988).

persons that are subject to the reporting requirements of SARA Title III.[197] That approach ties pollution prevention planning requirements to the manufacturing, processing, or use of specified amounts of toxic substances listed in SARA Title III. Some states require persons who use or release threshold amounts of a wider variety of toxic substances beyond the SARA Title III substances to prepare pollution prevention plans.[198]

Requiring plans from generators of hazardous waste and persons subject to the reporting requirements of SARA Title III are good legislative first steps, but future pollution prevention planning efforts should expand beyond the manufacturing industries covered by SARA Title III and address activities such as mining, agriculture, and wastewater treatment.[199] With regard to the scope of pollutants that should be addressed in pollution prevention plans, broad requirements will maximize the amount of pollution prevention achievable and minimize the transfer of hazards to unregulated substances or media. Pollution prevention plans should focus not only on hazardous waste and toxic substances listed under SARA Title III, but on all hazardous substances, pollutants, and contaminants. The RCRA reauthorization legislation recently introduced by Senator Max Baucus is one example of the breadth of pollutants that can be addressed in mandatory pollution prevention plans.[200]

If facilities are required to prepare pollution prevention plans, questions about review and enforcement of those plans must also

197. *See* ME. REV. STAT. ANN. tit. 38, §§ 2304-05 (West Supp. 1991); MASS. GEN. LAWS ANN. ch. 21I, § 11 (West Supp. 1991); MINN. STAT. ANN. § 115D.07 (West Supp. 1991); OR. REV. STAT. § 465.018 (1989); WASH. REV. CODE ANN. § 70.95C.200 (West Supp. 1991); S. 976, 102d Cong., 1st Sess. § 202 (1991); S. 761, 102d, 1st Sess. § 5 (1991). Maine, Oregon and Washington also require generators of hazardous waste to submit plans for hazardous waste reduction. *See* ME. REV. STAT. ANN. tit. 38, §§ 2304-05 (West Supp. 1990); OR. REV. STAT. § 465.018 (1989); WASH. REV. CODE ANN. § 70.95C.200 (West Supp. 1991).

198. For instance, the Oregon legislation allows the State to add substances to the list of substances in SARA Title III for purposes of State planning. OR. REV. STAT. § 465.009 (1989).

199. The reporting requirements of SARA Title III only apply to certain manufacturing industries. *See supra* note 11. Legislation that has been introduced to reauthorize the Clean Water Act includes provisions addressing pollution prevention at wastewater treatment facilities. *See* S. 1081, 102d Cong., 1st Sess. (1991).

200. The Baucus proposal requires planning for "hazardous substances," defined to include certain substances designated by EPA under sections 311(b)(2)(A) or 307(a) of the Clean Water Act, section 102 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), section 3001 of RCRA, section 112 of the Clean Air

be considered. With regard to the extent of governmental review of pollution prevention plans, several alternatives exist. First, pollution prevention legislation could authorize EPA to review pollution prevention plans for technical adequacy and to reject plans that fail to implement specific pollution prevention opportunities that the Agency determines are appropriate for the facility to implement. This approach would be resource-intensive, and would require significant expertise within EPA regarding industrial and manufacturing processes.

Alternatively, legislation could provide for limited review of pollution prevention plans by EPA to ensure that the persons subject to the planning requirements examine the full range of pollution prevention options and consider the costs and benefits of each.[201] If Congress and EPA are correct in their view that the greatest obstacle to pollution prevention is the lack of adequate information about pollution prevention opportunities,[202] a limited review of plans might be sufficient to achieve the congressional goal of encouraging widespread pollution prevention, since persons subject to the plan requirement may choose to implement pollution prevention opportunities revealed by planning. If the assumption of Congress and EPA is correct, a limited review of the plans by EPA may not even be necessary. Many states require persons subject to the planning requirements to have their plans prepared by a certified pollution prevention plan-

Act, section 7 of TSCA, or section 302 or 313 of SARA Title III. S. 976, 102d Cong., 1st Sess. §§ 104, 202 (1991).

Pollution prevention legislation in some states has provided state agencies with broader authority to define the substances for which mandatory planning is required. For instance, Massachusetts' legislation authorizes the State to prepare a list of toxic or hazardous substances for which planning is required. MASS. GEN. LAWS ANN. ch. 211, § 9 (West Supp. 1991). Similarly, Oregon's legislation authorizes Oregon's Environmental Quality Commission to add or remove toxic substances or hazardous waste from the list of substances for which planning is required. OR. REV. STAT. § 465.009 (1989).

201. The scope of review could be modeled on the requirements of the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4321-70A (1988). Several states have adopted this approach, focusing solely on whether the plan is complete and the procedural requirements for planning have been followed. *See* ME. REV. STAT. ANN. tit. 38, § 2307 (West Supp. 1991); TENN. CODE ANN. § 68-46-308 (Supp. 1991). The NELC also favored this approach, suggesting that the regulatory agency should be given the authority to reject plans that do not consider a "comprehensive set of reduction alternatives." NELC, *supra* note 4, at 18.

202. *See supra* note 57 and accompanying text.

ner,[203] the involvement of whom could ensure adequate consideration of all pollution prevention opportunities.[204]

Another difficult question that arises regarding review of pollution prevention plans concerns the confidentiality of the information they contain. Since pollution prevention planning provisions generally require disclosure of industrial processes and chemicals used in those processes,[205] industry is reluctant to compromise data confidentiality and trade secret protection by submitting such information to government agencies in a public document.[206] On the other hand, if the information is not disclosed, government regulators cannot determine whether the facility has complied with pollution planning requirements. The solution that has been reached by many state legislatures and incorporated in proposed federal legislation is to require persons to include confidential information and trade secrets in pollution prevention plans, but to allow them to maintain the plans at their place of business for inspection rather than to submit the plans to the government.[207] Furthermore, state laws often provide that pollution prevention plans are not public records.[208]

A final question that must be resolved if mandatory pollution prevention plans are required under federal legislation is whether such plans are enforceable. State legislatures have not addressed this question in a uniform fashion. Some states merely authorize state agencies to penalize persons for failing to prepare pollution prevention plans.[209] Others authorize state agencies to enforce

203. *See* CAL. HEALTH & SAFETY CODE § 25244.19(e) (West Supp. 1991); MASS. GEN. LAWS ANN. ch. 21I, § 11(B) (West Supp. 1991).

204. Presumably, those persons would then implement some of the pollution prevention measures identified through the planning process due to the economic benefits provided by those measures.

205. For instance, Minnesota's legislation requires that plans include "a description of the current processes generating or releasing toxic pollutants." MINN. STAT. ANN. § 115D.07.2 (West Supp. 1991).

206. These concerns are identical to the concerns created by reporting requirements in pollution prevention laws. *See infra note* 222 and accompanying text.

207. *See* CAL. HEALTH & SAFETY CODE § 25244.21 (West Supp. 1991); MASS. GEN. LAWS ANN. ch. 21I, § 11 (West Supp. 1991); MINN. STAT. ANN. § 115D.07 (West Supp. 1991); OR. REV. STAT. § 465.018 (1989); TENN. CODE ANN. § 68-46-304 (Supp. 1990); WASH. REV. CODE ANN. § 70.95C.220 (West Supp. 1991); S. 976, 102d Cong., 1st Sess. § 202 (1991); S. 761, 102d Cong., 1st Sess. § 5 (1991).

208. *See, e.g.*, OR. REV. STAT. § 465.018 (1989); TENN. CODE ANN. § 68-46-311 (Supp. 1991); WASH. REV. CODE ANN. § 70.95C.220 (West Supp. 1991).

209. *See, e.g.*, GA. CODE ANN. § 12-8-72 (Michie Supp. 1991).

pollution prevention plans[210] and to impose penalties for failing to implement them. Critics have argued that if pollution prevention plans are enforceable, persons will plan conservatively rather than including aggressive reduction strategies in plans.[211] Regardless of that concern, both pollution prevention initiatives proposed in the 102d Congress provide EPA with the authority to require implementation of pollution prevention plans prepared under the legislation.[212]

D. *Reporting*

Mandatory reporting requirements stimulate pollution prevention in several ways. By detailing the practices and technologies that are being used to prevent pollution, reporting provides EPA with a broad base of information about available pollution prevention opportunities that the Agency can disseminate to other interested parties.[213] Mandatory reporting also ensures that persons remain accountable for implementing pollution prevention practices and technologies and achieving actual reductions in pollution generation.[214] To maximize the impact that mandatory pollution prevention reporting has on gathering information and fostering accountability, reporting provisions should: (1) require the submission of as much information as needed and (2) ensure that it is as accurate and precise as possible.

While the Pollution Prevention Act includes provisions that require persons to report source reduction and recycling activities to EPA[215] several amendments are necessary to maximize the impact of those reporting requirements. First, reports should be required from a broader spectrum of polluters than persons required to file toxic release information forms under SARA Title

210. *See, e.g.*, CAL. HEALTH & SAFETY CODE § 25244.18 (West Supp. 1991).

211. *See* Hansen, *supra* note 3, at 33.

212. S. 976, 102d Cong., 1st Sess. § 202 (1991); S. 761, 102d Cong., 1st Sess. § 5 (1991).

213. The Pollution Prevention Act of 1990 includes several provisions requiring EPA to facilitate pollution prevention by providing information to persons on currently available pollution prevention opportunities. *See* Pollution Prevention Act §§ 6604(b)(4), (5), (8), (9), 6605, 6606, 42 U.S.C.A. §§ 13103(b)(4), (5), (8), (9), 13104, 13105 (West Supp. 1991).

214. Reporting enables EPA and the public to assess whether actual reductions in pollution are being achieved. OTA II, *supra* note 31, at 8. The role of the public in ensuring that industry remains accountable for pollution prevention is explored below in part IV(F).

215. Pollution Prevention Act § 6607, 42 U.S.C.A. § 13106 (West Supp. 1991).

III.[216] At a minimum, any person that is required to prepare a pollution prevention plan under amended federal legislation should be required to report the progress attained in implementing the plans.[217] Similarly, pollution prevention reports should address pollution prevention practices and technologies for a broader universe of pollutants than those identified in SARA Title III.

Pollution prevention reports should also address pollution prevention practices on a process-specific rather than on a facility-wide basis.[218] Since facilities often use several different processes, and production levels for particular processes vary significantly over time, facility-wide reporting does not allow EPA or the public to determine whether reductions reported for a facility are due to specific pollution prevention programs that the facility has implemented, or are merely due to cuts in production.[219] Process-specific information enables EPA to make this determination.[220] Without such information, EPA cannot evaluate the suc-

216. As noted above, reporting under SARA Title III is limited to persons who manufacture, process, or use specified amounts of certain chemicals in designated manufacturing processes. *See supra* note 11. While the Pollution Prevention Act only requires reports from persons who are required to file toxic chemical release reports under SARA Title III, the legislative history of the Act indicates that Congress felt that the reporting requirements in the Act were not necessarily the best way to measure the effectiveness of adoption of source reduction practices. H.R. REP. No. 555, *supra* note 19, at 13. The legislative history of the Pollution Prevention Act further provides that SARA Title III was selected as a model for the reporting requirements of the Act because it was the only multi-media reporting requirement in existence. *Id.*

217. State laws that require pollution prevention planning, and some proposed federal legislation, generally require reporting by all persons required to prepare plans identifying the progress made in implementing the plans. *See* CAL. HEALTH & SAFETY CODE § 25244.20 (West Supp. 1991); GA. CODE ANN. § 12-8-65 (Michie Supp. 1991); ME. REV. STAT. ANN. tit. 38, §§ 2303, 2307 (West Supp. 1990); MASS. GEN. LAWS ANN. ch. 21I, §§ 3, 10 (West Supp. 1991); MINN. STAT. ANN. § 115D.08 (West Supp. 1991); OR. REV. STAT. § 465.024 (1989); TENN. CODE ANN. § 68-46-306 (Supp. 1991); WASH. REV. CODE ANN. § 70.95C.200 (West Supp. 1991); S. 976, 102d Cong., 1st Sess. § 202 (1991); S. 761, 102d Cong., 1st Sess. § 6 (1991).

218. The reporting requirements of the Pollution Prevention Act only require reporting on a facility-wide basis. 42 U.S.C.A. § 13106(b) (West Supp. 1991). The performance report requirements of the proposed Baucus legislation, on the other hand, focus on process-specific activity. *See* S. 976, 102d Cong., 1st Sess. § 202 (1991).

219. NELC, *supra* note 4, at 19.

220. To ensure that the data contained in reports can be accurately interpreted by the government agencies, many states require persons to identify ratios of production between the reporting year and prior years. *See* MASS. GEN. LAWS ANN. ch. 21I, § 10 (West Supp. 1991). Although the Pollution Prevention Act of 1990 does not require reporting on a process-specific basis, it does require reporting of production ratios. 42 U.S.C.A. § 13106(b)(5) (West Supp. 1991). Whether reports address pollution prevention on a fa-

cess of specific pollution prevention programs and cannot determine whether such programs can be effectively implemented by other industries or implemented outside of the manufacturing sector. Process-specific information provides an accurate and useful description of the results achieved by various pollution prevention practices and technologies.

Finally, mandatory reporting provisions should require persons to report the specific practices and technologies they utilize to achieve reductions in pollution generation. The Pollution Prevention Act merely requires reporting of such practices by category.[221] The more general the pollution prevention information submitted to EPA, the less useful it is.

None of the amendments to the reporting requirements suggested above are likely to draw praise from the regulated community. As in the review of pollution prevention plans, reporting requirements generate concerns about disclosure of confidential information and trade secrets.[222] The Pollution Prevention Act addresses this tension by including provisions whereby persons filing pollution prevention reports can protect legitimate trade secrets and confidential information from disclosure.[223] However, those provisions only protect the identity of chemicals as trade secrets and do not apply to the other information that persons are required to report under the Act, including process descriptions and production figures.[224] If the trade secret provisions of the Pollution Prevention Act are expanded to offer

cility-wide or process-specific basis, production levels are vital in evaluating the true levels of pollution prevention achieved by a facility.

221. 42 U.S.C.A. § 13106(b)(3) (West Supp. 1991). Similarly, Massachusetts' toxic use reduction law merely requires reporting, on a matrix, the categories of pollution prevention opportunities that have been implemented. MASS. GEN. LAWS ANN. ch. 21I, § 10 (West Supp. 1991).

222. The potential for disclosure of confidential information and trade secrets increases as persons are required to report more detailed descriptions of industrial processes, raw material usage, and production figures. Pollution prevention methods and technologies might also be considered to be confidential information or trade secrets. Procedures or technologies that reduce a company's pollution generation by increasing the efficiency of its processes provide that company with a competitive advantage over rivals that do not use such procedures or technologies. A company that develops pollution-preventing process modifications may be reluctant to disclose those modifications and sacrifice the competitive advantage those modifications provide.

223. 42 U.S.C.A. § 13106(e) (West Supp. 1991). The Act provides that the trade secret provisions of section 322 of SARA apply to data reported under the Pollution Prevention Act. *Id.*

224. SARA, 42 U.S.C. § 11042 (1988).

protection for a broader scope of information,[225] and stricter penalties are provided for disclosure of confidential information, those measures should be adequate to protect legitimate trade secrets and confidential matters. At all times, though, industries' interest in preventing disclosure of trade secrets and confidential information must be weighed against the paramount interest of EPA and the public in gathering and disseminating information about successful pollution prevention methods and ensuring that industry is effectively implementing pollution prevention measures.

E. *Funding*

In order to combat ignorance among industry managers, the Pollution Prevention Act requires EPA to establish a national clearinghouse for the dissemination of information on pollution prevention[226] and to provide grants for states to implement technical assistance programs for pollution prevention.[227] Technical assistance and technology transfer play a central role in the Act. However, in order to implement the programs envisioned by the Pollution Prevention Act, an adequate and reliable source of funding must be found. The funding provided in the Pollution Prevention Act is insufficient to fully implement the technical assistance and technology transfer programs established by the Act.

The Pollution Prevention Act authorizes appropriations of $8 million per year to EPA for the 1991, 1992, and 1993 fiscal years for state grant programs, and an additional $8 million per year for

225. Information should only be protected if it is truly a trade secret or confidential information. While the trade secret provisions of SARA incorporated into the Pollution Prevention Act do not establish standards for determining whether information qualifies as a trade secret, SARA requires EPA to prescribe regulations to implement those provisions. *Id.* EPA could clarify the boundaries of legitimate trade secrets through regulation. Oregon and Massachusetts have particularly strong limitations on what type of information can be protected as a trade secret. *See* MASS. GEN. LAWS ANN. ch. 211, § 20 (West Supp. 1991); OR. REV. STAT. ANN. § 192.501 (Supp. 1990).

226. 42 U.S.C.A. § 13105 (West Supp. 1991).

227. *Id.*, § 13104. State agencies play a vital role in the dissemination of information on pollution prevention to industry because of their direct contact with industry and their familiarity with local factors that may impact on the ability of industries to effectively implement various pollution prevention practices or technologies. STATE/EPA COMMITTEE, *supra* note 34, at 50. While EPA may provide funding for 50% of the cost of the state programs, *see* Pollution Prevention Act § 6605(c), 42 U.S.C.A. § 13104(c) (West Supp. 1991), the legislative history of the Act makes it clear that Congress intended that state programs should become self-sufficient. S. REP. No. 526, *supra* note 12, at 6.

the Agency's other duties under the Act, including the establishment of the national pollution prevention clearinghouse.[228] In a 1987 report, the OTA recommended a commitment of $255 million by EPA over a five year period to establish an effective grants program for waste reduction programs.[229] Following the initial five year period, the OTA report speculated that a commitment of $10 million per year by EPA would be adequate to maintain the level of pollution prevention created by the five year program.[230] According to OTA's calculations, therefore, $8 million per year is insufficient to establish effective state programs to disseminate pollution prevention information.[231]

The source of funding under the Pollution Prevention Act is also inadequate. General appropriations are not a reliable funding mechanism for the potentially costly programs established by the Pollution Prevention Act.[232] A tax or fee imposed on the conduct that the Pollution Prevention Act intends to discourage would be a more effective alternative for funding the programs.[233] For instance, if pollution prevention is viewed in the broad sense suggested in this Article, federal legislation could impose taxes on toxics use, waste generation, and releases of toxic pollutants.[234] Such taxes would provide funding for pollution

228. 42 U.S.C.A. § 13109 (West Supp. 1991).

229. OTA II, *supra* note 31, at 14. The report suggested that EPA could reallocate 2% of its operating budget (approximately $30 million) in the first year of the program, and increase its commitment to 3% in the second year and 4% over the third, fourth, and fifth years. *Id.* at 52. OTA forecast that approximately 80 to 90% of the funds would be used for state grants, making technical assistance available to nearly 100,000 companies at the end of the five years, while it was available to only a small number of companies prior to the program's inception. *Id.* OTA envisioned the $255 million as seed money for the state programs. *Id.* Furthermore, OTA predicted that increased tax revenues from corporate profits resulting from waste management savings due to the program would be greater than the cost of the grants. *Id.* at 54. In effect, the grant program would pay for itself.

230. *Id.* at 53.

231. Massachusetts alone spends $5.2 million per year on pollution prevention programs. NELC, *supra* note 4, at 15.

232. In evaluating state toxic use reduction laws, the National Environmental Law Center and the Center for Policy Alternatives deemed general appropriations to be the least reliable method used by states to fund their pollution prevention programs. NELC, *supra* note 4, at 15.

233. Several states fund their toxics use reduction programs through the imposition of dedicated fees or taxes. *See* ME. REV. STAT. ANN. tit. 38, § 2311 (West Supp. 1990); MASS. GEN. LAWS ANN. ch. 21I, § 19 (West Supp. 1991); MINN. STAT. ANN. § 115D.12 (West Supp. 1991).

234. Pollution taxes have been considered by Congress in the past. A bill introduced by Rep. Thomas Lukens in the 101st Congress, would have established a tax on virgin materials to encourage recycling. H.R. 3737, 101st Cong., 1st Sess. (1989). Similarly, taxes on

prevention programs as long as the problems that those programs were designed to combat persisted.

F. *Role of Citizens and Employees*

Another aspect of pollution prevention that is not adequately addressed in the Pollution Prevention Act is the role of citizens and employees in implementation and enforcement. Public accountability can be a useful tool to force industry to implement pollution prevention measures.[235] Additionally, since citizens and employees are intimately affected by pollution, they have an interest in forcing industry to reduce potential hazards and risks to their health and the environment by preventing the generation of pollution.[236]

Citizens and employees cannot be effectively involved in the implementation and enforcement of federal pollution prevention legislation unless two prerequisites are satisfied. First, citizens and employees must be provided with coherent, meaningful information about the efforts undertaken by industries to meet pollution prevention requirements.[237] The Pollution Prevention Act includes several provisions aimed at improving the quality and clarity of data on pollution prevention and improving the dissemination of that data.[238] Thus, the Act appears to satisfy the first requirement.

hazardous waste sent to land disposal sites were considered in Superfund reauthorization legislation as a method of encouraging waste reduction. OTA II, *supra* note 31, at 43. Finally, the proposed Clean Water Act reauthorization introduced by Sen. Max Baucus includes a provision that provides funding for the establishment of effluent guidelines and new source performance standards by assessing fees on sources within the categories of sources proposed to be regulated, based on the volume and toxicity of discharges by the source. S. 1081, 102d Cong., 1st Sess. § 7 (1991).

235. *See supra* note 38 and accompanying text.

236. NELC, *supra* note 4, at 8.

237. *See* STATE/EPA COMMITTEE, *supra* note 34, at 51.

238. For instance, the Act requires EPA to develop improved methods for collecting data under federal environmental laws and making it available to the public, to establish an advisory panel of technical experts to advise the Administrator on the collection and dissemination of data, and to establish a source reduction clearinghouse, which can be accessed by the public for entry and retrieval of information. The Act also ensures that data included in source reduction and recycling reports under the Act is made publicly available, subject to trade secret and confidential information limitations. 42 U.S.C.A. §§ 13103(b)(4), 13103(b)(8), 13105, 13106(e) (West Supp. 1991).

Pursuant to its pollution prevention strategy, EPA is working to further improve the quality of pollution prevention data and to give concrete meaning to the data. 56 Fed. Reg. 7856 (1991). The Agency is endeavoring to refine the data so that the public may use it as "ecological indicators." *Id.*

Second, legislation must specifically empower citizens and employees to act upon the information that they receive about pollution prevention efforts by industry. While boycotts and strikes are often available to citizens and employees, legislation should empower citizens and employees to take specific actions to implement or enforce provisions of federal pollution prevention legislation. For instance, as the pollution prevention responsibilities of industries and businesses expand beyond mere reporting to include planning and implementation of mandatory pollution prevention measures specified by EPA, citizens and employees should be authorized to bring citizen suits to ensure that industries and businesses comply with the expanded pollution prevention requirements.[239] Pollution prevention legislation in some states empowers local citizen groups to play a role in preparing pollution prevention plans for industries.[240] The Pollution Prevention Act, on the other hand, does not empower citizens and employees to play a significant role in fostering pollution prevention.

Due to their familiarity with processes and technologies used by industrial facilities, employees are uniquely situated to assist employers in complying with pollution prevention requirements and identifying pollution prevention opportunities. Employees are also capable of aiding the federal government in enforcing the Act when employers fail to comply with pollution prevention requirements. Specific whistleblower protection provisions should be added to the Pollution Prevention Act to encourage employees to fearlessly implement and enforce the Act.

239. The Pollution Prevention Act merely authorizes citizen suits against persons who fail to complete or submit source reduction and recycling reports. 42 U.S.C.A. § 13106(c) (West Supp. 1991). The Act provides that section 326 of SARA applies to the reporting requirements under the Pollution Prevention Act. *Id.* Section 326 of SARA says that "any person may commence a civil action on his own behalf against . . . [a]n owner or operator of a facility for failure to . . . complete and submit a toxic chemical release form." 42 U.S.C. § 11046 (a)(1)(A)(iv) (1988).

240. *See* MASS. GEN. LAWS ANN. ch. 211, § 18(B) (West Supp. 1991); MINN. STAT. ANN. § 115D.08.2 (West Supp. 1991).

G. *Goals*

In contrast to many state laws,[241] the Pollution Prevention Act does not establish numerical goals for pollution reduction.[242] Congress should have included national pollution prevention goals in the Act. The advantage of including national pollution prevention goals in the form of a legislative policy statement is that the goals, while not individually enforceable, indicate the nation's level of commitment to pollution prevention and provide pollution prevention targets for government agencies and private industries to strive toward.[243]

Mandatory site-specific goals, another alternative, pose implementation problems that are not presented by national goals. The greatest obstacle to mandatory, site-specific pollution prevention goals at present is the lack of uniform methods for measuring pollution prevention.[244] If pollution prevention cannot be measured, mandatory goals to achieve specific levels of pollution prevention are meaningless. The concept of mandatory, site-specific pollution prevention goals should not, however, be abandoned.[245] By requiring EPA to establish standard methods of measuring pollution prevention,[246] and to identify measurable pollution prevention goals and timetables for meeting those goals,[247] the Pollution Prevention Act itself may be laying the

241. *See* ME. REV. STAT. ANN. tit. 38, §§ 2303-04 (West Supp. 1990); MASS. GEN. LAWS ANN. ch. 21I, § 1 (West Supp. 1991); WASH. REV. CODE ANN. § 70.95C.010 (West Supp. 1991).

242. The Act does, however, require EPA "to identify, where appropriate, measurable goals for pollution prevention." 42 U.S.C.A. § 13103(b)(6) (West Supp. 1991).

243. NELC, *supra* note 4, at 21.

244. *See* OTA, *supra* note 9, at 20; STATE/EPA COMMITTEE, *supra* note 34, at 49. *See also supra* notes 61-63 and accompanying text.

245. In its 1986 report, OTA suggested a less stringent variation of mandatory reduction goals. OTA, *supra* note 9, at 55. In that report, OTA suggested that EPA establish "soft" waste reduction targets for specific industrial processes or wastes, and authorize persons to offer justifications for noncompliance based on technological or economic factors, or to offer schedules for compliance. *Id.* Since the targets would be "soft," EPA could spend less time, money, and resources than it would on mandatory performance standards or throughput requirements. However, OTA acknowledged that EPA would still be required to expend the money and resources to develop defensible waste reduction targets. *Id.* Setting the reduction targets too high would result in administrative nightmares due to the flood of requests for noncompliance or altered compliance schedules, while setting the level too low would not result in sufficient amounts of waste reduction. *Id.*

246. 42 U.S.C.A. § 13103(b)(1) (West Supp. 1991).

247. *Id.* § 13103(b)(6).

foundation for the future imposition of mandatory pollution prevention goals for specific facilities or processes.

H. *Regulatory Incentives*

Another concept that is gaining favor with EPA and Congress, but was not included in the Pollution Prevention Act, is the concept of "regulatory incentives." To the extent that EPA is authorized to do so under existing statutes, the Agency has begun to modify its administrative practices to encourage pollution prevention.[248] Future legislation could expand EPA's authority to use the administrative process to encourage pollution prevention.

Both EPA and OTA have explored the possibility of authorizing the Agency to waive or modify, by rule or through individual permits, pollution control requirements of the environmental protection statutes in exchange for the implementation of pollution prevention practices or technologies.[249]

OTA argues that trade-offs encourage more pollution prevention than a combination of mandatory pollution control and voluntary pollution prevention measures because the existing statutory and regulatory system does not provide sufficient incentives for voluntary pollution prevention.[250] The waiver or modification of pollution control requirements, OTA claims, provides the necessary economic incentives. Additionally, OTA reasons, since the existing pollution control system has had limited success in achieving environmental protection, these regulatory concessions would not necessarily sacrifice environmental protection. OTA acknowledges that the trade-off approach opens a large po-

248. *See supra* notes 126-28 and accompanying text.

249. *See* OTA II, *supra* note 31, at 51; 56 Fed. Reg. 7856, 7859 (1991). In particular, OTA praised the economic benefits of such an approach in improving international competitiveness of industry. OTA II, *supra* note 31, at 52. Historically, OTA noted, other countries have been more successful than the United States in encouraging economic competitiveness of industry and pollution prevention through regulatory flexibility. *Id.*

250. OTA argues that the existing regulatory system does not necessarily encourage persons to engage in pollution prevention, through waste reduction, for a variety of reasons. OTA II, *supra* note 31, at 27. For instance, OTA argues that companies are more likely to install pollution control technologies to comply with pollution control requirements than to implement pollution prevention measures because they are more familiar with pollution control technologies than with pollution prevention; they believe that pollution control technologies can be made safe enough to minimize liabilities as much as pollution prevention; there is no technical support structure or reward for implementing pollution prevention; and there is a mistaken belief that no pollution prevention opportunities remain. *Id.* at 27-29.

tential loophole in environmental regulation under existing pollution control statutes,[251] but the approach does show promise. Some proposed RCRA reauthorization legislation wisely included provisions requiring EPA to explore and report to Congress on the benefits of using incentives to encourage pollution prevention.[252]

V. Conclusion

The pure pollution control approach that has dominated environmental protection legislation and regulations over the past two decades is inadequate to address the global and systemic environmental threats that face the planet. In order to overcome the nation's environmental problems, Congress and EPA must shift their regulatory focus from reaction to proaction. Pollution prevention measures must be implemented wherever possible to supplement or replace pollution control measures.

Several states have already enacted aggressive pollution prevention legislation in the face of federal inactivity. Such legislation should prove to be instructive as Congress begins to appreciate the merits of a refocused environmental protection effort and incorporate pollution prevention requirements into federal law. The Pollution Prevention Act does not aggressively refocus environmental protection regulation from pollution control to pollution prevention. Indeed, the Act is a very modest piece of legislation in terms of what it can achieve on its own. However, the Act can make a difference if Congress and EPA build on the framework that it creates, and impose new and expanded pollution prevention requirements through regulations and additional legislation.

In the short term, Congress should enact legislation that requires mandatory pollution prevention planning for manufacturing industries and for a wide range of other activities, including agriculture, mining, and wastewater treatment.[253] Recent federal legislation proposed to reauthorize the Clean Water Act includes provisions addressing pollution prevention by wastewater treatment facilities. The overall focus of pollution prevention legisla-

251. OTA notes that "[v]alid concerns arise about this policy creating opportunities to avoid or escape regulatory compliance." OTA II, *supra* note 31, at 51.

252. S. 976, 102d Cong., 1st Sess. § 206 (1991).

253. EPA identified these activities in its pollution prevention strategy as candidates for future pollution prevention initiatives. 56 Fed. Reg. at 7850.

tion should be expanded beyond manufacturing industries, and definitions used under the Act should be clarified and expanded to encourage the maximum amount of pollution prevention achievable.

Pollution prevention reporting provisions should be expanded and refocused to ensure that EPA obtains the most accurate and detailed information available regarding currently available pollution prevention opportunities. Citizens and employees should be given greater access to information on pollution generation and prevention and should be given more power to enforce pollution prevention requirements. National goals should be articulated so as to define the nation's commitment to pollution prevention. In order to exhibit its commitment to this philosophical shift to pollution prevention, Congress should provide adequate funding for a federal pollution prevention program through dedicated fees or taxes. All of these measures could be layered quite naturally upon the requirements imposed by the Pollution Prevention Act. EPA may actually make some of these improvements through its regulations implementing the Act.

In the longer term, as the strengths and weaknesses of such measures are more fully understood, Congress should authorize EPA to impose mandatory pollution prevention requirements and to use regulatory incentives to encourage pollution prevention. Much remains to be done before pollution prevention becomes the national environmental practice that EPA and Congress envision that it will become. To the extent that Congress and EPA build upon the framework created by the Pollution Prevention Act, the Act is a useful first step from reaction to proaction.

SEC. 6601. SHORT TITLE.

Pollution Prevention Act of 1990.
42 USC 13101 note.

This subtitle may be cited as the "Pollution Prevention Act of 1990".

SEC. 6602. FINDINGS AND POLICY.

42 USC 13101.

(a) FINDINGS.—The Congress finds that:

(1) The United States of America annually produces millions of tons of pollution and spends tens of billions of dollars per year controlling this pollution.

(2) There are significant opportunities for industry to reduce or prevent pollution at the source through cost-effective changes in production, operation, and raw materials use. Such changes offer industry substantial savings in reduced raw material, pollution control, and liability costs as well as help protect the environment and reduce risks to worker health and safety.

(3) The opportunities for source reduction are often not realized because existing regulations, and the industrial resources they require for compliance, focus upon treatment and disposal, rather than source reduction; existing regulations do not emphasize multi-media management of pollution; and businesses need information and technical assistance to overcome institutional barriers to the adoption of source reduction practices.

(4) Source reduction is fundamentally different and more desirable than waste management and pollution control. The Environmental Protection Agency needs to address the historical lack of attention to source reduction.

(5) As a first step in preventing pollution through source reduction, the Environmental Protection Agency must establish a source reduction program which collects and disseminates information, provides financial assistance to States, and implements the other activities provided for in this subtitle.

(b) POLICY.—The Congress hereby declares it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

SEC. 6603. DEFINITIONS.

42 USC 13102.

For purposes of this subtitle—

(1) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(2) The term "Agency" means the Environmental Protection Agency.

(3) The term "toxic chemical" means any substance on the list described in section 313(c) of the Superfund Amendments and Reauthorization Act of 1986.

(4) The term "release" has the same meaning as provided by section 329(8) of the Superfund Amendments and Reauthorization Act of 1986.

(5)(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 integral to and necessary for the production of a product or the providing of a service.

(6) The term "multi-media" means water, air, and land.

(7) The term "SIC codes" refers to the 2-digit code numbers used for classification of economic activity in the Standard Industrial Classification Manual.

42 USC 13103.

SEC. 6604. EPA ACTIVITIES.

(a) AUTHORITIES.—The Administrator shall establish in the Agency an office to carry out the functions of the Administrator under this subtitle. The office shall be independent of the Agency's single-medium program offices but shall have the authority to review and advise such offices on their activities to promote a multi-media approach to source reduction. The office shall be under the direction of such officer of the Agency as the Administrator shall designate.

(b) FUNCTIONS.—The Administrator shall develop and implement a strategy to promote source reduction. As part of the strategy, the Administrator shall—

(1) establish standard methods of measurement of source reduction;

(2) ensure that the Agency considers the effect of its existing and proposed programs on source reduction efforts and shall review regulations of the Agency prior and subsequent to their proposal to determine their effect on source reduction;

(3) coordinate source reduction activities in each Agency Office and coordinate with appropriate offices to promote source reduction practices in other Federal agencies, and generic research and development on techniques and processes which have broad applicability;

(4) develop improved methods of coordinating, streamlining and assuring public access to data collected under Federal environmental statutes;

(5) facilitate the adoption of source reduction techniques by businesses. This strategy shall include the use of the Source Reduction Clearinghouse and State matching grants provided in this subtitle to foster the exchange of information regarding source reduction techniques, the dissemination of such information to businesses, and the provision of technical assistance to

businesses. The strategy shall also consider the capabilities of various businesses to make use of source reduction techniques;

(6) identify, where appropriate, measurable goals which reflect the policy of this subtitle, 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;

(8) establish an advisory panel of technical experts comprised of representatives from industry, the States, and public interest groups, to advise the Administrator on ways to improve collection and dissemination of data;

(9) establish a training program on source reduction opportunities, including workshops and guidance documents, for State and Federal permit issuance, enforcement, and inspection officials working within all agency program offices.

(10) identify and make recommendations to Congress to eliminate barriers to source reduction including the use of incentives and disincentives;

(11) identify opportunities to use Federal procurement to encourage source reduction;

(12) develop, test and disseminate model source reduction auditing procedures designed to highlight source reduction opportunities; and

(13) establish an annual award program to recognize a company or companies which operate outstanding or innovative source reduction programs.

SEC. 6605. GRANTS TO STATES FOR STATE TECHNICAL ASSISTANCE PROGRAMS. 42 USC 13104.

(a) GENERAL AUTHORITY.—The Administrator shall make matching grants to States for programs to promote the use of source reduction techniques by businesses.

(b) CRITERIA.—When evaluating the requests for grants under this section, the Administrator shall consider, among other things, whether the proposed State program would accomplish the following:

(1) Make specific technical assistance available to businesses seeking information about source reduction opportunities, including funding for experts to provide onsite technical advice to business seeking assistance and to assist in the development of source reduction plans.

(2) Target assistance to businesses for whom lack of information is an impediment to source reduction.

(3) Provide training in source reduction techniques. Such training may be provided through local engineering schools or any other appropriate means.

(c) MATCHING FUNDS.—Federal funds used in any State program under this section shall provide no more than 50 per centum of the funds made available to a State in each year of that State's participation in the program.

(d) EFFECTIVENESS.—The Administrator shall establish appropriate means for measuring the effectiveness of the State grants made under this section in promoting the use of source reduction techniques by businesses.

(e) INFORMATION.—States receiving grants under this section shall make information generated under the grants available to the Administrator.

42 USC 13105.

SEC. 6606. SOURCE REDUCTION CLEARINGHOUSE.

(a) AUTHORITY.—The Administrator shall establish a Source Reduction Clearinghouse to compile information including a computer data base which contains information on management, technical, and operational approaches to source reduction. The Administrator shall use the clearinghouse to—

(1) serve as a center for source reduction technology transfer;

(2) mount active outreach and education programs by the States to further the adoption of source reduction technologies; and

(3) collect and compile information reported by States receiving grants under section 6605 on the operation and success of State source reduction programs.

(b) PUBLIC AVAILABILITY.—The Administrator shall make available to the public such information on source reduction as is gathered pursuant to this subtitle and such other pertinent information and analysis regarding source reduction as may be available to the Administrator. The data base shall permit entry and retrieval of information to any person.

42 USC 13106.

SEC. 6607. SOURCE REDUCTION AND RECYCLING DATA COLLECTION.

(a) REPORTING REQUIREMENTS.—Each owner or operator of a facility required to file an annual toxic chemical release form under section 313 of the Superfund Amendments and Reauthorization Act of 1986 ("SARA") for any toxic chemical shall include with each such annual filing a toxic chemical source reduction and recycling report for the preceeding [70] calendar year. The toxic chemical source reduction and recycling report shall cover each toxic chemical required to be reported in the annual toxic chemical release form filed by the owner or operator under section 313(c) of that Act. This section shall take effect with the annual report filed under section 313 for the first full calendar year beginning after the enactment of this subtitle.

(b) ITEMS INCLUDED IN REPORT.—The toxic chemical source reduction and recycling report required under subsection (a) shall set forth each of the following on a facility-by-facility basis for each toxic chemical:

(1) The quantity of the chemical entering any waste stream (or otherwise released into the environment) prior to recycling, treatment, or disposal during the calendar year for which the report is filed and the percentage change from the previous year. The quantity reported shall not include any amount reported under paragraph (7). When actual measurements of the quantity of a toxic chemical entering the waste streams are not readily available, reasonable estimates should be made based on best engineering judgment.

(2) The amount of the chemical from the facility which is recycled (at the facility or elsewhere) during such calendar year, the percentage change from the previous year, and the process of recycling used.

(3) The source reduction practices used with respect to that chemical during such year at the facility. Such practices shall be reported in accordance with the following categories unless

[70] So in original. Probably should be "preceding".

the Administrator finds other categories to be more appropriate:

(A) Equipment, technology, process, or procedure modifications.

(B) Reformulation or redesign of products.

(C) Substitution of raw materials.

(D) Improvement in management, training, inventory control, materials handling, or other general operational phases of industrial facilities.

(4) The amount expected to be reported under paragraph (1) and (2) for the two calendar years immediately following the calendar year for which the report is filed. Such amount shall be expressed as a percentage change from the amount reported in paragraphs (1) and (2).

(5) A ratio of production in the reporting year to production in the previous year. The ratio should be calculated to most closely reflect all activities involving the toxic chemical. In specific industrial classifications subject to this section, where a feedstock or some variable other than production is the primary influence on waste characteristics or volumes, the report may provide an index based on that primary variable for each toxic chemical. The Administrator is encouraged to develop production indexes to accommodate individual industries for use on a voluntary basis.

(6) The techniques which were used to identify source reduction opportunities. Techniques listed should include, but are not limited to, employee recommendations, external and internal audits, participative team management, and material balance audits. Each type of source reduction listed under paragraph (3) should be associated with the techniques or multiples of techniques used to identify the source reduction technique.

(7) The amount of any toxic chemical released into the environment which resulted from a catastrophic event, remedial action, or other one-time event, and is not associated with production processess during the reporting year.

(8) The amount of the chemical from the facility which is treated (at the facility or elsewhere) during such calendar year and the percentage change from the previous year. For the first year of reporting under this subsection, comparison with the previous year is required only to the extent such information is available.

(c) SARA PROVISIONS.—The provisions of sections 322, 325(c), and 326 of the Superfund Amendments and Reauthorization Act of 1986 shall apply to the reporting requirements of this section in the same manner as to the reports required under section 313 of that Act. The Administrator may modify the form required for purposes of reporting information under section 313 of that Act to the extent he deems necessary to include the additional information required under this section.

(d) ADDITIONAL OPTIONAL INFORMATION.—Any person filing a report under this section for any year may include with the report additional information regarding source reduction, recycling, and other pollution control techniques in earlier years.

(e) AVAILABILITY OF DATA.—Subject to section 322 of the Superfund Amendments and Reauthorization Act of 1986, the Administrator shall make data collected under this section publicly

available in the same manner as the data collected under section 313 of the Superfund Amendments and Reauthorization Act of 1986.

42 USC 13107.

SEC. 6608. EPA REPORT.

(a) BIENNIAL REPORTS.—The Administrator shall provide Congress with a report within eighteen months after enactment of this subtitle and biennially thereafter, containing a detailed description of the actions taken to implement the strategy to promote source reduction developed under section 4(b) and of the results of such actions. The report shall include an assessment of the effectiveness of the clearinghouse and grant program established under this subtitle in promoting the goals of the strategy, and shall evaluate data gaps and data duplication with respect to data collected under Federal environmental statutes.

(b) SUBSEQUENT REPORTS.—Each biennial report submitted under subsection (a) after the first report shall contain each of the following:

(1) An analysis of the data collected under section 6607 on an industry-by-industry basis for not less than five SIC codes or other categories as the Administrator deems appropriate. The analysis shall begin with those SIC codes or other categories of facilities which generate the largest quantities of toxic chemical waste. The analysis shall include an evaluation of trends in source reduction by industry, firm size; production, or other useful means. Each such subsequent report shall cover five SIC codes or other categories which were not covered in a prior report until all SIC codes or other categories have been covered.

(2) An analysis of the usefulness and validity of the data collected under section 6607 for measuring trends in source reduction and the adoption of source reduction by business.

(3) Identification of regulatory and nonregulatory barriers to source reduction, and of opportunities for using existing regulatory programs, and incentives and disincentives to promote and assist source reduction.

(4) Identification of industries and pollutants that require priority assistance in multi-media source reduction [71]

(5) Recommendations as to incentives needed to encourage investment and research and development in source reduction.

(6) Identification of opportunities and development of priorities for research and development in source reduction methods and techniques.

(7) An evaluation of the cost and technical feasibility, by industry and processes, of source reduction opportunities and current activities and an identification of any industries for which there are significant barriers to source reduction with an analysis of the basis of this identification.

(8) An evaluation of methods of coordinating, streamlining, and improving public access to data collected under Federal environmental statutes.

(9) An evaluation of data gaps and data duplication with respect to data collected under Federal environmental statutes.

In the report following the first biennial report provided for under this subsection, paragraphs (3) through (9) may be included at the discretion of the Administrator.

[71] So in original. Probably should be "reduction.".

SEC. 6609. SAVINGS PROVISIONS.

42 USC 13108.

(a) Nothing in this subtitle shall be construed to modify or interfere with the implementation of title III of the Superfund Amendments and Reauthorization Act of 1986.

(b) Nothing contained in this subtitle shall be construed, interpreted or applied to supplant, displace, preempt or otherwise diminish the responsibilities and liabilities under other State or Federal law, whether statutory or common.

SEC. 6610. AUTHORIZATION OF APPROPRIATIONS.

42 USC 13109

There is authorized to be appropriated to the Administrator $8,000,000 for each of the fiscal years 1991, 1992 and 1993 for functions carried out under this subtitle (other than State Grants), and $8,000,000 for each of the fiscal years 1991, 1992 and 1993, for grant programs to States issued pursuant to section 6605.

POLLUTION PREVENTION—ENVIRONMENTAL ASSISTANCE TO BUSINESS

P.A. No. 91-376

S.H.B. No. 6022

AN ACT PROVIDING ENVIRONMENTAL ASSISTANCE TO BUSINESS.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. It shall be the policy of the state to encourage the practice of pollution prevention, thereby reducing risks to the environment and the health of workers and consumers. As used in this section, pollution prevention includes the change of or use of production processes, practices, raw materials or products that reduce or eliminate the generation of by-products without creating new risks of concern or that protect natural resources through their conservation.

Cross References

Definitions relating to section, see 1991, P.A. 91-376, § 3.

Proceeds from bond sale to be used to carry out section, see, 1991, P.A. 91-376, § 8.

Library References

Words and Phrases

Words and Phrases (Perm.Ed.)

United States Code Annotated

Air pollution and control, see, 42 U.S.C.A. § 7401 et seq.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, see 42 U.S.C.A. § 9601 et seq.

National environmental policy, see 42 U.S.C.A. § 4321 et seq.

Sec. 2. (a) An environmental assistance revolving loan fund is created. The state, acting through the Connecticut development authority, may provide loans, lines of credit or loan guarantees to businesses from the environmental assistance revolving loan fund for the purpose of pollution prevention activities, as defined in section 3 of public act 91-376. For the purposes of this section, "business" means any business which (1) has gross revenues of less than twenty-five million dollars in its fiscal year ending prior to the application for any such loans, lines of credit or loan guarantees or (2) has fewer than one hundred fifty employees. The department of economic development shall charge and collect interest on each such loan or line of credit at a rate to be determined in accordance with procedures adopted pursuant to subsection (b) of this section. Payments made by businesses on all loans, lines of credit and loan guarantees shall be paid to the treasurer for deposit in the environmental assistance revolving loan fund.

(b) The Connecticut development authority shall adopt written procedures, in accordance with the provisions of section 1-121, to carry out the provisions of this section. Such procedures shall establish requirements for loans, guarantees, interest, repayment terms, security requirements, default and remedies and such other terms and conditions as the authority shall deem appropriate.

(c) Each such loan, guarantee or extension of credit shall be authorized by the Connecticut development authority or, if the authority so determines, by a committee of the authority consisting of the chairman and either one other member of the authority or its executive director, as specified in the determination of the authority. Any administrative expenses incurred in carrying out the provisions of this section, to the extent not paid by the authority or from moneys appropriated to the authority, shall be paid from the environmental assistance revolving loan fund. Payments from the environmental assistance revolving loan fund to businesses or to pay such administrative expenses shall be made by the treasurer upon certification by the chairman of the authority that the payment is authorized under the provisions of this section, under the applicable rules and regulations of the authority, and, if made to a business, under the terms and conditions established by the authority or the duly appointed committee thereof in authorizing the making of the loan or the extension of credit.

(d) On or before the second Wednesday after the convening of each regular session of the general assembly, the Connecticut development authority shall submit a report to the joint standing committee of the general assembly having cognizance of matters relating to commerce and exportation, which sets forth, for the year ending the preceding June thirtieth, the status of the fund, including the number and amount of loans made and the amount of loans outstanding.

(e) The authority shall not approve an application for a loan, line of credit or guarantee unless the Connecticut hazardous waste management service determines the applicant is eligible for such loan, line of credit or guarantee.

Cross References

Definitions relating to section, see 1991, P.A. 91-376, § 3.

Proceeds from bond sale to be used to carry out section, see, 1991, P.A. 91-376, § 8.

Library References

Words and Phrases

Words and Phrases (Perm.Ed.)

Sec. 3. As used in sections 1 to 3, inclusive, of public act 91-376:

(1) "Pollution prevention activities" means changes within a plant in production processes, product or raw materials that reduce, avoid or eliminate the generation of hazardous by-products per unit of product or the use of toxic or hazardous substances per unit of product without creating new risks of concern, but shall not be construed to promote or require (A) incineration, (B) transfer from one medium of exposure, release or discharge to another medium, (C) off-site or out-of-production process recycling or (D) methods of end-of-pipe treatment of toxic or hazardous substances as waste;

(2) "Production process" means a process, line method, activity or technique or combination or series thereof, which is integral to and necessary for the production of a product or the provision of a service; and

(3) "Hazardous by-product" means any nonproduct output, waste or residue, including fugitive emissions, of hazardous substance from a production process.

Cross References

Proceeds from bond sale to be used to carry out section, see, 1991, P.A. 91-376, § 8.

Sec. 4. (a) There is established within the Connecticut hazardous waste management service an office of environmental business assistance. Such office shall provide technical assistance to business in pollution prevention techniques and methods with a focus on pollution prevention activities. The office may provide technical assistance on recycling,

waste treatment and contained disposal when pollution prevention techniques are not applicable. In providing such assistance, the office shall give priority to the needs of small business and shall coordinate its activities with private and public sector initiatives in pollution prevention, including education.

(b) The Connecticut hazardous waste management service may adopt written procedures, in accordance with the provisions of section 1-121, establishing eligibility criteria applicable to loans, lines of credit or loan guarantees by the Connecticut development authority from the environmental assistance revolving loan fund established under section 2 of public act 91-376 for purposes of pollution prevention activities.

Cross References

Proceeds from bond sale to be used to carry out section, see, 1991, P.A. 91-376, § 8.

United States Code Annotated

Solid waste disposal, see, 42 U.S.C.A. § 6901 et seq.

Section 5. [See 1992 pocket part tables.]

Sec. 6. There is established within the department of environmental protection the office of business ombudsman. Such office shall provide information to businesses on environmental programs and requirements, including information on permits, and shall coordinate and serve as a liaison between the department and programs affecting businesses.

Sec. 7. The budget of each state agency receiving funds from the emergency spill response fund under subdivisions 5 to 12, inclusive, of subsection (d) of section 22a-451 shall specify the amount of expenditures to be paid from said emergency spill response fund.

Sec. 8. (a) For the purposes described in subsection (b) of this section, the state bond commission shall have the power, from time to time to authorize the issuance of bonds of the state in one or more series and in principal amounts not exceeding in the aggregate ten million dollars.

(b) The proceeds of the sale of said bonds, to the extent of the amount stated in subsection (a) of this section, shall be used by the Connecticut development authority for the purpose of sections 1 to 4, inclusive, of public act 91-376.

(c) All provisions of section 3-20, or the exercise of any right or power granted thereby which are not inconsistent with the provisions of this section are hereby adopted and shall apply to all bonds authorized by the state bond commission pursuant to this section, and temporary notes in anticipation of the money to be derived from the sale of any such bonds so authorized may be issued in accordance with said section 3-20 and from time to time renewed. Such bonds shall mature at such time or times not exceeding twenty years from their respective dates as may be provided in or pursuant to the resolution or resolutions of the state bond commission authorizing such bonds. None of said bonds shall be authorized except upon a finding by the state bond commission that there has been filed with it a request for such authorization, which is signed by or on behalf of the secretary of the office of policy and management and states such terms and conditions as said commission, in its discretion, may require. Said bonds issued pursuant to this section shall be general obligations of the state and the full faith and credit of the state of Connecticut are pledged for the payment of the principal of and interest on said bonds as the same become due, and accordingly and as part of the contract of the state with the holders of said bonds, appropriation of all amounts necessary for punctual payment of such principal and interest is hereby made, and the treasurer shall pay such principal and interest as the same become due.

Section 9. [See 1992 pocket part tables.]

Sec. 10. This act shall take effect July 1, 1991.

Approved June 25, 1991.

ENVIRONMENTAL PROTECTION—MERCURY BATTERIES—SOLE, DISPOSAL, RECYCLING

P.A. No. 91-377

S.H.B. No. 7216

AN ACT CONCERNING MERCURY BATTERIES.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. (a) As used in this section:

(1) "Retailer" means a person who engages in the sale of mercuric oxide batteries to a consumer, and

(2) "Wholesaler" means a person who engages in the sale of mercuric oxide batteries to a retailer in this state.

(b) Each retailer shall post a written notice at his place of business which shall advise consumers that used mercuric oxide batteries are hazardous waste requiring separate disposal and that the retailer is required to accept used mercuric oxide batteries from a consumer in accordance with the provisions of this section. The notice shall be posted in a location on or near the display area of such batteries and shall be reasonably prominent in size so as to carry out the provisions of this section.

(c) No retailer shall refuse to accept used mercuric oxide batteries from consumers and no wholesaler shall refuse to accept used mercuric oxide batteries from retailers or consumers. Any mercuric oxide batteries accepted by a retailer or a wholesaler shall be disposed of in accordance with the provisions of this section.

(d) No person shall dispose of a used mercuric oxide battery except by delivery to (1) a retailer, (2) a wholesaler, (3) a manufacturer of mercuric oxide batteries or (4) a recycling center.

(e) Any person who sells, or offers for sale, hearing aid devices or cameras which utilize mercuric oxide batteries shall provide to any purchaser of such a device a written notice that such device contains a mercuric oxide battery which requires disposal in accordance with this section.

Library References

Words and Phrases

Words and Phrases (Perm.Ed.)

Sec. 2. The commissioner of environmental protection, in consultation with the commissioner on aging, shall assist senior citizen centers in the establishment of a program for the collection of mercuric oxide batteries. The program shall provide for the safe disposal and recycling of such batteries and shall provide guidelines for containers suitable for the safe collection and disposal of such batteries.

Sec. 3. No person may sell or offer for sale an alkaline manganese battery manufactured on or after January 1, 1992, containing mercury in a concentration in excess of twenty-five one-thousandths of one per cent by weight of such battery.

Sec. 4. No person may sell or offer for sale a zinc-carbon battery manufactured on or after January 1, 1991, containing mercury in a concentration in excess of one part per million by weight of such battery.

See, also, 1991, P.A. 91-407, § 13, which amends 1991, P.A. 91-377, § 4.

Sec. 5. The commissioner of public works shall establish a pilot program for the collection and recycling of used fluorescent light bulbs in a state facility deemed suitable by him for such a program. On or before January 1, 1993, said commissioner shall

Editorial Note—

The 1992 amendment struck subsections (b) and (c), which were relative to use of tipping fees, audits and the upgrading of refuse burning facilities.

Acts 1987, ch. 584, §§ 48A and 49, provide as follows:

[No change in the first paragraph.]

[The second paragraph is amended to read as follows:]

Resource recovery facilities and other solid waste incinerators operating prior to January first, nineteen hundred and seventy-seven shall, no later than April thirtieth, nineteen hundred and ninety-one, operate with acid gas scrubbers or such other technology providing equal or greater protection to the public health and environment, as determined by the department. (Amended by 1989, 183, § 1, approved, with emergency preamble, June 29, 1989; 1990, 150, § 179, approved August 1, 1990, by § 383 effective July 1, 1990).

[No change in section 49.]

§ 7. Program for Recycling Leaves and Other Organic Matter; Composting.

Code of Massachusetts Regulations—

Agricultural composting program, 330 CMR 25.00.

Agricultural composting program, 330 CMR 25.00.

CHAPTER 21I

Massachusetts Toxics Use Reduction Act

SEC.

§ 1. Massachusetts Toxics Use Reduction Act; Citation.

This chapter shall be known and may be cited as the "Massachusetts Toxics Use Reduction Act."

History—

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—

Acts 1989, ch. 265, §§ 1 and 6, entitled "An act to promote reduced use of toxic and hazardous substances in the commonwealth", which was approved, July 24, 1989, effective 90 days thereafter, provide as follows:

Section 1. WHEREAS, the commonwealth of Massachusetts has suffered environmental and public and occupational health problems caused by releases of toxic and hazardous substances, it is hereby resolved that an effective way to promote industrial hygiene, worker safety, and protection of the environment and public health in the commonwealth is through reductions in the use of toxic and hazardous substances. To this end, the policy goals of this act shall be:

1. To establish for the commonwealth a statewide goal of reducing toxic waste generated by fifty percent (50%) by the year 1997 using toxics use reduction as the means of meeting this goal.

2. To establish toxics use reduction as the preferred means for achieving compliance with any federal or state law or regulation pertaining to toxics production and use, hazardous waste, industrial hygiene, worker safety, public exposure to toxics, or releases of toxics into the environment and for minimizing the risks associated with the use of toxic or hazardous substances and the production of toxic or hazardous substances or hazardous wastes;

3. To sustain, safeguard and promote the competitive advantage of Massachusetts businesses, large and small, while advancing innovation in toxics use reduction and management;

4. To promote reductions in the production and use of toxic and hazardous substances within the commonwealth, both through the programs established in section three of this act and through existing toxics-related state programs;

5. To enhance and strengthen the enforcement of existing environmental laws and regulations within the commonwealth; and.

6. To promote coordination and cooperation between all state departments and agencies administering toxics-related programs.

Section 6. The provisions of this act are severable, and if any of its provisions or an application thereof shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions or other applications thereof.

Code of Massachusetts Regulations—

Special provisions for trade secret claims pursuant to M.G.L. c. 211, 310 CMR 3.30.

§ 2. Definitions.

In this chapter, the following words shall have the following meanings:

"Agency," state agency.

"Byproduct," All nonproduct outputs of toxic or hazardous substances generated by a production unit, prior to handling, transfer, treatment or release.

"CERCLA," the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. S9601 et seq. (Public Law 92-500).

"Commissioner", the commissioner of the department of environmental protection.

"Council," the administrative council on toxics use reduction as established by section four of this chapter.

"Department", the department of environmental protection.

"Emission," a release of a toxic or hazardous substance to the environment or a transfer of a toxic or hazardous substance in waste to an off-site location.

"EPCRA," the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. S11001 et. seq. (Public Law 99-499).

"Facility," all buildings, equipment, structures, and other stationary items which are located on a single site or on contiguous or adjacent sites and which are owned or operated by the same person, or by any person who controls, is controlled by, or is under common control with, such person.

"Intermediate product," (a) in chemical manufacturing, any chemical substance that is consumed, in whole or in part, in chemical reactions used for the intentional manufacture of another chemical substance or mixture, or that is intentionally present for the purpose of altering the

rate of chemical reactions, other than a non-isolated intermediate as defined in this chapter; (b) in any other setting, any manufactured substance, compound, or product that is consumed, in whole or in part, in a chemical or physical process for the intentional manufacture of another product, becomes a component part of another product, or that is intentionally present for the purpose of aiding the manufacture of another product, other than a non-isolated intermediate as defined in this chapter.

"Large quantity toxic user," any toxics user who manufactures, processes or otherwise uses any toxic or hazardous substance in an amount the same as or greater than the applicable threshold amount in a calendar year at a facility.

"Manufacture," to produce, prepare, import or compound a toxic or hazardous substance.

"Mixture," means any combination of two or more chemicals, if the combination is not, in whole or in part, the result of a chemical reaction. However, if the combination was produced by a chemical reaction but could have been produced without a chemical reaction, it is also treated as a mixture. A mixture also includes any combination which consists of a chemical and associated impurities.

"Multi-media," having to do with all environmental media including, but not limited to, water, land and air and workplaces within facilities.

"Non-isolated intermediate," any intermediate which is not intentionally removed from the equipment in which it is manufactured, including any reaction vessel in which it is manufactured, equipment which is ancillary to the reaction vessel or similar equipment, and any equipment through which the intermediate passes during a continuous flow process, but not including tanks or other vessels or equipment in which the substance or product is stored after manufacture.

"Office," or "Office of Toxics Use Reduction Assistance and Technology," the Office of Toxics Use Reduction Assistance and Technology established pursuant to section seven of this chapter.

"Person," any individual, trust, firm, joint stock company, corporation, partnership, or association engaged in business or in providing service, excluding the Commonwealth of Massachusetts, and any authority, district, municipality or political subdivision of the Commonwealth of Massachusetts.

"POTW (publicly-owned treatment works) operators," holders of discharge permits for any devices and systems owned by the commonwealth or any of its political subdivisions and used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature to implement 33 U.S.C. S1281, or necessary to recycle or reuse water at the most economical cost under the estimated life of the works, including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment, and the appurtenances; extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities; any works,

including the land that will be an integral part of the treatment process (including land used for the storage of treated wastewater in land treatment systems prior to land application) or is used for ultimate disposal of residues resulting from such treatment; any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, or industrial waste, including waste in combined storm water and sanitary sewer systems.

"Process," the preparation of a toxic or hazardous substance, after its manufacture, for distribution in commerce:

(a) in the same form or physical state, or in a different form or physical state from, that in which it was received by the toxics user so preparing such substance; or

(b) as part of an article containing the toxic or hazardous substance.

"Product," a product, a family of products, an intermediate product, a family of intermediate products, or a desired results or a family of result.

"Production unit," a process, line, method, activity, or technique, or a combination or series thereof, used to produce a product.

"SIC code," the identification code assigned to facilities by the United States Department of Commerce.

"Small quantity toxics user," any toxics user who is not a large quantity toxics user.

"State agency," any agency or authority of the commonwealth as defined in section one of chapter thirty A of the General Laws.

"Threshold amounts," shall be initially established as the following:

(a) for those toxics users that manufacture or process a toxic or hazardous substance, as the terms "manufacture" and "process" are defined herein, the threshold amount for a toxic or hazardous substance shall be twenty-five thousand pounds each year at any one facility; and

(b) for those toxic users that otherwise use a toxic or hazardous substance, the threshold amount for a toxic or hazardous substance shall be ten thousand pounds each year at any one facility.

However, if the administrator of the United States Environmental Protection Agency sets a threshold quantity for facility reporting on a toxic or hazardous substance under Section 313 of EPCRA which is lower than a corresponding threshold amount specified in paragraph (a) or (b), the department shall change the corresponding threshold for that substance under this chapter to be the same as the federal threshold.

"Toxics user", any person who owns or operates any facility that manufactures, processes or otherwise uses any toxic or hazardous substance that is classified in SIC Codes ten through fourteen, inclusive, twenty through forty, inclusive, forty-four through fifty-one, inclusive, seventy two, seventy-three, seventy-five, or seventy-six.

"Toxic," toxic or hazardous.

"Toxic or hazardous substance," any chemical substance in a gaseous,

liquid or solid state which is identified on the toxic or hazardous substance list established pursuant to section nine of this chapter, but which will not include any chemical substance when it is (1) present in an article; (2) used as a structural component of a facility; (3) present in a product used for routine janitorial or facility grounds maintenance; (4) present in foods, drugs, cosmetics or other personal items used by employees or other persons at a facility; (5) present in a product used for the purpose of maintaining motor vehicles operated by a facility; (6) present in process water or non-contact cooling water as drawn from the environment or from municipal sources, or present in air used either as compressed air or as part of combustion; (7) present in a pesticide or herbicide when used in agricultural applications; or (8) present in crude, lube or fuel oils or other petroleum materials being held for direct wholesale or retail sale.

"Toxic or hazardous substance list," the list of toxic or hazardous substances established pursuant to section nine of this chapter.

"Toxics," toxic or hazardous substances.

"Toxics use reduction," in-plant changes in production processes or raw materials that reduce, avoid, or eliminate the use of toxic or hazardous substances or generation of hazardous byproducts per unit of product, so as to reduce risks to the health of workers, consumers, or the environment, without shifting risks between workers, consumers, or parts of the environment. Toxics use reduction shall be achieved through any of the following techniques:

1. Input substitution, which refers to replacing a toxic or hazardous substance or raw material used in a production unit with a non-toxic or less toxic substance;

2. Product reformulation, which refers to substituting for an existing end-product an end-product which is non-toxic or less toxic upon use, release or disposal;

3. Production unit redesign or modification, which refers to developing and using production units of a different design than those currently used;

4. Production unit modernization, which refers to upgrading or replacing existing production unit equipment and methods with other equipment and methods based on the same production unit;

5. Improved operation and maintenance of production unit equipment and methods which refers to modifying or adding to existing equipment or methods including, but not limited to, such techniques as improved housekeeping practices, system adjustments, product and process inspections, or production unit control equipment or methods; or

6. Recycling, reuse, or extended use of toxics by using equipment or methods which become an integral part of the production unit of concern, including but not limited to filtration and other closed loop methods.

However, toxics use reduction shall not include or in any way be inferred to promote or require incineration, transfer from one medium of release or discharge to other media, off-site or out-of-production unit

waste recycling, or methods of end-of-pipe treatment of toxics as waste.

"Trade secret," any formula, plan, pattern, process, production data, device, information, or compilation of information which is used in a toxics user's business, and which gives said toxics user an opportunity to obtain an advantage over competitors who do not know or use it.

"User segment," a set of no fewer than five toxics users who employ a similar production unit, as classified by the department pursuant to section three of this chapter.

"Toxics Use Reduction Institute," or "Institute," the Toxics Use Reduction Institute established pursuant to section six of this chapter.

History—

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Amended by 1990, 177, §§ 65 and 66, approved, with emergency preamble, Aug 7, 1990; 1991, 6, §§ 10, 11, approved March 22, 1991; by § 96(c), effective upon enactment.

Editorial Note—

See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

The 1990 amendment, in the definitions "Commissioner" and "Department", substituted "protection" for "quality engineering", in each instance.

The 1991 amendment, by § 10, rewrote the definition of "Toxics user", substituting "person" for "toxics user", following "hazardous substance", deleting "and", and changing the initial letters of the numbers appearing therein from capitalized to lower-cased, and by § 11, rewrote clause (4) of the definition of "Toxic or hazardous substance", substituting "persons" for "toxic users".

§ 3. Responsibilities of the Department.

In addition to any other requirements or authorities of this chapter, the department's duties shall include the following:

(A) The department shall identify all department requirements for reporting on chemical use, release and disposal, and to the maximum extent possible, shall standardize, consolidate and coordinate these reporting requirements to minimize unnecessary duplication.

(B) By January 1, 1991 the department shall, to the extent practicable, coordinate information about the manufacture, distribution, process, sale, storage, disposal, release or other use of toxics, including the inventory reporting requirement of section ten, on a computer system in order to provide reliable and accessible information across the commonwealth to aid in standardizing the inspection, enforcement and other activities of the commonwealth. The department shall also cooperate with and make this information readily available through computer connections and other means to the Office, the Institute, the environmental protection division of the department of the attorney general, and other state agencies and POTW operators.

(C) In order to facilitate the coordination of reporting requirements, the department is hereby authorized to seek unified reporting and enforcement authority from the United States Environmental Protection Agency on federal toxics laws and regulations, including but not limited to the Clean Air Act, 42 U.S.C. § 7401 et seq.; Federal Water Pollution Control Act, 33 U.S.C. § 1251 et seq.; Toxic Substances Control Act, 15

U.S.C. § 2601 et seq.; Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq.; CERCLA and any amendments thereto.

(D) The department shall develop and implement, by January 1, 1992, guidelines and regulations on inspections which (1) ensure that, where appropriate, inspections are multi-media in approach; (2) ensure that, where appropriate, the inspections are performed by teams of inspectors representing existing programs within the department; and (3) minimize duplication of inspection and enforcement efforts being conducted with other agencies.

(E) The department shall ensure that, to the maximum extent practicable, any toxics user found to be violating any law or standard for which the department has enforcement jurisdiction shall practice toxics use reduction in order to come into compliance with the violated law or standard.

(F) The department shall adopt, and may from time to time amend or repeal, rules and regulations which it deems necessary for the proper administration of this chapter and to protect the environment and public health, safety and welfare. As nearly as the department deems appropriate and practicable, regulations pertaining to reporting pursuant to section ten shall comport with and complement regulations adopted pursuant to section 313 of EPCRA.

(G) On or before January 1, 1990, the department shall issue guidelines concerning classification of production units in user segments according to similarities in products and processes. Such guidelines shall be based primarily on the logic and methodology of the product process codes developed for the Organic Chemicals, Plastics, and Synthetic Fibers ("OCPSF") effluent guidelines and pretreatment standards under the Federal Water Pollution Control Act ("FWPCA") as amended and, to the extent feasible and appropriate, on protocols and standards used by Massachusetts and others. Based on these guidelines, reports filed pursuant to section ten as of July 1, 1991, and further consideration of then existing classification systems and protocols, the Department shall on or before January 1, 1992 promulgate regulations establishing classifications for production units.

(H) The department annually shall compile, analyze and summarize the reports and plan summaries required by sections ten and eleven, to the extent available, and shall submit a report to the Council on the agency's findings regarding progress in and expected progress in toxics use reduction and emissions reduction in the commonwealth. A copy of said report shall be filed with the clerk of the House of Representatives and the clerk of the Senate.

(I) Personnel or authorized agents of the department may at all reasonable times enter into any premises, public or private, for the purpose of investigating any records, substance, condition, equipment, practice, or property relating to activities subject to regulation under this chapter. For the purposes of such entries no warrant shall be required provided, however, that upon demand by the owner or individual in control of such premises, a warrant authorizing such entry and inspection

shall be sought after such demand. A warrant may be sought by personnel or authorized agents of the department without such demand having been made. Any court, judge, justice or other officer authorized to issue warrants in criminal cases may issue such warrants.

(J) Unless indicated otherwise in this chapter, the department shall develop and make operational all programs and functions required of the department by January 1, 1992.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

Code of Massachusetts Regulations—
Special provisions for trade secret claims pursuant to M.G.L. c. 21I, 310 CMR 3.30.
Toxics use reduction, 310 CMR 50.01 et seq.

§ 4. Administrative Council on Toxics Use Reduction.

There is hereby established an administrative council on toxics use reduction. The council shall be composed of the secretary of the executive office of environmental affairs or his designee, the commissioner of the department or his designee, the secretary of the executive office of economic affairs or his designee, the director of the office of science and technology or his designee, the commissioner of the department of public health or his designee, the secretary of the executive office of labor or his designee, and an employee of the commonwealth appointed by the governor. The members of the council shall serve without additional compensation. The secretary of environmental affairs shall be the chairperson of the council and direct and coordinate the activities of the council. The council shall be deemed to be a government body for the purposes of, and shall be subject to, section eleven A and one-half of chapter thirty A of the general laws. The council shall have its own staff. In addition to any other requirements of this chapter, the council's duties shall include the following:

(A) By January 1, 1991, and on an annual basis thereafter, the council shall identify all federal or state laws or regulations pertaining to chemical production and use, hazardous waste, industrial hygiene, worker safety, public exposure to toxics, and releases of toxics into the environment. The council shall promote increased coordination of efforts to enforce these laws and regulations and also determine how state programs should be coordinated to promote most effectively toxics use reduction in the commonwealth.

(B) The council shall, by January 1, 1991, identify all state agency and POTW requirements for reporting on chemical or hazardous substance production, use; release, disposal, and worker exposure and to the maximum extent practicable shall make recommendations to said state agencies and POTW operators in order to standardize, consolidate and coordinate these reporting requirements to minimize unnecessary duplication and provide for up-to-date and consistent information about manufacturing, worker exposure, distribution, process, sale, storage, disposal,

release or other use of chemicals on a facility, regional and statewide basis.

(C) The council shall adopt, and from time to time amend or repeal, rules and regulations which it deems necessary for the proper administration of its responsibilities pursuant to this chapter.

(D) The council shall annually make policy recommendations in a report to the governor regarding toxics use reduction, the implementation of this act, including a detailed report of the expenditures made from the Toxic Use Reduction Fund, and the achievement of increased toxics use reduction, and shall file a copy of this report with the clerk of the House of Representatives and the clerk of the Senate.

(E) In order to promote and effect toxics use reduction, the council may comment on all proposed regulations pertaining to toxics production and use, hazardous waste, industrial hygiene, worker safety, public exposure to toxics, or releases of toxics into the environment prior to their promulgation and may provide an equal opportunity for such comment by the advisory board.

(F) The council may recommend to the Massachusetts advisory Board on Toxics Use Reduction the formation of ad hoc committees pursuant to section five (D) of this chapter.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

Code of Massachusetts Regulations—
Toxic use fee, 301 CMR 40.01, 40.02.

§ 5. Massachusetts Advisory Board on Toxics Use Reduction.

There is hereby established a Massachusetts Advisory Board on Toxics Use Reduction, hereinafter referred to as the advisory board. The advisory board shall be composed of the following fifteen individuals: the attorney general of the commonwealth or his designee; the executive director of the Massachusetts Water Resources Authority, or his designee; and including the following thirteen members of the general public: two individuals, each representing a statewide environmental organization; two individuals, each representing organized labor; four representatives of business in the commonwealth, including two representatives of small business; one representative of a water authority other than the Massachusetts Water Resources Authority; two members of the general public, one of whom shall be a citizen who has been active in a local toxics-related environmental organization; and two individuals, each representing a statewide health policy advocacy organization. The governor shall appoint the thirteen members of the general public. Four of the initial appointees shall serve for an initial term of one year. Four of the initial appointees shall serve for an initial term of two years. All other appointees shall serve three year terms. No member of the general public may be reappointed for more than two consecutive terms. The governor shall appoint one member of the advisory board to serve as

chairperson. The members of the advisory board shall serve without compensation, however, each member other than officials of the commonwealth shall be reimbursed for all reasonable expenses incurred in the performance of his duties, as authorized by the council. The advisory board shall be deemed to be a governmental body for the purposes of, and shall be subject to, section eleven A and one-half of chapter thirty A of the General Laws. The advisory board's responsibilities shall include, but not be limited to, the following:

(A) The advisory board shall fulfill its obligations and responsibilities to work with the council as described in this chapter.

(B) The advisory board shall provide a forum for discussion and deliberation on matters pertaining to the implementation of this chapter.

(C) The advisory board shall establish an annual governor's toxics use reduction award program to recognize outstanding individual and organizational public and private achievement in toxics use reduction.

(D) The advisory board shall, whenever it deems it necessary or propitious, or at the recommendation of the council, establish ad hoc committees including but not limited to members of the advisory board, to study and formulate recommendations on particular issues or problems that arise concerning the implementation of this chapter. The chairperson of the advisory board, subject to the approval of the majority of the advisory board, shall appoint members of ad hoc committees. Ad hoc committees shall be established to include representation from priority user segments.

History

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—

See [illegible]

There is hereby established a Toxics Use Reduction Institute at the University of Lowell, hereinafter referred to as the Institute. The Institute shall work in cooperation with other faculty, staff, students and programs of the university. The Institute shall submit to the council a set of operating guidelines including, but not limited to, the types of services, programs and priorities related to toxics use reduction which it will offer. The Institute shall establish cooperative programs with other public and private colleges and universities designed to augment the implementation of this chapter; provided, however, that any programs or curricula developed by any other public and private colleges and universities in cooperation with the Institute shall be subject to the approval of the council. The Institute shall be funded through the toxics use reduction fund established through section Two K (2K) of chapter twenty-nine of the General Laws. The Institute may establish fees, tuitions, or other financial charges for its programs. For the programs required under this act, these monies shall be deposited in the toxics use reduction fund established in section Two K (2K) of chapter twenty-nine of the General Laws. However, all monies appropriated to the

Institute from the toxics use reduction fund, or received by the Institute through additional grants, gifts, bequests, or contracts shall be administered through the research foundation established in section twenty-two of chapter seventy-five A of the General Laws.

Through such programs the Institute shall:

(A) Provide general information about and actively publicize the advantages of and developments in toxics use reduction, and the requirements of this chapter.

(B) Establish courses, seminars, conferences and other events, and reports, updates, guides and other publications, and other means of providing technical information for toxics users, and may be appropriate work in cooperation with the office.

(C) Develop and provide curriculum and training for higher education students and faculty on toxics use reduction.

(D) Engage in research, development and demonstration of toxics use reduction methods. Such research may include but not be limited to assessments of the impact of adopting such methods on the environment, public health and worker exposure, and assessments of the economic and employment impacts within affected firms or user segments.

(E) By July 1, 1991, develop, in consultation with the department, the office, the executive office of economic affairs, and the Science Advisory Board, a toxics use reduction planning program for individuals who wish to be certified as toxics use reduction planners. Programs may also be [illegible] shall be designed to train toxics use reduction planners to be qualified to assist toxics users in the development and implementation of current

[illegible] innovative technologies for toxics use reduction. The results of all such projects shall be available for use by the public. Information protected by trade secret protections as established in section twenty shall remain so protected.

(G) May assist in the training of inspectors and other key toxics personnel, if so requested by the department.

(H) Provide toxics use reduction training and assistance to citizens, community groups, workers, labor representatives, and local government boards and officials. This program shall at a minimum assist these individuals and groups in understanding and reviewing reporting requirements, toxics use reduction plan summaries, and citizen petition and enforcement activities, pursuant to this chapter.

(I) Shall take advantage of all available information from existing state and federal programs on toxics use reduction and pollution prevention.

(J) Shall conduct a detailed study on potential restrictions on the use of chemicals in the commonwealth. The study shall include, but not be limited to existing national and international experiences with restric-

tions; the social, environmental and economic costs and benefits of adopting chemical restrictions; the potential for restrictions in Massachusetts, and how a restriction program could be implemented. By January 1, 1993, the Institute shall present its findings on the study to the Council, which shall file a copy of the study with the clerk of the House of Representatives, the clerk of the Senate, and the joint committee on Natural Resources and Agriculture. The council shall hold a public hearing on the study. By January 1, 1995, the Institute shall present to the council a further study on the Massachusetts experience with this chapter, and how it relates to the issue of chemical restrictions. The council shall file a copy of the study with the clerk of the House of Representatives, the clerk of the Senate, and the joint committee on Natural Resources and Agriculture. The council shall hold a public hearing on the study.

There shall be a Science Advisory Board associated with the Institute consisting of eleven members appointed by the governor, three members shall be nominated by the secretary of the executive office of environmental affairs, three members shall be nominated by the director of the Institute, three members shall be nominated by the secretary of the executive office of economic affairs, one member shall be nominated by the secretary of the executive office of labor, and one member shall be nominated by the secretary of the executive office of human services. Four of the initial appointees shall serve for an initial term of one year, four of the initial appointees shall serve for an initial term of two years, and all other appointees shall serve for three year terms. No member shall serve for more than two consecutive terms. Each member must have appropriate academic or professional experience. The Institute shall consult with the Science Advisory Board on issues including, but not limited to, user segments, and additions and deletions to the list of chemicals, and may consult with the Science Advisory Board on other related matters. The members of the Science Advisory Board shall serve without compensation.

Unless otherwise noted all programs of the Institute described in this section shall be developed and operational by January 1, 1992.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 7. Office of Toxics Use Reduction Assistance and Technology.

In order to implement this chapter the Office of Toxics Use Reduction Assistance and Technology is established within the executive office of environmental affairs and shall provide, in addition to any other responsibilities in this act, the programs and responsibilities listed below:

(A) The office shall provide technical assistance to toxics users and small quantity toxics users to assist them in achieving toxics use reduction and in complying with the requirements of this chapter and the laws and regulations identified in section four. Provided, however, that office shall

establish criteria for prioritizing such assistance for users in priority user segments and to users which have been referred to the office by the department.

(B) The office may recommend to the council user segments for prioritization subject to the provisions of section fourteen of this chapter.

(C) The office shall engage in an outreach program to small businesses required to report and plan as a result of prioritization and shall assist first-time filers with reporting requirements and trade secret submissions.

(D) The office's activities, wherever feasible, shall be coordinated with private sector initiatives in toxics use reduction and waste prevention education and technical assistance.

(E) The office shall not make available to the department information it obtains in the course of providing technical assistance to a toxics user, unless:

(i) the toxics user agrees that such information may be available to the department; or

(ii) the information is public record information; or

(iii) the information pertains to an imminent threat to public health or safety, or to the environment; or

(iv) disclosure to the department is required by law.

Nothing in this section shall relieve any toxics user of any obligation to provide the department any notice or information required by any statute.

The office shall notify toxics users requesting technical assistance of these provisions.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 8. Responsibilities of All State Agencies.

In order to facilitate coordination of the implementation of this chapter with existing state and federal programs pertaining to toxics production and use, hazardous waste, industrial hygiene, worker safety, public exposure to toxics, or release of toxics into the environment, agencies of the commonwealth which administer such programs shall:

(A) review the programs and associated regulations of the agency and ascertain how toxics use reduction can be promoted and achieved;

(B) amend those programs or associated regulations, where feasible, so as to promote toxics use reduction as the preferred method for achieving the goals of such programs and submit to the council recommendations for coordinating toxics use reduction efforts with the programs specifically established by this chapter within the department, the office, and the Institute;

(C) by January 1, 1992, coordinate, to the extent feasible, reporting requirements and guidelines concerning the manufacture, use, or release of toxic or hazardous substances in a manner consistent with the recommendations for standardized, consolidated and coordinated state

reporting requirements developed by the council pursuant to section four (B) of this chapter;

(D) develop, on a biennial basis, a multi-media inspection manual and training program for all inspectors on multi-media team inspections related to toxics. Where feasible, inspector training shall include cross-training with other agencies that administer toxics-related inspections. Agencies may request that the Institute assist with the training of inspectors to carry out multi-media inspections.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 9. Toxic or Hazardous Substance List.

The toxic or hazardous substance list shall consist of:—

(A) As of January 1, 1990, and thereafter, the chemicals identified on the Toxic Chemical List established pursuant to Section 313 of EPCRA. Each year the council shall adjust the toxic or hazardous substance list to add or delete substances consistent with changes in said toxic chemical list.

(B) The council shall by regulation, add all of the chemicals listed pursuant to sections 101(14) and 102 of CERCLA. The council shall, by January 1, 1991, establish a schedule for the addition of said chemicals to the toxic or hazardous substance list which shall specify the chemicals to be added for the calendar year reporting periods of 1991, 1992 and 1993. No more than thirty-five percent of said chemicals shall be added for each of the first two reporting periods. Each year the council shall adjust the toxic or hazardous substance list to add or delete substances consistent with changes in the lists of chemicals established pursuant to sections 101(14) and 102 of CERCLA.

(C) For the calendar year reporting periods 1994 and beyond, the council may add to or delete additional chemicals from the list. No more than ten (10) such chemicals may be added for any one calendar year, and no more than ten (10) such chemicals may be deleted for any one calendar year. The Department and the Department of Public Health shall provide recommendations proposing additions or deletions. The council shall consult with the Institute on any such additions or deletions. Any such change in the list shall require a one hundred eighty-day notice before taking effect. Such chemicals added or deleted by the council shall not be affected by paragraphs a or b of this section.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.
Amended by 1992, 286, § 64, approved, with emergency preamble, Dec 23, 1992.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.
The 1992 amendment, revised the introductory paragraph by inserting at the end ":—".

§ 10. Annual Toxic or Hazardous Substance Report.

Each large quantity toxics user shall provide to the department for each

facility an annual report for each toxic or hazardous substance manufactured, processed, or otherwise used at that facility in amounts equal to or exceeding the applicable threshold amounts. In addition, large quantity toxics users shall submit a report for each toxic or hazardous substance manufactured or processed at that facility in an amount greater than or equal to ten thousand pounds, if the threshold amount as defined in section two for manufacturing or processing that substance exceeds ten thousand pounds. Reporting shall be expressed in terms of the mass of each toxic or hazardous substance manufactured, processed, or otherwise used. In reporting on each such toxic or hazardous substance, the large quantity toxics user shall report the total mass of the substance, whether in a pure form or contained in a mixture, subject to the establishment of *de minimis* levels of chemicals in a mixture by regulation of the department. Such reports for facilities in SIC Codes Twenty through Thirty-nine inclusive shall be submitted to the department on or before July 1, 1991, and annually thereafter on or before July 1. Such reports for facilities in SIC Codes Ten through Fourteen inclusive, Forty, Forty-four through Fifty-one inclusive, Seventy-two, Seventy-three, Seventy-five and Seventy-six shall be submitted to the department on or before July 1, 1992, and annually thereafter on or before July 1. All such reports shall contain data accounting for toxic or hazardous substances manufactured, processed or otherwise used during the preceding calendar year.

(A) The reports shall use reporting forms required by the regulations promulgated pursuant to section 313 of EPCRA. To the extent that information required by this section is not included in such forms, such information shall be submitted on supplemental forms established by the department by regulation promulgated no later than January 1, 1991, and modified thereafter as appropriate.

(B) Each report shall include the following facility information:

(1) The information required to be submitted under regulations promulgated pursuant to section 313 of EPCRA.

(2) The quantities of the toxic or hazardous substance at the facility which are: manufactured; processed; otherwise used; generated as byproduct prior to any handling, transfer, treatment or release; and shipped as or in product from the facility.

(C)(1) Each report shall also include for each production unit at the large quantity toxics user's facility in which the toxic or hazardous substance is manufactured, processed or otherwise used, the following information:

(a) the information necessary to identify the large quantity toxics user, the facility, the production unit and the toxic or hazardous substance;

(b) an indication of whether the toxic or hazardous substance was used in the production unit in amounts *(i)* greater than zero pounds and less than or equal to five thousand pounds; *(ii)* greater than five thousand pounds but less than or equal to ten thousand pounds; or *(iii)* greater than ten thousand pounds.

(c) the reporting base year, which shall be the later of *(i)* the first

calendar year for which the large quantity toxics user was or is required to file any information regarding the toxic or hazardous substance pursuant to this chapter or Section 313 of EPCRA or *(ii)* the first year for which the large quantity toxics user has full information necessary to document the information required under this subsection.

(d) a byproduct reduction index which shall be a number that is the result of the following equation: one hundred times ((A less B) divided by A), where A represents the quantity of toxics generated as byproduct per unit of product produced in the reporting base year, and B represents the quantity of toxics generated as byproduct per unit of product produced in the current reporting year.

(e) an emissions reduction index which shall be a number that is the result of the following equation: one hundred times ((A less B) divided by A), where A represents the quantity of emissions attributable to the production unit per unit of product produced in the reporting base year, and B represents the quantity of emissions attributable to the production unit per unit of product produced in the current reporting year.

(f) a matrix form on which the large quantity toxics user indicates the methods by which the increase in the byproduct reduction index was achieved for each production operation during the reporting year. On the horizontal axis of the matrix shall be listed the toxics use reduction techniques of: input substitution, product reformulation, production unit redesign, production unit modernization, improved operation and maintenance of production units, and recycling or reuse which is integral to the production unit, and the management technique of using byproduct as product. On the vertical axis of the matrix shall be listed: materials handling and storage, processing operations, and finished goods handling. The large quantity toxics user shall mark the intersection of a production operation row and a reduction or management technique column if during the reporting year implementation of that technique for that operation accounted for an increase of five or more points in the byproduct reduction index. In addition, the matrix shall contain another column listed "miscellaneous" on the horizontal axis. The large quantity toxics user shall mark the intersection of a product operation row and the miscellaneous column if during the reporting year implementation of two or more of the reduction or management techniques not otherwise marked for that row, together account for an increase of five or more points in the byproduct reduction index.

(2) For the information submitted under this subsection the large quantity toxics user shall maintain at the facility documentation which is necessary to substantiate the information submitted, including, but not limited to, documentation of the quantity of the toxic or hazardous substance used in each production unit and the quantity generated as byproduct by each production unit.

(D)(1) The following shall be exempted from the reporting requirements of this section:

(a) facilities with fewer than the equivalent of ten full-time employees;

(b) activities in laboratories, including quality control laboratories, to the extent and in the manner such activities are exempted from reporting in regulations promulgated pursuant to section 313 of EPCRA.

(2) The following shall be exempted from the reporting requirements of subsection (C) of this section:

(a) pilot plants and pilot production units;

(b) start-up production units for a time period equal to the shorter of either the time period from the date of initial operation until required operational efficiency is achieved, or two years from the date of initial operation.

(3) Facilities claiming the exemptions provided for in this subsection shall maintain on-site documentation supporting all exemption claims.

(E) In calculating, measuring, or estimating quantities of a toxic or hazardous substance to be reported under this section, large quantity toxics users shall report with the maximum accuracy that is feasible and practicable. Large quantity toxics users shall report quantities with accuracy to two significant digits.

(F) If the department discovers a deficiency in a report, the department shall allow the user ninety days from the date of notice of the deficiency to correct the deficiency unless the deficiency was intentional.

(G) A senior management official shall sign each report certifying its accuracy and completeness.

(H) The department shall make available and, to the extent practicable, shall require, reporting and recording of the report data via magnetic media.

(I) Pursuant to and consistent with the authority established under section fourteen, the department may require that small quantity toxics users in user segments designated as priority segments pursuant to that section, comply with part or all of the reporting requirements applicable to large quantity toxics users pursuant to this section.

(J) Any toxic user required to file a report with the United States Environmental Protection Agency pursuant to section 313 of EPCRA during the year 1990 shall file a copy of such report with the department on or before July 1, 1990.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

Code of Massachusetts Regulations—
Toxics use reduction, 310 CMR 50.01 et seq.

§ 11. Toxics Use Reduction Plans.

(A)(1) Large quantity toxics users shall by July 1, 1994, or by July 1 of the first subsequent year in which a report pursuant to section ten

is required, prepare and complete a toxics use reduction plan for each facility for which they are required to file a report in that year. The department shall, by January 1, 1991, specify criteria for acceptable plans according to the requirements of this section. In preparing plans, large quantity toxics users shall comply with the requirements of this section for those toxic or hazardous substances for which they are required to file reports for the previous calendar year.

(2) The plan shall include:

(a) a statement of facility-wide management policy regarding toxics use reduction; and

(b) a statement of the scope and objectives of the plan, including the planned reductions in facility-wide use and byproduct generation from the relevant base year for each covered toxic or hazardous substance during the next two years and during the next five years. The relevant base year shall be established in accordance with subsection (C)(1) *(c)* of section ten.

(3) The plan shall include for each production unit in which a covered toxic or hazardous substance is manufactured, processed or otherwise used:

(a) a comprehensive economic and technical evaluation of appropriate technologies, procedures and training programs for potentially achieving toxics use reduction for each covered toxic or hazardous substance;

(b) an analysis of current and projected toxics use, byproduct generation, and emissions;

(c) an evaluation of the types and amounts of covered toxic or hazardous substances used;

(d) an identification of the economic impacts of the use of each covered toxic or hazardous substance in the production unit, including, but not limited to, raw material and byproduct storage and handling costs, potential liability costs, and costs associated with regulation;

(e) an identification of each technology, procedure or training program to be implemented for the purposes of achieving toxics use reduction, the anticipated costs of implementation of each, and the anticipated savings expected due to each;

(f) a schedule for implementation of such technologies, procedures and training programs;

(g) for each covered toxic or hazardous substance a two-year and a five-year goal for the byproduct reduction index reported pursuant to section ten.

(B) Each toxics use reduction plan must be certified by a toxics use reduction planner as meeting the department's criteria for acceptable plans.

(C) Large quantity toxics users shall keep plans for a facility on the premises of that facility, and shall make them available on the premises to the department upon request.

(D) Large quantity toxics users shall update and recertify plans every two years by July 1 of the applicable year.

(E) Six months prior to the date when the initial plan or an update must be completed, each large quantity toxics user shall notify all of its employees of the requirements for the plan or update, identify the toxic or hazardous substances and production units for which a plan or update will be submitted, provide the criteria for plans specified by the department and solicit in the notice comments or suggestions from all employees on toxics use reduction options.

(F) Large quantity toxics users shall file a plan summary with the department on or before July 1 of the applicable year. Such summary shall include:

(1) a copy of the plan certification by a toxics use reduction planner.

(2) the goals contained in the plan as specified by subsections (A)(2) *(b)*

(3) for each production unit in which a covered toxic or hazardous substance is manufactured, processed or otherwise used, a matrix of the form required to be submitted pursuant to section ten. In completing the matrix, the large quantity toxics user shall mark the intersection of a production operation row and a technique column if the large quantity toxics user anticipates that during the next five years implementation of that technique for that operation is expected to account for an increase of five or more points in the byproduct reduction index for one or more covered toxic or hazardous substances.

(G) Pursuant to the authority established under section fourteen, the department may require that small quantity toxics users in user segments designated as priority segments pursuant to that section, must comply with part or all of the planning requirements applicable to large quantity toxics users established in this section.

(H) If the Department determines the plan or a plan summary is not in compliance with the requirements of this section, the Department shall allow the large quantity toxics user ninety days from the date of the notice of the deficiency to correct the deficiency unless the deficiency was intentional.

History—

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—

See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 12. Toxics Use Reduction Planners.

(A) In order to be a certified toxics use reduction planner, an individual must either (1) have satisfactorily completed a toxics use reduction planning program, developed pursuant to section six (E) of this chapter, and passed a uniform certification examination which the department shall prepare by January 1, 1992 and modify thereafter as appropriate, or (2) have at least two years of work experience in toxics use reduction activities. The department shall by January 1, 1991, after consultation with the Institute and the office, promulgate regulations implementing the requirements of this section.

(B) Any individual who satisfies the requirement of at least two years of work experience in toxics use reduction activities, but who has not satisfactorily completed a toxics use reduction planning program and passed the

uniform certification examination, shall only be certified as a toxics use reduction planner to engage in toxics use reduction activities in the facilities owned or operated by his employer.

(C) Certification shall be for not more than two years and shall be renewable for additional two year periods. For a certification to be renewed, a toxics use reduction planner must successfully complete continuing education instruction in toxics use reduction activities.

(D) The department may establish a fee to be assessed on any individual when such individual receives or renews his certification as a toxics use reduction planner pursuant to this section. Any such fees shall be deposited in the toxics use reduction fund established pursuant to section two K of chapter twenty-nine of the General Laws.

(E) Certification may be suspended or revoked by the department based on a finding of fraud, gross negligence in the certification of toxics use reduction plans, or other good cause.

History—

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—

See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 13. Statewide Reduction Goal.

(A) The goal of the commonwealth is to achieve by 1997, through toxics use reduction, a fifty percent (50%) reduction from 1987 quantities of toxic or hazardous byproducts generated by industry in the commonwealth of Massachusetts.

(B) The department shall compile annually the goals of all reduction plans submitted by toxics users. By January 1, 1995, the department shall complete a report comparing large quantity toxics user goals to the statewide goal and file a copy of the report with the council, the clerk of the Senate, the clerk of the House of Representatives, and the Joint Committee on Natural Resources and Agriculture.

History—

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—

See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 14. Prioritization of User Segments.

(A) Beginning on July 1, 1995, the council shall identify by regulation user segments which it considers to be priorities for achieving toxics use reduction, based on recommendations from the department and the office, and in consultation with the Institute. User segments shall include similar production units in all facilities regardless of threshold amounts. Important considerations for identifying priority user segments shall include:

(1) amounts of toxic or hazardous substances used by the user segment in the production units of concern and their toxicity;

(2) amounts of toxic or hazardous substances disposed of, discharged, or released to water, land, air or workplaces within facilities;

(3) the potential for current and future toxics use reduction and the technical and economic feasibility of such reduction;

(4) the need for improvement by the user segment in its toxics use reduction efforts; and

(5) the social, health, and economic benefits and costs to the commonwealth, its political subdivisions, workers, and large quantity and small quantity toxics users.

Consideration shall be given to the adequacy of the state's resources to effectively implement the prioritization of a user segment under subsections (D), (E) and (F).

(B) The council may designate no more than three priority user segments in any calendar year. There shall be at no time more than fifteen priority user segments.

(C) A priority designation shall expire upon the date five years after designation. Priority designation may be renewed in the manner set forth in subsection (A). Upon expiration of a priority designation, a toxics user in the user segment shall no longer be treated as being within a priority user segment for purposes of this chapter, except that applicable performance standards issued for the user segment or a specific toxics user shall remain in effect.

(D) Results of prioritization include:

(1) The department may refer toxics users in priority user segments to the office for assistance in achieving toxics use reduction;

(2) For toxics users in a priority user segment, the department may require one or more of the following:

(i) For facilities with fewer than the equivalent of ten full-time employees, reporting and planning on the priority production unit consistent with the requirements of sections ten and eleven;

(ii) For facilities that manufacture or process between ten thousand and twenty-five thousand pounds of a toxic or hazardous substance used in a priority production unit, reporting and planning on the priority production unit consistent with the requirements of sections ten and eleven, regardless of the number of employees;

(iii) For facilities that manufacture, process, or otherwise use under ten thousand pounds of a toxic or hazardous substance in a priority production unit, reporting the quantity of the substance manufactured, processed or otherwise used in that production unit in excess of a threshold established by the department, and maintaining back-up information for that quantity, regardless of the number of employees. In addition, the toxics user shall maintain and make available to the department on-site the quantity of that substance generated as byproduct per unit of product for that production unit for each applicable reporting calendar year.

(E) Facilities within a priority user segment may apply for toxics use reduction waivers pursuant to section seventeen.

(F) The department may set performance standards for priority user segments pursuant to section fifteen.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

Code of Massachusetts Regulations—
Toxics use reduction, 310 CMR 50.01 et seq.

§ 15. Performance Standards.

(A) The department may request authority from the council to establish, by regulation, a performance standard for a priority user segment on a segment-wide basis. Such authority shall only be granted if:

(1) A majority of toxics users in the user segment fall significantly below regional, national or international achievements of byproduct generated per unit of product based on reasonably proven, public domain technologies and/or industry practices; or

(2) A number of toxics users in the user segment fall significantly below a Massachusetts-based norm for byproduct generated per unit of product based on reasonably proven, public domain technologies and/or industry practices.

(B) Each performance standard issued under subsection *(a)* of this section shall require large quantity toxics users within the relevant user segment to achieve a level or set of levels of byproducts generated per unit of product. Any such level shall be based on reasonably proven, public domain technologies and/or industry practices applicable to that user segment.

(C) Each performance standard issued under subsection *(a)* of this section shall specify a reasonable time for compliance, not to exceed three years. Any production unit covered by a performance standard shall come into compliance to the extent economically feasible. The toxics user shall maintain onsite justification for any noncompliance with the standard, or shall apply to the department for a waiver of the standard based on a showing that the standard is not economically feasible for that user.

(D) The department may establish performance standards under this section for a specific toxics user within a priority segment after considering the toxics user's efforts to reduce byproduct and emissions and the potential effectiveness of referral for technical assistance and/or proposing changes in the toxics user's use reduction plan instead of establishing a performance standard, such consideration not being subject to adjudication. A standard shall be set through the issuance of an administrative order applicable to the toxics user, which may require a specified percent reduction of byproduct generated per unit of product which is cost-effective, economically and technically feasible to the toxics user and the technology for which is commercially available to the user segment. Such an administrative order shall specify a reasonable time for compliance. A toxics user for whom a performance standard is set through this administrative order mechanism may appeal said order through the adjudicatory hearing process set forth in chapter thirty A of the General Laws.

(E) Upon the date one year after issuance of a performance standard for a user segment, the department may apply to the council for authority to

extend the standard by regulation to small quantity toxics users within the relevant user segment.

(F) A production unit otherwise covered by a performance standard shall be exempt from such standard if compliance would adversely affect the toxics user's ability to produce its product in conformance with product specifications of the United States Food and Drug Administration, Department of Defense or any other federal agency.

(G) Nothing in this section shall diminish the existing authority of the department pursuant to any statute to establish by regulation, permit, license, or order treatment technology standards, emission or discharge limits, operation and maintenance requirements, or management practices for abating, controlling or preventing a release or threat of release of toxic or hazardous substances to the environment.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 16. Improved Enforcement of Toxics Laws.

Except where otherwise specifically provided, whenever it appears to the department that there has been a violation of this chapter, or any regulation or approval issued or adopted hereunder, the department may refer the toxics user to the office for technical assistance, issue administrative orders requiring compliance with the applicable requirement, or issue an administrative penalty pursuant to the provisions of section sixteen of chapter twenty-one A.

Without limiting any other authority available to the department pursuant to any statute, the department may order a toxics user who violates any standard limiting a release of toxic or hazardous substances to the environment, or a threat of such release, to prepare for that production unit at which the violation occurred a toxics use reduction plan certified by a toxics use reduction planner demonstrating maximum toxics use reduction opportunities available to that user, where (i) the violation causes or threatens to cause significant harm to the environment or to public health or safety, or *(ii)* the toxics user has previously violated any standard limiting a release of toxic or hazardous substances to the environment, or a threat of such release.

Any toxics user in violation of any requirement of this chapter, or any regulation or approval issued or adopted hereunder, may apply to the department for a toxics use reduction waiver pursuant to section seventeen.

Nothing in this section shall in any manner diminish or condition any authority conferred on the department by any other statute.

History—
Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—
See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 17. Toxics Use Reduction Waiver.

A toxics user may petition the department for the temporary waiver of any law which the department administers or any regulation adopted by the department if the toxics user proposes to comply with such law or regulation through implementation of a toxics use reduction technique or combination of toxics use reduction techniques in preference to other techniques, or through use of innovative toxics use reduction techniques. By January 1, 1991, the department shall develop regulations governing waiver applications and issuance of waivers.

The department may grant a waiver if the department finds that the following conditions are met:

(A) that the proposed toxics use reduction technique or combination of techniques will be effective in achieving toxics use reduction and will achieve compliance with toxics laws and regulations within the time period of the waiver; and

(B) that the proposed technique or combination of techniques will not cause or contribute to an unreasonable risk to public health or safety or the environment in their operation, function or malfunction; and

(C) for waivers regarding the use of innovative toxics use reduction techniques, that the proposed technique or combination of techniques ultimately will achieve greater toxics use reduction than currently available toxics use reduction techniques; and

(D) for waivers regarding the use of a toxics use reduction technique or combination of such techniques in preference to other techniques, that the long-term benefit to the environment from the proposed technique or combination of techniques outweighs the benefits to the environment from more prompt compliance through other techniques.

The department shall decide whether or not to issue a waiver within one hundred and twenty calendar days of receiving an application for a waiver.

Any waiver granted shall be for a period not to exceed two years. A toxics user may reapply for a waiver if he has been initially refused, or may apply for an extension of a current waiver. The department shall make decisions on these determinations within sixty calendar days of receiving said applications.

The department shall monitor the implementation and effectiveness of the approved toxics use reduction techniques. If at any time the department finds that the toxics user has not made a good faith effort to implement the approved toxics use reduction techniques or that the application was not made in good faith, the waiver shall be terminated and the toxics user shall have twenty-one calendar days to achieve compliance with the requirements prescribed by the laws and regulations from which the waiver was granted.

For violations which continue beyond the twenty-one day limit the toxics user shall be considered in violation of this chapter and subject to the penalties established in section seventeen.

If at any time the department finds that the toxics user has made a good faith effort to implement the approved toxics use reduction techniques and to maintain compliance with the waiver but finds that implementation of the

approved toxics use reduction techniques does not meet the conditions for the issuance of a waiver, then the agency shall suspend or revoke the waiver and the toxics user shall have sixty days to achieve the requirements prescribed by the laws and regulations from which the waiver was granted.

In any event, the toxics user shall eliminate as quickly as possible all unreasonable risks to public health, safety, welfare or the environment.

A toxics user may also request that the department assist it in seeking a waiver from any federal laws or regulations which are administered by the department if the toxics user proposes to comply with such law or regulation through implementation of a toxics use reduction technique or combination of toxics use reduction techniques in preference to other techniques, or through use of innovative toxics use reduction techniques.

History—

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—

See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 18. Citizen Involvement.

Massachusetts residents may participate in monitoring and enforcement procedures as follows:

(A) The department shall make available for resident review reports which are required under section ten and plan summaries which are required under section eleven; provided, however, that such availability shall be subject to the provisions of section twenty.

(B) Any ten residents living within ten miles of a facility required to prepare a toxics use reduction plan may petition the department for the department to examine the plan, the plan summary and any required back up data and determine their adequacy. The department shall determine whether the plan, plan summary and any required backup data meet the standards established pursuant to this chapter. The department shall report its determination to the petitioners and the toxics user in writing within a reasonable time.

(C)(1) The superior court shall have jurisdiction to enforce the requirements of this chapter in an action brought by any ten residents of the commonwealth against: (1) any toxics user alleged to be in violation of such requirements; or (2) an appropriate official of the commonwealth when there is alleged a failure of that official to perform any act or duty under this chapter which is not discretionary with that official.

(2) No action may be commenced under this subsection against any toxics user alleged to be in violation of the requirements of this chapter prior to sixty days after the date on which the plaintiff gives notice of the alleged violation to the department and the alleged violator. No action may be commenced under this subsection against an owner or operator of a facility alleged to be in violation of such requirements if the department has commenced and is diligently pursuing an administrative order or civil action to enforce the requirement concerned or to impose a civil penalty under this chapter with respect to the violation

of such requirement. No action may be commenced under this subsection against an appropriate official of the commonwealth prior to sixty days after the date on which the plaintiff gives notice to said official and the commissioner that the plaintiff will commence the action. Notice under this subsection shall be given in a manner as the department shall prescribe by regulation.

(3) The court, in issuing any final order in any action brought pursuant to this subsection, may award costs of litigation, including reasonable attorney and expert witness fees, to the prevailing or substantially prevailing party other than the commonwealth who advances the purposes of this chapter. The court may, if a temporary restraining order or preliminary injunction is sought, require the filing of a bond or equivalent security in accordance with the Massachusetts Rules of Civil Procedure.

Nothing in this subsection shall restrict or expand any right which anyone may have under any federal or state statute or common law to seek enforcement of any requirement or to seek any other relief.

History—

Added by 1989, 265, § 3, approved July 24, 1989, effective 90 days thereafter.

Editorial Note—

See 1989 editorial note (Ch 265, §§ 1, 6) under § 1.

§ 19. Establishment of Toxics Use Fee.

(A) No later than April 1, 1990 the department shall prepare and distribute to all employers in the commonwealth in SIC codes Ten through Fourteen inclusive, Twenty through Forty inclusive, Forty-four through Fifty-one inclusive, Seventy-two, Seventy-three, Seventy-five and Seventy-six a toxics use survey. All such employers shall complete the survey and return it to the department no later than July 1, 1990. The survey shall require each such employer to identify as of January 1, 1990, for each covered facility it owns or operates within the commonwealth, the full-time equivalent number of employees at that facility; and, for each chemical identified in a list of chemicals provided by the department containing chemicals identified in either the list established pursuant to section 313 of EPCRA or the list established pursuant to sections 101(14) and 102 of CERCLA, whether such chemical is manufactured, processed, or otherwise used in such facility and if so, whether the quantity of each such use is below ten thousand pounds, between ten thousand and twenty-five thousand pounds, or over twenty-five thousand pounds. The completeness and accuracy of the employer's response to the survey shall be certified under pains and penalties of perjury by the manager of the facility. The department shall analyze the results of such survey no later than October 1, 1990, and shall recommend to the council any adjustment to the toxics use fee that may be necessary to comply with paragraph (D) of this section.

(B) Any toxic user required to file a report with the United States Environmental Protection Agency pursuant to section 313 of EPCRA during the year 1990 shall file a copy of such report with the department,

and shall pay a toxics use fee as set forth in paragraph (C), on or before July 1, 1990.

(C) The toxics use fee shall be initially determined as set forth in this paragraph. The base fee for each facility shall be five hundred dollars for facilities at which the full-time equivalent of ten or more, but fewer than fifty, individuals are employed; seven hundred and fifty dollars for facilities at which the full-time equivalent of fifty, or more, but fewer than one hundred, individuals are employed; one thousand two hundred and fifty dollars for facilities at which the full-time equivalent of one hundred or more, but fewer than five hundred, individuals are employed; and two thousand five hundred dollars for facilities at which the full-time equivalent of five hundred or more individuals are employed. The base fee shall be increased by three hundred dollars for each toxic or hazardous substance for which the toxics user is required to file a report pursuant to section nine; provided, however, that the maximum fee shall be one thousand five hundred dollars for facilities at which the full-time equivalent of ten or more, but fewer than fifty, individuals are employed; two thousand dollars for facilities at which the full-time equivalent of fifty or more, but fewer than one hundred, individuals are employed; four thousand dollars for facilities at which the full-time equivalent of one hundred or more, but fewer than five hundred, individuals are employed, and eight thousand five hundred dollars for facilities at which the full-time equivalent of five hundred or more individuals are employed.

(D) On or before November 1, 1990, the council shall by regulation adjust the toxics use fee as set forth in this paragraph. If the council projects, on the basis of the survey required pursuant to paragraph (a), that the aggregate assessment of toxics use fees on July 1, 1991 is likely to fall below a lower bound which shall be four million dollars increased by a proportion equal to any increase in the Producer Price Index between July 1, 1989 and July 1, 1991, or above an upper bound which shall be five million, five hundred thousand dollars increased by a proportion equal to any increase in the Producer Price Index between July 1, 1989 and July 1, 1991, the council shall adjust the base fees, additional amount per chemical reported, and maximum fees in direct proportion, to result in a projected aggregate target assessment, which shall be five million dollars increased by a proportion equal to any increase in the Producer Price Index between July 1, 1989 and July 1, 1991. The base fees, additional amount per chemical, and maximum fees shall be adjusted annually to reflect changes in the Producer Price Index. The department shall annually on or before April 1, publish in the Massachusetts register the adjustments to be made for that year.

(E) On or before July 1 of 1991 and each year thereafter, each toxics user filing a report pursuant to this chapter shall pay a toxics use fee determined in accordance with paragraph (d) for each facility for which such a report is filed.

(F) The department shall impose an additional administrative fee for failure to file a complete and accurate survey, or to pay any fee pursuant to this section, in a timely manner. The fee for failure to file the survey shall be no greater than one thousand dollars. Late payment fees shall be twenty percent of the fee otherwise due if payment is made between seven and