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ENVIRONMENTAL REGULATION: IS MAJOR REFORM NEEDED?

A central achievement of the 1970s was the establishment of a consensus for the protection of the environment. Prodded and led by the environmental movement, this consensus made itself felt in a series of bills aimed at protecting clean air, clean water, and the safe disposal of toxic and hazardous substances, and so on. Without the no-nonsense commitment of this movement, nothing would have been achieved.

Today, these achievements are under attack from the Reagan Administration, and the lead agency involved, the Environmental Protection Agency, is in disarray with industrial pressure making itself felt throughout the regulatory process and at every stage of government. Attempts are being made to revise significantly major environmental laws passed in the last decade, most notably the Clean Air Act.

In the context of this review over the costs and the benefits of environmental regulation, the Federation asked Harvard Professor Robert Dorfman to pull together what, after a poll, he considered representative economic appraisals of the major acts, and the overall approach they embodied. Not surprisingly, the economists were found to call for more consideration of cost-effectiveness and for the use of economic incentives in inducing compliance with the regulations. This approach to regulation, while conventional enough within

the economics profession, is controversial outside it. Accordingly, we asked defenders of the various acts to provide contrasting views and even secured from FAS Chairman Frank von Hippel a general response to the lead piece.

On the whole, economists and environmentalists have normally found a compatible middle ground in the use of economic incentives to motivate compliance with environmental regulation—as in taxing pollution. Real differences arise, however, in the reliance on analysis of costs and benefits to set standards to be achieved. Here the fundamental problem is the difficulty of quantifying benefits as contrasted with the relative ease in assessing the economic costs of regulation.

Needless to say, environmental regulation covers so many issues of cost-effectiveness, and cost/benefit analysis, that there is no possibility of decisively resolving these different emphases. Nevertheless, the time does seem to have arrived in which to debate the manner in which the injection of a greater application of economic principles would usefully improve environmental regulation. In that context, we believe the following exchanges will usefully vent the issues and we solicit the comments of members with a view to determining those issues upon which we do, and do not, have general agreement.

ENVIRONMENTAL LAWS—MAJOR CHANGES ARE NEEDED

Robert Dorfman

In the following articles, four aspects of our national environmental policy are examined, aspects I view with alarm. Each portrays a program that is elaborate, awkward, expensive, intrusive, barely implementable, and therefore frustratingly ineffectual. I would like to inquire into the reasons for these uniformly disappointing results.

Our environmental policy is inscribed in about nine major acts and a number of provisions in other legislation. Taken together, they confront the Environmental Protection Agency, which administers all of them, with a jigsaw puzzle that has some pieces missing and others that will not fit together. No wonder: the laws were enacted piecemeal over a period of a generation, dealing with specific problems in the haphazard order in which the public became aware of them, and with no attention to each other. Least of all did any of them benefit from the experience with its predecessors.

There is a sameness that pervades all of the legislation: some acts are being performed that damage the environ-

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APPLYING COST BENEFIT ANALYSIS TO ENVIRONMENTAL REGULATIONS—NO PANACEA

Frank von Hippel

The economists writing in this newsletter have, understandably, put stress on the use of economic principles in environmental analysis. Much of their thought goes to the use of economic incentives to secure compliance with environmental regulations and with this I have no complaint.

But cost/benefit analysis does raise more problems, I feel, than the economists may suggest.

There is no question that cost/benefit analysis must be an essential part of the regulatory process. And in fact it is. Even when it is expressly forbidden, it is used informally in making judgments on the degree to which it is reasonable to enforce certain laws which were formulated without taking the necessary tradeoffs explicitly into account. If such laws were enforced mechanically, our society would rapidly go into paralysis. Cost/benefit analysis is also a useful analytical tool to help structure a decision-making process.

The uncertainties involved in cost/benefit analysis
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Robert Dorfman

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ment and thereby public health; forbid them. Little heed is paid to who performs the harmful acts, why, what alternatives he has, or how he can be made to stop. Prohibition is piled on prohibition, report on mandatory report. Any substantial manufacturing plant is subject to the requirements of the Clean Air Act, the Clean Water Act, the Hazardous Substances Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, and perhaps several others. Every city and town has obligations under the Clean Water Act, the Clean Air Act, the Safe Drinking Water Act, and several others. The Clean Air Act imposes duties and expenses on every automobile owner.

The result? This impressive battery of legislation, that might well be effective if complied with, cannot be enforced and is widely flouted. Six years after enactment, the Toxic Substances Control Act is tied up in litigation and barely implemented. Ten years after enactment, EPA is still struggling to issue legally acceptable regulations for industrial discharges into lakes and rivers, as required by the Clean Water Act. About half of the municipalities are violating the waste treatment provisions of that act because they cannot afford the treatment works it requires. Automobiles on the road emit about 50 percent more hydrocarbons than the law permits. In 1977, 244 counties (out of more than 3,000) kept usable records of carbon monoxide concentrations; more than a quarter of them violated the primary standard at least ten times during the year. Twenty-two percent of counties with records violated the oxidant standard ten or more times; eleven percent violated the particulate standard. And so it goes to quote Vonnegut.

Environmental Regulations Elicit Resistance

The reasons? Basically two, it appears. First, the requirements are often unrealistic, in isolation and a fortiori in combination. By that I mean that for many years we have developed ways of living lives and doing business predicated on free use of the environment for disposing of our gaseous, liquid, and solid wastes. We are now told to abandon those accustomed modes abruptly, with little provision to facilitate doing so. Naturally, we resist, and the resistance is too widespread to be overcome. The second reason interacts with the first. Very likely the environmental laws would gain much more acceptance and compliance

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if it were evident that the results would be worth the trouble and expense, or, in short, that the benefits were worth the costs. But frequently they are not. Municipalities resist paying for waste treatment plants especially when nobody lives downstream. Utilities resist installing expensive fuel-gas desulfurizers when low-sulfur fuel would do the same job more cheaply. And there are thousands of such instances where environmental regulations make, or seem to make, little sense.

The alternatives? When you are slogging through a rough and muddy road it may be because there really isn't any throughway. That is the case here. We must abate our environmentally destructive practices, but we must abate them at a pace that can be implemented. How fast is partly a matter of judgment, and partly one of analysis. The analysis is needed to gain understanding of how costly and disruptive it is to shift to environmentally considerate modes of behavior at different rates, and thereby to inform the judgment of the appropriate rate. Benefit-cost analysis again, if you like.

Cost/Benefit Analysis Needed

It is clear that progress can be faster if the regulations elicit willing compliance. This implies that the benefits of the restrictions and regulations should be evident, and this in turn implies that there really should be benefits. The laws and administrative practices should be amended to encourage EPA to assess the benefits and costs of all its regulations, and to regulate only when the benefits are commensurate with the costs it imposes on the public. The regulations should also grant the public wide flexibility in modes of compliance so that the desired degree of environmental protection can be achieved in the least painful possible way.

When EPA follows such a considerate policy, the elaborate legal and administrative requirements which are intended to protect the public from undue impositions and which hamper the agency at every turn, can be relaxed. This is mandatory. Under the current system of bureaucratic and legal appeals, more than a year of effort and the better part of a million dollars can be required to clear a single regulation. The elaborate proofs of necessity now required of EPA at every step, including often mere requests for information, must be abandoned.

Economic Incentives Should Be Explored Further

Regulations should be avoided whenever possible, and often it is possible to achieve the same ends by invoking a variety of economic incentives. EPA currently makes scant and timid use of economic inducements; it should move in this direction.

Finally, recognition of the need to reform our treatment of the environment at a moderate pace means that we need conscious and coherent decisions about what to do now and what to do later. In order to gain a notion of appropriate priorities, we conducted an informal opinion poll of twenty economists who study and follow environmental matters. Each of them was asked to rank ten of EPA's major program areas in order of the urgency of continued attention to them. There was a surprising consistency of view. The areas of air quality, control of toxic substances,

and disposal of hazardous waste were closely bunched and were chosen for first or second place far more frequently than any of the others. Air quality is currently one of EPA's two major areas of effort, the toxic substances program is comparatively modest, and hazardous waste disposal receives hardly any attention at all. The other major program at EPA is water quality, which ranked far down the list of knowledgeable economists' concerns. The economists could be wrong. Still, they are well-informed and thoughtful. Some rethinking of the current priorities appears to be in order.

In summary: Granted that we must reduce our profligate impositions on the environment, we must move toward more judicious practices at a pace that does not impose unacceptable costs or disruptions, we must live within this pace by establishing thoughtfully chosen priorities among the many environmental problems that confront us, we must accelerate the tolerable pace by imposing regulations only when the benefits clearly justify the costs, must avoid regulating at all whenever alternatives such as economic inducement will achieve the same end, must design regulations that afford the public considerable scope for meeting the desired goals with minimum cost and inconvenience, and must simplify the administrative requirements that now virtually paralyze EPA.

EPA Will Be More Efficient

That's all we have to do. The result will not be a smaller EPA or a less vigorous one, but an Agency with a better focus on manageable responsibilities. It will need to have better facilities than at present for program planning, for research, and especially for monitoring progress, compliance, and points of resistance. In short, it will be a more sophisticated agency administering a more flexible and coherent program.

Such a restructuring of our environmental policy will not confer on us the blessings of an environment free from blemishes or hazards for a very long time, but it will enable us to make visible progress toward that goal. Considering the alternative, that's a great deal. □

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almost always are, however, enormous. There are frequently many orders of magnitude differences, for example, between various estimates of the carcinogenic and teratogenic (with defect-producing) impacts of exposure to low levels of chemicals. Judgments are required about how conservative to be and such judgments involve setting values on the risks of being wrong.

It must therefore be acknowledged that regulating the human and environmental impact of industries involves value judgments as well as analysis. And once we get to value judgments we get to politics—not least because the costs and benefits flow in different proportions to different groups. It is disturbing in this context that many of the points being made by the economists in this newsletter

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Frank von Hippel

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appear to implicitly assume that our country is run by a philosopher king—and this at a time when we have an Administration which has invited industry in to supervise the federal regulatory apparatus with one result being that our best cost/benefit analysts are being forced out of the government.

Certain Questions Must Be Answered

Ultimately, the question which will have to be faced is this: if formal cost/benefit analysis is going to be required as a basis for all federal regulations, who is going to do it and who is going to provide peer review so that both policy makers and the public are aware of the uncertainties, oversights, and value judgments involved? The art of cost/benefit analysis is so uncertain that in all but the most clearcut cases the answers which will be produced will depend very much upon who is producing them. Accepting the results without critical inspection will leave us unprotected in a world of powerful technologies and shortsighted decision-makers. We are already confronted too often with the situation described by Heinz Kallman:

Considering the world all around,
A thorough study has recently found;
To save the place for the human race,
Is not economically sound. □

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THE NEED FOR ENVIRONMENTAL REGULATORY REFORM: 1982

Paul R. Portney

Balancing Benefits and Costs

The formation of a good regulatory policy requires a careful weighing of what the policy will accomplish against what society must give up in exchange for these accomplishments. While some regulatory statutes encourage or require such balancing, several major pieces of environmental and occupational safety and health legislation have been interpreted to *prohibit* this weighing of pros and cons when specific rules are designed. For this reason, one goal of would-be regulatory reformers has been to introduce at least a qualitative, if not a quantitative, balancing of benefits and costs into the regulatory process.

The Clean Air Act, currently up for re-authorization in Congress, is a timely example. Among other things, the Act directs the Administrator of the Environmental Protection Agency (EPA) to establish maximum permissible ambient concentrations of certain "common" pollutants. These are to be set at levels which provide an "adequate margin of safety" against adverse health effects even in so-called sensitive groups in the general population. While this is clearly a noble goal, it creates a number of problems. First, there probably is *no* concentration other than zero which is free from the risk of injuring the health of at least a few highly susceptible individuals. Equally important, it may prove extremely expensive to guard against certain kinds of adverse health effects which many believe affect only a small number of people and in a mild way.

For instance, it may well cost several thousands of dollars to reduce by one hour the exposure of one individual to what some doctors feel is an unhealthy level of ozone. (from "EPA's Proposed Revisions to the National Ambient Air Quality Standards for Photochemical Oxidants," Oct. 16, 1978). Similarly, studies have argued that it may cost between \$6,000 and \$286,000 to prevent *one* sick day resulting from elevated levels of carbon monoxide in the air (from "EPA's Proposed Revisions to the National Ambient Air Quality Standard for Carbon Monoxide," Nov. 24, 1980). Because these costs appear to some quite high relative to what is being gained, it has been argued that the Clean Air Act should be amended to permit or direct the EPA Administrator to pay some attention to costs as well as health benefits in setting air quality standards. Similar arguments have been advanced for other regulatory statutes including the Clean Water Act, the Occupational Safety and Health Act, and the Federal Food, Drug and Cosmetic Act.

In spite of its stated intention of rationalizing federal regulation, the Reagan Administration has to date shied away from embracing this or similar changes in the Clean Air Act. However, like the Ford and Card Administrations that preceded it, the present Administration is forcing regulatory agencies to pay attention to and publicize the costs of their regulations, even where they are prohibited by law from taking costs into account in setting regulatory standards. The vehicle for this effort is Executive Order 12291, issued less than a month after President Reagan took office. Among other things, it requires all regulatory agencies to conduct "regulatory impact analyses" of pro-



Paul Portney

posed major rules which identify and, where possible, quantify the costs and benefits expected to result from the proposed regulation. Moreover, agencies are required (to the extent permitted by law) to choose regulations so as to "maximize the net benefits to society," a goal near and dear to the hearts of many economists and policy analysts.

While such public information will be of some use, a more significant step is required. Meaningful balancing of environmental and other social goals will require changes in all the regulatory-enabling statutes that now prohibit economic and other costs from being considered in standard setting. Such changes will be difficult to win, but would accomplish another worthy aim in the process—standardizing regulatory legislation. It makes little sense to maintain, as we now do, that costs *should* be taken into account when protecting the public against pesticide hazards or unsafe consumer products, but *should not* be considered in setting ambient air, water, or workplace exposure standards. Comprehensive regulatory reform could address this schizophrenic approach at the same time it introduced *balancing into the law*.

Congressional Reforms

Not to be outdone by Executive Branch reform efforts, Congress is itself considering several important regulatory reform bills. One bill, S.1080, which would amend the Administrative Procedure Act (APA), would with some differences add the force of law to Executive Order 12291 that regulatory agencies identify both the costs as well as the benefits associated with proposed rules, and make other important changes as well in the regulatory process. For instance, it would amend a section of the APA and require more justification from regulatory agencies on the validity of their actions; it would encourage more public participation in rulemaking including the possible cross-examination of those whose work or findings were used in establishing proposed regulations; and it would direct all regulatory agencies to review and analyze within ten years all their existing major rules and regulations and their impacts.

This approach also suffers from a failure to address the real cause of many regulatory problems—the original enabling legislation. Rather than mandate band-aid requirements for economic analysis, Congress would do better to review the prohibitions on using such analysis in standard setting. While it is at it, Congress would do well to address one part of the Clean Air Act where it went too far in the direction of specificity—the emissions standards for automobiles. In the 1970 amendments to the Clean Air Act, Congress specified these emissions standards directly rather than directing the Administrator of EPA to do so, as it had done with emissions standards for stationary sources. Current evidence suggests that these mobile source standards are among the least cost-effective of any in the environmental area (from "Pollution From Mobile Sources," American Enterprise Institute, 1982). Congress would do well to direct EPA to review these standards and propose new ones where the evidence seems to warrant. As a general rule, moreover, Congress ought to delegate to regulatory agencies responsibility for highly detailed stand-

ards; the attention of Congress is better focused on establishing broad directions for policy.

Simpler Reforms

It would be a mistake to think that all regulatory reform initiatives involve the introduction of benefit cost comparisons to standard setting. Much less controversial are reforms that reduce the cost to society of meeting some predetermined environmental or other social goals. Surely we all ought to be able to agree on the wisdom of such reforms. Fortunately, there are many opportunities for such savings in the regulatory arena. They arise mainly where *existing regulation takes the form of uniform controls on offending activities which are insensitive to special circumstances, or where regulations specify not only what is to be accomplished, but also how it should be done*. In the latter cases, relatively inexpensive means of accomplishing the same ends are often precluded. Both the current and past administrations have worked to permit more flexibility in specifying individual controls and to allow regulatees to meet social goals however best they see fit.

EPA has led the way in reforming its rules to save society money while at the same time accomplishing its goals. This is the effect of both its "bubble" policy—whereby a plant can increase its emissions of a pollutant from one stack so long as it effects an equal reduction in emissions of that same pollutant elsewhere at the plant—as well as its "offset" policy—which allows a new polluter to enter a dirty area so long as it can strike a bargain with another polluter in that area to reduce its pollution by even more than the prospective newcomer would emit. Both these policies implicitly attach an economic value to clean air and ensure that any given amount of environmental quality is "purchased" as cheaply as possible.

Both policies could be expanded considerably to the benefit of both the economy and the environment. Given this fact, and the often-expressed commitment of the Reagan Administration to use the market rather than direct government intervention to achieve social goals, it is surprising that the current leadership at EPA has been so slow to embrace these market-like approaches to environmental quality. While they have recently "rediscovered" the Carter Administration's bubble policy, top management at EPA appears to view the more promising offset policy as anathema. In so doing, they ignore one of the rare opportunities to relieve the regulatory burdens on business while preserving or even improving the quality of our environment. This is the real promise of economic incentives in place of more traditional "command-and-control" regulation. □

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RESPONSE: THE PROBLEMS WITH PROPOSED REGULATORY REFORM

Anthony Z. Roisman

The basic concept behind cost/benefit analysis is that in-
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Anthony Roisman

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dustry should not be required to reduce the level of environmental pollution, cancer-producing food additives, dangerous and defective products, or hazards in the work place if the economic cost to the industry exceeds the economic value of the health and safety protection to the public. This cost/benefit concept is based upon two fallacious premises: first, it assumes that industry, in the name of corporate profits, has a right to endanger the public health and safety and to contaminate the environment and that right can only be abridged if the *public* proves that the economic value of its health and safety and the environment is worth more than the profits to be earned. Second, it assumes that the value of public health and safety can be quantified in the same terms as the value of a car, or a ton of steel, or a bottle of catsup.

The first assumption has much currency among the conservatives, particularly the Reagan Administration. It is basically "manifest destiny" applied not merely to land but to the health and welfare of all of us. This callous disregard for the value of human life is ironically inconsistent with other strongly held Reagan views such as opposition to abortion, a point of view which has not been subjected to a rigorous cost/benefit analysis. The proper test, as wisely embodied by Congress in many statutes, is to prohibit conduct which reliable evidence proves may cause environmental and human health danger until industry can prove it will not.

Cost/Benefit Dehumanizing

The second assumption upon which arguments for cost/benefit analysis are based has much currency among those for whom all things, and the very wonder of life itself, are reduced to dollars and cents. This fixation on the monetary value of everything is understandable since if all things can be expressed within a common denominator, it is easy to measure which is greater. Life is more complex than that. As Amory Lovins has observed, the value of a human life depends substantially on whose life we are discussing. For example, in a classic cost/benefit analysis a regulation limiting releases of a hazardous chemical may be found to save one additional life out of every one million persons exposed to the chemical. But it will cost \$50 million to meet the new standard and only 200 lives will be saved. That comes to \$250,000 per life, often thought to be in excess of the value of the average human life. But what if that life is *yours*, or *your child's*? Cost/benefit analysis allows the

disinterested decision-maker to reduce human life to an abstract dollar value and thus dehumanizes all of us.

In addition to its philosophical flaws, cost/benefit analysis suffers from other infirmities. Even if one were to accept the validity of cost/benefit analysis in principle, proponents still do not have any answers as to how to quantify the costs and benefits. As Mr. Portney has himself demonstrated in his examples of costs incurred to prevent one sick day resulting from elevated levels of carbon monoxide, the estimates in cost can range considerably, in this case by a factor of 50. And quantifying costs is simple in comparison to the task of quantifying benefits. How does one put a dollar figure, for example, on the benefits resulting from reduced carcinogenicity in a water supply, on the aesthetics of clean air, on the absence of future Love Canals? At best, these numbers are pulled from a hat. Under such circumstances, what credibility can strict cost/benefit analysis have?

Who Will Undertake the Analysis?

Moreover, proponents of this approach do not address the question of who will undertake the cost/benefit analysis. In these days of straining federal budgets, it is unlikely the federal government will do so. And the general public has neither the focus nor the resources to do so. That leaves the regulated industries themselves. They have the resources to do such analyses, but they can hardly be called unbiased.

Finally, in a related comment, while many proponents of cost/benefit analysis stress the need to avoid broad sweeping regulations and to focus instead on fact-specific standards for each individual member of the regulated community, none explains how it would be possible to implement or enforce such a system. The size of the government bureaucracy, whether federal, state or local, would have to expand enormously to write and enforce a regulation for each company. The consequence would be substantial delay in implementing any standards, and haphazard and uncertain enforcement.

Need for Public's Wishes To Be Heard

In contrast to cost/benefit analysis, there is one area in which regulatory reform is needed: providing a direct way for the wishes of the public, the very beneficiaries of the regulatory scheme, to be heard. The only way the public can now participate in setting the regulations is to become involved in formal proceedings. Yet the cost of such participation means hundreds of thousands and even millions of dollars for technical experts, studies and analyses, and attorneys, costs few can afford. If public participants had the resources to participate meaningfully in the regulatory process they would have more stake in it and a greater commitment to it. □

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CLEARING THE AIR: REFORMING THE CLEAN AIR ACT

Lester B. Lave and Gilbert S. Omenn

The current system for abating air pollution in the United States desperately needs attention. We challenge a prevalent view that the 1970 Clean Air Act Amendments, the flagship legislation of the environmental decade, have worked well and that reauthorization need only smooth a few rough edges.

The myth of success comes from the earlier dramatic gains of the 1950s and 1960s, sustained during the past decade primarily through the "good luck" of a limping economy and continuing substitution of oil and natural gas for coal. According to reports from the Environmental Protection Agency (EPA) for most pollutants average ambient concentrations or estimated national emissions did not decline significantly during the 1970s. While the Act certainly helped prevent deterioration through stringent standards on new plants and new cars, its implementation has been inefficient and relatively ineffective.

If the economy expands and the use of coal and wood increases, enormous strains will be placed on the current system of pollution control. Changes are needed in the setting of air quality standards, in the emissions-control strategies for industry and vehicles, and in the coordination of environmental, energy, and economic policies.

Setting and Meeting Air Quality Standards

Air quality is regulated by a two-stage procedure. First, EPA establishes *ambient* standards that prescribe the maximum permissible concentrations of widespread pollutants that impair health and welfare; it also sets *emissions* standards for some old and new sources. Then the individual states submit for EPA approval detailed implementation plans designed to achieve EPA's ambient standards by a specified date. Seven harmful pollutants are regulated in this manner: sulfur dioxide, total suspended particulate matter (dust particles), nitrogen dioxide, hydrocarbons, ozone, carbon monoxide, and lead. We now know that three of these standards are targeted only directly on the pollutant which threatens public health: acid sulfates and fine respirable particles should replace the first two, and the ambient hydrocarbon standard can be scrapped.

The Clean Air Act's goal is air quality at which few, if any, people ever suffer adverse health effects. However,

the best available evidence indicates that there is no concentration (other than zero) that is innocuous to everybody. The public should know how much and what kinds of health risk remain, rather than being falsely assured that we are "perfectly safe." Furthermore, the law has been interpreted as forbidding EPA to consider costs of abatement. These illogical requirements should be replaced by a statement of policy that instructs EPA to set standards at levels and deadlines at times where the cost of additional standards should be related to the additional protection provided.

The monitoring system used to assess the achievement of the national ambient air quality standards is in shambles. Siting is arbitrary, quality control is lax, and localities can manipulate the monitoring to serve their ends. Forty areas have stopped monitoring air quality in order to become "unclassified" and thereby avoid strict emissions control requirements. EPA should assume control over the monitoring system.

Designing Cost-Effective Emissions Control Strategies

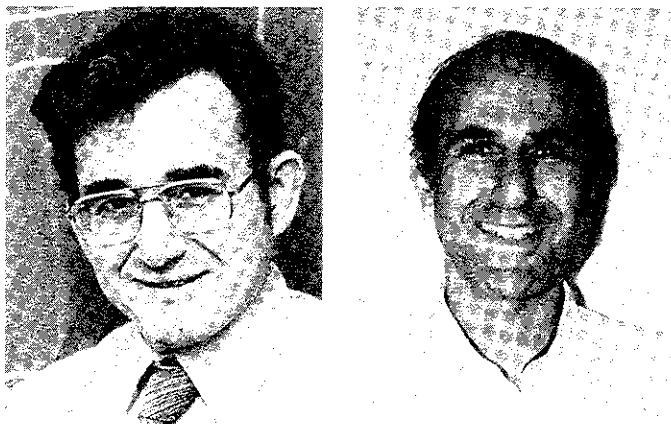
To formulate implementation plans, every significant utility and industrial source must be assessed and regulated, with elaborate modeling of dispersion and air chemistry. The process is extremely cumbersome.

Previous shortcuts have sometimes generated new problems. For example, tall stacks reduce ambient pollutant levels near a facility, but the emitted sulfur oxides and nitrogen oxides can then be transported to distant regions as acid precipitation; they should be prohibited.

Bright spots in an otherwise gloomy picture are the offset and bubble policies introduced by EPA over the past several years. The former allows new industry in a polluted area only if the new polluter manages to get other sources to lower their emissions enough to more than offset the new emissions; the latter defines emissions limits for a whole plant, as if there were a bubble over it rather than for individual stacks. Both policies provide flexibility at the same time they provide powerful incentives to reduce emissions. The bubble and offset policies should be expanded, and economic incentives, such as marketable discharge licenses and effluent fees, should be encouraged. Steps must be taken to avoid manipulation, however.

In areas that already meet clean air standards, the protection of air quality should be assessed in the context of regional development and energy needs (as was mandated in the 1977 Clean Air Act Amendments). A National Academy of Sciences study criticized EPA and the states for too rigidly applying guidelines, instead of balancing air quality-related values against other needs and goals. Planning for energy and economic development should not rest on the first-come, first-served, plant-by-plant approach of incremental environmental permits. The EPA should simplify the regulations, give highest priority to fine particles and acid sulfates, use stringent technology standards, and eliminate the modeling requirements and increments for areas other than national parks and wilderness areas.

Automobiles have been regulated differently. Emissions standards were set by Congress itself in the 1970 Clean Air



Lester Lave and Gilbert Omenn

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Act Amendments. Later, the deadlines were postponed, and the nitrogen oxides standard was relaxed. Even now, new car models are certified that in actual use do not come close to meeting the statutory standards for hydrocarbons, carbon monoxide, or nitrogen dioxide emissions. For example, EPA's tests show 19 grams of carbon monoxide per vehicle mile for models whose prototypes on the test track in Michigan met the 3.4 gram standard (after 50,000 miles of driving). Meanwhile, the rhetoric in Congress remains fixed on present and proposed standards of 3.4 and 7.0. Realistic emissions standards must be enforced by economic incentives over the entire life of vehicles in use. Congress and EPA should stop relying on pass-fail tests on prototype vehicles.

Defining Federal and State Roles

The roles of federal and state regulation should be revised. The federal government should be responsible for policies and regulations affecting public health, the control of pollutants that cross state boundaries, the protection of national park and wilderness areas, and for monitoring. States should have more responsibility for implementation plans than at present, and should take the lead in setting secondary standards (controlling, for example, damage to crops, reductions in visibility, soiling, and corrosion of exposed materials).

This year can mark an important transition in the pursuit of environmental goals. Economic and energy policies will severely strain the fragile, ill-prepared pollution control system. Opinion polls indicate that Americans strongly support protection of the environment, yet they also show considerable anxiety about inflation, productivity, energy, defense, and tax burdens.

It is not necessary to relinquish the nation's air quality goals, but it is necessary to focus the effort, to be clear about which pollutants are the significant threats to health or the environment, and to revise emissions control strategies to achieve the goals at lower costs. All of that agenda is feasible. □

Lester Lave is a Senior Fellow at the Brookings Institution. Gilbert Omenn is a Science Fellow at Brookings.

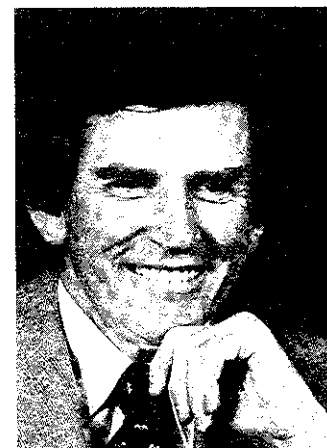
RESPONSE: IT WAS CONGRESS THAT CLEANED THE AIR

Robert Stafford and Gary Hart

Lester B. Lave and Gilbert S. Omenn...argue that the Clean Air Act has not been effective in reducing air pollution. To hear them tell the story, one might believe that the Clean Air Act is seriously off course or in danger of floundering.

We take exception to this conclusion. The truth is that the air is significantly cleaner today than it was in 1970, and vastly cleaner than it would have been without the law. The Clean Air Act has worked remarkably well. Now we must improve it over the next 10 years....

...(The authors) claim that progress in cleaning up our air is a "myth," sustained "through the 'good luck' of a limping economy and continuing substitution of oil and



Senators Robert Stafford and Gary Hart

natural gas for coal."

In fact, from 1970 to 1980, electricity generated using oil and coal increased by more than 50 percent—hardly evidence of a "limping economy." At the same time, sulfur dioxide emissions from these plants remained about level. And in the West, where smelters are the major source of sulfur dioxide, we've done even better. The percentage of sulfur removed from all smelters has risen steadily—from 15.7 percent in 1972 to 50.6 percent in 1980.

Sulfur dioxide emissions cause heart and lung disease, reduced visibility and acid rain. They account for an estimated 50,000 deaths and billions of dollars in damages each year in this country. Reduced sulfur emissions are no "myth"; they are one of the Clean Air Act's success stories.

Lave and Omenn cap their criticism of the Clean Air Act with the assertion that "environmental goals can no longer be pursued in isolation from other national goals." We agree. In drafting the Clean Air Act, Congress balanced environmental goals and other goals. For example, in setting emission standards for cars, Congress balanced tighter controls and fuel efficiency. Today, as a result, our cars pollute less and get better gas mileage. As the president of General Motors said in unveiling GM's 1981 cars, that company has been able "to reduce emissions to their lowest level ever, while simultaneously recording the highest average fuel economy in GM's history."

Another example: Congress explicitly required the EPA and state agencies to consider the costs of pollution controls when they set emission standards for new plants and factories. And when companies use innovative or more energy-efficient technology, they can be exempted from generic emissions requirements.

Lave and Omenn are correct on several key points....

It is...true that the Clean Air Act has not concentrated enough on cleaning up existing plants and factories. Strengthening the act in this respect would have great impact in industrial regions where air quality still falls below national health standards.

Such change will be difficult, but it is necessary if pollution control is to be relevant in the 1980s and 1990s. We must preserve—even strengthen—effective programs; streamline—even eliminate—those that are unduly burden-

some; and address new problems discovered since the Clean Air Act was last amended....□

The above article is excerpted from a Washington Post op-ed piece printed in November 1981 by Senators Robert Stafford and Gary Hart.

WASTE DISPOSAL

Michael O'Hare

Everything we make or use eventually becomes waste, and it all has to go somewhere. Fortunately, most of this waste (such as used fuel) is a gas placed in the atmosphere at the point of generation; it doesn't require specific attention except to remove particular pollutants. Most of the remainder (used water) is almost as easy to get rid of. There remain, however, wastes in solid or liquid form that will pile up if not actively removed from the point of generation, or will damage society if simply allowed to flow downhill. For each of these wastes, society must answer two questions: "where do we put it?" and "how do we make it go there?"

Most discussion recognizes three large classes of waste: solid waste (trash); hazardous industrial waste; and radioactive waste. The third of these will not be discussed here for reasons of space and because it involves issues beyond waste management.

Solid Waste

Solid waste accumulates at a sobering rate: an average American produces about half a ton per year. Historically, this trash has been buried in the ground by local government or private contractors. Some governments used to gasify what they could (by incineration) to reduce waste volumes. Unfortunately, dangerous chemicals tend to leak out of landfills that do not include expensive containment systems; incinerators have been found intolerable sources of air pollution and closed; and landfill space is becoming very hard to find, especially in the East. These factors have induced a search for alternatives, and resource recovery is generally favored except where safe landfilling is still cheap.

Resource recovery involves volume reduction and extraction of economically valuable components from solid waste. Energy is always recovered by burning the waste in sophisticated equipment to produce electricity or steam; some proposed systems (already used in Europe) also recover metals and even the ash for building material. Technical problems continue to dog this new industry, but the principal obstacles to resource recovery development have been the difficulty of assuring an economically large volume of trash to a recoverer. Sometimes the problem is administrative, or managerial, or political as in large cities, where enough trash to make a project workable is legally in a single decision-making unit's hand. Sometimes it is constitutional: trash that "belongs" to a group of small towns seems to be as hard to gather into one contract as mercury spilled on a polished table top. Some sort of state seizure of "trash disposal rights" from local government may be appropriate.

For the most part, solid waste is a state or local problem—and should be—despite federal law regulating land-

fills to reduce groundwater pollution. However, one part of the solid waste stream may be an exception to this rule: seven states have enacted laws requiring deposits on soft drink and beer containers (so-called "bottle bills"), and three more are likely to do so in the near future. These laws vary from state to state; if many states have such legislation, it might be important for efficiency reasons to have a uniform national system under federal law, since soft drink and beer markets are regional and overlapping across state lines.

Hazardous Industrial Waste

Unlike household trash, the fifty million-odd annual tons of hazardous industrial waste occurs as several distinct streams; different kinds of wastes present different hazards and are appropriately handled by different treatments (incineration, chemical neutralization, secure landfilling, etc.). The "hazardous waste problem" in a nutshell is that too much of it is being dumped into the environment, whether in the woods or down sewer pipes. Congress, and many states responding to federal initiative, have made this sort of behavior illegal in general terms; but three principal issue areas remain.

Sins of the Past

Decades of uncontrolled dumping have left hundreds of places where untreated waste poses a continuing hazard to public health or the environment. A "superfund" law makes federal funds available to states with especially dangerous dumps, but some of these locations, such as harbors and estuaries polluted with PCBs, are frighteningly expensive to clean up no matter whose budget is being tapped.

EPA's movement in implementing the superfund law has been glacial under the Reagan Administration and cannot be said to evidence a perception that these dumps represent real and present dangers. Furthermore, real differences exist among experts regarding how the risks of these sites should be assessed. The important obstacles to cleanup are budgetary and political; expensive though it is, we know pretty much how to clean up most abandoned dumps and we have found enough of them to keep state and federal agencies busy for the near future.

Enforcement

Like all waste, hazardous waste must ultimately be put somewhere, but storage facilities are especially expensive (secure chemical landfills) and some of it must be

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Michael O'Hare

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chemically transformed (e.g., by specialized incineration) before disposal. Proper handling of hazardous waste is much more expensive than pouring it down the drain or into the back yard. Though careless disposal is now illegal, an industry already exists to provide illegal disposal services, and has been linked in testimony and otherwise to organized crime.

Illegal dumping is very hard to observe. To control it, the Resource Conservation and Recovery Act requires a record of each hazardous substance removed from the plant that generates it ("a manifest") that shows which authorized disposal site it is consigned to. The only required notification, however, is to the operator of the disposal site, so unless he goes out of his way to inform the authorities of shipments that do not arrive, there is no way to detect illegal diversions. A few states do require that the regulatory authorities be notified of all shipments; enforcement will be better there than under the national procedure. But the ease with which moonlight dumping can be concealed limits the effectiveness of even the best notification system. Since even small amounts of hazardous substances can contaminate air and drinking water supplies with serious effects, more effective controls than those now planned are probably needed.

Hazardous waste dumping can be controlled by subsidizing its processing—to compete by price, in effect, with the illegal dumper. The cost of the subsidy, of course, could be recovered either from the general fund or a tax on industries principally responsible for hazardous waste generation. But it would obviously remove the economic incentive to reduce waste volumes at the source, by process and product change, that full-price processing offers.

It might seem sensible to preserve the incentive to reduce waste volumes by imposing a tax on waste generation, but such a tax would provide exactly the same powerful incentive to conceal the existence of the waste and dump it as full-cost processing fees. An excise tax on chemical purchases or some similar effort to impose approximately the cost of waste disposal on waste generators is better than a subsidy supported by all taxpayers from the point of view of efficiency. But any charge system tied specifically to waste generation, whether tax or commercial prices, requires a capability of effective enforcement (in the face of easy concealment and strong economic pressure to evade the law) that may well be beyond society's power to achieve. The unfortunate truth may be that we eventually have to choose between, say, 50 million tons of waste generated of which 20 are processed correctly, and 75 million tons of which all is processed properly. Forty million tons all processed correctly may be an impossible goal.

Siting

The second principal obstacle to proper hazardous waste processing is the lack of adequate facilities with which to do so in many regions of the country. The technology of these facilities is well understood (though many people are not aware of this), but a regulatory and a political obstacle remain. The regulatory obstacle is the failure of EPA to

promulgate regulations governing the construction and licensing of these new facilities, and the further delay threatened by the stasis currently gripping that agency.

The political obstacle is probably more serious: it is the effective power of organized neighbors of a new facility to prevent its development by a variety of legal and extra-legal tactics. Several states have passed siting legislation that depends on an exercise of state authority to override local opposition.

But this model has never worked. One state, Massachusetts, has correctly recognized that local ability to stop facility development is not within the power of state government to override. It has enacted a negotiated compensation mechanism in its new siting law that is intended to make it easy for a facility developer to work out a deal—covering not only direct compensation to neighbors and local government but also operating requirements, monitoring, and other protections—that would make the facility *together* with the agreed-upon conditions an attractive, or at least acceptable, option to the community in which it is built. Much depends on the success of this experiment in negotiation-based facility siting, since the strong arm tactics embodied in the "state override" models have shown themselves to be ineffective. □

Michael O'Hare is a Lecturer at Harvard University's John F. Kennedy School of Government.

RESPONSE: HAZARDOUS WASTE DISPOSAL NEEDS FURTHER ATTENTION

Christine Hall

The following points should be made in answer to Michael O'Hare's discussion of hazardous waste:

(1) The waste disposal problem cannot be reduced down simply to the problem of getting rid of solid waste or toxic liquids. The very existence of the Clean Air and Clean Water Acts gives evidence that the release of both gases and "used water" can harm the environment and threaten public health as much as the release of toxic liquids and solid waste. In our zeal to deal with disposal of the latter, let us not lose sight of the need to deal also with the disposal of the former.

(2) The basis for the widespread concern over the disposal, storage, and treatment of hazardous waste—a legitimate one—is the serious threat posed to human health



Christine Hall

by these wastes. The health aspect should not be lost sight of. The goal of society should be to eliminate this threat as soon as possible.

(3) Mr. O'Hare has overlooked the fact that despite public recognition of the hazardous waste problem, the passage of state and federal legislation, and several rulemakings, some of the most dangerous chemicals known to man continue to be treated and disposed of without meaningful regulation. Current federal regulations *do not* prevent the recurrence of another Love Canal. The Environmental Protection Agency, in fact, appears to be moving backwards in this area. It is imperative, if public health is to be protected, that EPA be held to carrying out its statutory duty to issue, implement, and enforce meaningful hazardous waste regulations.

(4) Economic incentives which *discourage* the production of hazardous waste and encourage its proper disposal must be explored and developed. For this reason, general subsidies for the proper disposal of hazardous waste are not a good idea. Internalization of the full cost of disposal of hazardous waste is a critical principle. The issue of economic incentives is an area that is ripe for further research. In line with this, one of the most productive approaches at the present is through the liability system. Making clear to the generators of hazardous chemicals that they are liable and responsible for all damage caused by their products, by-products, and wastes will eventually lead to safer practices. Development of an effective liability system through the courts will take time, however.

(5) The statement that the technology is known for safe disposal of hazardous waste is not true for all methods of disposal. Even though it is the least desirable, disposal of hazardous waste on land continues to be the dominant mode of disposal. To date no technology exists to prevent landfills from leaking. The regulatory approach taken by the Environmental Protection Agency, unfortunately, does nothing to discourage the use of landfills. The recent initiative by the state of California to ban certain substances from landfills will serve such a purpose and may be useful as a model to other states. □

Kristine Hall is a staff attorney for the Environmental Defense Fund, where she works on the Toxic Chemicals Program.

THE CLEAN WATER ACT

David Harrison, Jr.

Since 1972, the nation has been embarked on an enormous campaign to clean up its waterways. Costing hundreds of billions of dollars, the program includes funds for upgrading municipal treatment plants, requirements for treating industrial discharges, and an ambitious commitment to the planning and administration of the federal, state, and local programs that oversee the pollution control effort.

The 1972 Amendments to the Federal Water Pollution Control Act include five major provisions:

- a national goal of eliminating the discharge of pollutants by 1985;
- an interim goal of achieving "fishable and swim-

mable" water quality in 1983;

- federal technology-based standards for all major point dischargers, both municipal and industrial, with a minimum level of treatment required by 1977, and a higher level of treatment by 1983;
- an initial \$18 billion in grants for the construction of municipal wastewater treatment facilities for the following three years; and
- a National Pollutant Discharge Elimination System (NPDES), which required every facility discharging pollutants to obtain a permit.

My comments will concentrate on the achievements of the 1972 Act in controlling so-called conventional pollutants (biochemical oxygen-demand and suspended solids) rather than toxic pollutants. Although the 1972 Act required EPA to set standards for toxics, virtually none have yet been promulgated and thus we have no information on their costs and benefits.

Historical Perspective

It is important to put the water pollution control effort in perspective. Although water-borne disease was a major public health hazard in the United States until the 1920s—and continues to be such a hazard in much of the rest of the world today—cholera, typhoid, and the other water-borne diseases were virtually eliminated as a result of relatively simple sanitation techniques. Thus, when the 1972 Clean Water Act was passed, concern had shifted to non-health factors. One motivation for clean water was to preserve or reclaim water-based recreation sites. Pollution and industrial growth placed heavy oxygen-using demands on many rivers and lakes, making them unable to support a well-rounded fish population or to allow public swimming, boating and fishing. Commercial fishermen, of course, also suffered when water quality deteriorated. To many of its supporters, however, the 1972 Clean Water Act represented much more than a means of increasing opportunities for recreation or commercial fishing. The objective of the Act was "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters"—that is, return to an ecological purity. This objective led the zero discharge goal.

History also played a role in the choice of means to
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David Harrison

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achieve water quality goals. Before 1972, state and federal officials had to demonstrate that particular discharges were linked to water quality problems before they could enforce standards against industrial or municipal polluters. In response to the difficulties of sustaining such a burden of proof and the regulatory inaction that resulted, the 1972 Act required technology-based limitations on both existing and new discharges. Standards were to be set by the federal government—rather than the states—and were to be set independent of the discharges on the receiving waters, i.e., they were not to require a link between discharges and water quality.

An Economic Evaluation

The Council on Environmental Quality (CEQ) estimates that the cumulative costs to control conventional pollutants will be \$170 billion over the period from 1979 to 1988, with annual costs rising from \$12.7 billion per year in 1979 to \$24.4 billion in 1988. For comparison, Edwin Mills and Daniel Feenberg, in a recent study (*Measuring the Benefits of Water Pollution Abatement*, 1981), estimate national water quality benefits at \$17.2 billion per year in 1985, with recreational and aesthetic benefits put at \$15.2 billion—or 88 percent of the total. Myrick Freeman puts the range of total benefits between \$6.6 billion and \$24.8 billion per year (from *The Benefits of Air and Water Pollution Control: A Review and Synthesis of Recent Estimates*, 1979). The range is so large because of the paucity of water quality data, the difficulties of determining how much recreational use or enjoyment would be increased if water quality were improved, and the difficulties of deriving national estimates from studies of particular watersheds. All these estimates are based upon projections of water quality conditions when the full program is eventually in place. Little improvement in water quality is now apparent from CEQ data, which is not surprising since many industrial and municipal clean-up projects are not yet complete. Nevertheless, on the basis of these aggregate studies, the national benefits of the current control program may exceed its costs.

Such a comparison of the grand totals of benefits and costs give only a crude indication of the worth of the program, and none at all of its efficiency. It includes the results of several distinct programs and thousands of detailed regulations, some of which are well worth the cost and some not. In fact, recent studies have shown that the costs imposed by many of the regulations far exceed their benefits, and that in many other instances the same improvements in water quality could have been achieved at far less cost. These findings are not surprising in view of the legislation and the operating procedures of EPA, both of which discourage paying attention to cost-effectiveness or cost-benefit considerations.

In promulgating the 1977 industrial discharge standards (Best Practicable Technology), EPA determined for each industry or industrial subcategory what the current discharge concentrations are, what technologies are available to reduce pollutants, and what the controlled effluent concentrations would be for a model plant in the in-

dustry. A particular technology was then chosen as the basis for the standard based upon an evaluation of what the industry could afford. This process allows no comparisons of costs either with pollutant reductions or with water quality benefits. Indeed, the rulemakings do not consider information on water quality improvements even when such information is available. For example, the state of California argued for variances for California firms discharging far offshore into the Pacific Ocean on the grounds that no water quality improvement would result from the companies' meeting stringent limitations. The EPA did not dispute the findings but denied the variance because of its interpretation that effects on receiving waters cannot be taken into account. Costs were only considered in the rulemakings if they led to substantial employment declines or plant closings.

The program to subsidize the construction of municipal wastewater treatment facilities has already cost approximately \$30 billion, and future "needs" could be \$50 billion more. Almost all commentators conclude that the program is costly, poorly managed and has done relatively little to improve water quality. Indeed, among its most vociferous critics are environmentalists and others committed to clean water goals. The emphasis on funding construction costs—and not operating and maintenance expenses—means that local governments often build excessively capital intensive projects, skimp on maintenance, and operate the treatment plants poorly. EPA's technology-based discharge standards have sometimes led to expensive treatment plants built on already clean waterways by small towns that do not want the facility and cannot pay even their reduced share of the capital costs, let alone the operating costs.

Such rigidity is not surprising in light of the hope in 1972 that switching to technology-based standards would create an easily enforceable system in which industrial polluters paid to insure that all rivers and lakes were clean. Unfortunately, this hope has not been realized. Setting standards for the 55,000 industrial and municipal dischargers has taken far longer than the one year allowed in the Act, and virtually all standards have been challenged in court. Water quality benefits were not achieved partly because of these delays and partly because non-point sources (runoff) create poor water quality by themselves. Such dispersed pollution is virtually impossible to control. Moreover, we have come to realize that costs of control are not borne by business but by consumers and taxpayers. Finally, as the California example suggests, we became aware that stringent standards were not necessary for water bodies such as the deep ocean where water quality was already good.

Specific Recommendations

No one would want to return to the pre-1972 disregard for water quality. But I believe that it is possible to make adjustments to the Clean Water Act that retain its commitment to water quality while at the same time reducing its costs and increasing its effectiveness. These recommendations build on our decade of experience with the Act.

(1) *Introduce costs and benefits into the setting of standards for industries and municipalities.*

It will never be possible to determine with precision the control costs or benefits of water quality standards. But current information on water quality and recreation benefits allows us to provide rough cost/benefit comparisons in many circumstances. Moreover, the existing emphasis on whether costs are affordable—rather than whether they are worth the benefits—means that some economically marginal firms are allowed to pollute more than would be permitted under a cost/benefit test.

(2) Permit standards to vary geographically.

Perhaps the most important improvement is to permit discharge standards to vary for different water bodies. Where water quality is already very good, such as in the Pacific Ocean, or where non-point sources dominate, standards could be less stringent. Congress has already met this objective somewhat in the 1977 amendments, which permitted variations for ocean outfalls.

(3) Use municipal grants to promote water quality.

This program should be redirected to ensure that the operation and placement of treatment plants generate substantial water quality benefits. This would involve eliminating the bias toward capital-intensive projects and providing incentives to operate facilities properly.

(4) Abandon the national zero discharge goal and permit states greater discretion in setting water quality goals.

Although zero discharge is not—and never will be—required, the goal has been used to legitimize a disregard for costs and benefits in the setting for thousands of individual standards. Reform of the federal water pollution control effort may not take place until the goal is changed. For water bodies that cross state boundaries, federal officials must take major responsibility for developing realistic goals. But for many intrastate rivers and lakes, it will make more economic sense to leave the setting of goals to localities or states, whose residents are most likely to bear the costs and reap the benefits of water quality improvements. □

David Harrison is an Associate Professor at Harvard University's John F. Kennedy School of Government. Appraised of Ms. Dubrowski's rebuttal, Mr. Harrison revised his paper at the last editorial moment to take cognizance of her remarks insofar as his position permitted; with this understanding, her following (original) paper remains highly relevant.

RESPONSE: THE CLEAN WATER ACT IS WORKING

Frances Dubrowski

Mr. Harrison's critique of the Clean Water Act is premised on faulty assumptions and posits unworkable alternatives. First, he acknowledges the environmental benefits of the law—its protection of recreation and fishing opportunities—but ignores its strong health-protective orientation. The 1972 law had special provisions for prompt toxics control, and in 1977 Congress elevated control of toxic pollutants to the highest priority. Toxic pollution standards now being developed by EPA will protect public health directly, by preventing contamination of drinking water supplies, or indirectly by avoiding



Frances Dubrowski

bioconcentration of toxics in plants and fish consumed by humans.

Second, he neglects the law's substantial attention to the cost of pollution control requirements. "Best practicable control technology" standards, which industrial dischargers must meet by 1977, can only be set after EPA balances the cost of control against the effluent reduction benefits. The second level of industrial control, "best available control technology" due in 1984-87, also requires consideration of costs and must be "economically achievable."

Finally, he understates the substantial work that remains to be done. For example, although nonpoint sources (runoff) are responsible for over half of the pollutants entering the nation's waters, they are unregulated under current law. And standard-setting progress for industrial dischargers has been modest indeed. EPA has set only 2 of 34 categorical pretreatment standards for industries discharging into municipal plant and only one final "BAT" standard for those discharging directly to rivers and streams. Disrupting the program now would have serious health and environmental consequences.

Response to Specific Recommendations:

1. *The law already directs EPA to consider the cost of industrial and municipal pollution control requirements. Detailed cost-benefit analyses would delay clean-up of a program acknowledged to be worth its costs.*

The Clean Water Act is already carefully crafted to require EPA to consider the reasonableness of the costs imposed. The law thus strikes a balance between the desire to know whether particular EPA decisions are worth their costs and the urgent need to protect health and the environment in the absence of less than perfect data.

Upsetting this balance by requiring detailed cost/benefit studies would burden the regulatory process with expensive and time-consuming analytical hurdles that are too crude for decision-making. That is because the data needed to perform a cost/benefit analysis is often not available and because some values, like human health, cannot be quantified. For example, a recent EPA study of the pretreatment program identified over 37 significant variables; only 4 were quantitatively addressed in the EPA model.

2. *A return to water-quality based standards is unworkable.*

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Mr. Harrison suggests that the law ought to be rewritten to permit each industrial facility to discharge the maximum amount of pollution that its receiving stream can accommodate. This "water-quality based approach" would return our national clean-up program to a strategy Congress wisely rejected in 1972 after 25 years of failure with this approach. Exhaustive Congressional inquiry a decade ago revealed three major problems with water quality standards. First, scientists are incapable of telling us how much pollution a stream can accommodate. Second, EPA and the states lack the technical capacity to model each particular discharger's control requirements from water quality standards. Third, the lack of uniformity in this approach reduced the states to economic warfare to attract industrial facilities. Therefore, Congress adopted uniform, national technology-based standards as the foundation of the law's requirements.

Nothing has changed since 1972 to suggest that Congress erred. If anything, the technical problems and information costs of using water quality standards are greater today, given the number of potentially critical variables that have been identified and the increased focus on poorly understood toxic chemicals.

3. *The municipal grants program has recently been revised and improved.*

Since 1972, much progress has been made in controlling municipal sewage discharges—over 70% of the nationwide flow now meets secondary treatment levels. Although Mr. Harrison attacks past failures, he does not mention that Congress recently revised this portion of the statute to ensure that future plants will be located where maximum clean-up will occur and that federal funds will be spent on treatment instead of growth. Staffing and training of treatment plant operators is now being emphasized by EPA to upgrade the performance of existing plants.

4. *The national zero discharge goal should be retained.*

The zero discharge goal emphasizes the most cost-effective controls: reclamation of raw materials and water conservation. It does not distort the consideration of costs and benefits. On the contrary, EPA has and will continue to calculate the costs of pollution control at each step of the regulatory process, employing zero discharge only where it is the best and most efficient technological solution.

Moreover, allowing the states total discretion to set our goals as Mr. Harrison advocates will simply return us to the past when states with the weakest goals attracted industry most easily. The national goal prevents such economic warfare and keeps the entire program focused on the elimination of pollution. It deserves to be retained. □

Frances Dubrowski is a senior attorney at the Natural Resources Defense Council, Inc. where she works on water pollution, air pollution, and regulatory reform issues.



Laurence Moss

A FINAL WORD ON ENVIRONMENTAL REGULATIONS: A PROPOSAL TO IMPROVE THEM

Laurence I. Moss

I begin, though at some risk of stating the obvious, by noting that this debate is not concerned with whether government intervention is required to protect and improve environmental quality. We are dealing here with public goods (air and water of acceptable quality) in finite supply (i.e. with limited capacity to accept contamination or pollution before a socially-determined intolerable level is reached). In the general case the polluter benefits by avoiding the costs of abatement. Although this may lower the costs of his products or services, the beneficiaries (his customers and clients) are not necessarily those who suffer the effects of the pollution. In this sense the link between cost and benefit is broken. Free markets will thus lead to more and more pollution. There simply is no credible argument that, absent government intervention, this problem can be solved.

The disagreements center instead on such questions as: Who should decide what is an acceptable level of environmental quality? What criteria and procedures should be used? Can implementation be more effective and efficient?

The debate does not occur in a vacuum. There is an existing framework of laws and regulations dealing with many of these matters. It takes years for new laws to be passed and then run the gauntlet of establishing new procedures and regulations and withstanding the inevitable administrative appeals and litigation. For this reason an existing framework, unless fatally flawed, may be preferred to one that is potentially more efficient and effective.

In order for a pollution abatement strategy to succeed, it must provide for the following: (1) Setting acceptable levels of environmental quality; (2) Influencing polluters to modify their practices so as to achieve that level; (3) Monitoring of both ambient quality and emissions to determine how the strategy is working; and (4) Enforcement to discourage cheating.

Although every successful strategy must contain all of these elements, the way in which each is structured can produce important differences. Probably the most important of these has to do with the amount and quality of in-

formation needed by the responsible government agency to make decisions.

Let us make the discussion more specific by considering the present Clean Air Act as it deals with stationary source emissions, along with an alternative strategy based on the creation of marketable emission rights. Although many variations of a workable emission rights strategy exist, let us assume for this discussion that a limited number of rights to emit particular pollutants for a specified time are periodically auctioned off by the government.

Setting acceptable levels of environmental quality. Here there is no fundamental difference between the two strategies. Useful additional information on the marginal cost of abatement will be provided by the market price of the emission rights, but the problems of weighing such costs against the benefits of abatement are still the same. The analyst can provide needed information, but in the end the decision is best made in a highly visible political process in which the often intangible and incommensurable values are weighed. The Congress is an appropriate forum.

In any event, the present Clean Air Act does not adequately deal with the problems of acid precipitation and fine particulate matter in the respirable size range (which also happens to be the size range of most importance in scattering light and hence affecting visibility). This deficiency should be remedied.

Influencing polluters to modify their practices. Here there is a big difference between the two strategies. The conventional regulatory approach, as embodied in the Clean Air Act, requires specific limits on each significant source. These are stated in the State Implementation Plans (SIPs). State and federal regulators must make thousands of individual decisions, each of them subject to challenge in administrative and judicial procedures. If those decisions are to be efficient in an economic sense, the regulator must be aware of the costs of abatement in each case. Alternatives to be examined include those of new technologies, modes of operation, and even operating levels. In practice this burden of information-gathering and decision-making is intolerable, so the regulator takes shortcuts which appear (though are often far from) equitable. For example, a uniform roll-back in emissions of a given percentage may seem fair, but the emitters' different marginal costs makes it an inefficient way of achieving the desired degree of improvement. Note also that the regulatory strategy gives the polluter an incentive to claim that the technology is not available, or is too expensive. Furthermore, effective public participation at this level of decision-making is sporadic at best.

The Clean Air Act is flexible enough to allow some, perhaps a great deal, of experimentation with strategies that provide an economic incentive to abate. Application of the bubble concept and the trading of offsets in non-attainment areas have already begun. A broadly-based system of marketable emission rights might or might not require the specific sanction of Congress. Even if not required, however, such approval would speed acceptance of the strategy and its ability to withstand legal challenge.

With this strategy the entire system of limits on in-

dividual sources could be abandoned. The "bubble," so to speak, would cover several counties, a state, region, or even the entire nation. Since polluters would have to pay for their rights to emit, they would seek cost-effective ways of reducing their use of these rights. Delay would usually be to their disadvantage.

Many people, even the so-called energy experts, were surprised at the recent (and continuing) drop in U.S. and world demand for crude oil and petroleum products. They underestimated the impact of market forces. I am convinced that many people would be similarly surprised in the drop in demand for emission rights should their prices be high, as they are likely to be if we establish as a goal a high level of environmental quality.

Monitoring. The requirements for ambient monitoring are the same for both strategies. With respect to monitoring of sources, the proponents of conventional regulation claim a major advantage. A violation occurs only when the established limit is exceeded, so a monitoring system which can detect this is sufficient. It need not measure and record the emissions when the total is less than the limit.

In most cases this advantage is of little consequence, since the same key components are required in the monitoring system. I fear that proponents of the conventional regulatory approach have been comparing an inexpensive but also ineffective monitoring system for their strategy with one that is both more expensive and effective for the market-based strategy. When apples are compared with apples the cost is about the same.

Enforcement. Here again the basic requirements are similar for the two strategies, though differences are present in detail. A polluter "cheats" in the regulatory strategy by exceeding his allowable emissions. In the market-based strategy, cheating occurs when emissions exceed the amount for which emission rights have been purchased. Effective monitoring and periodic (unannounced) auditing are required in both cases to catch the violators.

The market strategy perhaps lends itself to a simpler penalty provision. For example, emissions in excess of the purchased rights might be penalized by charging the violator a fixed multiple of the market price of those rights.

This comparison has not dealt with all of the important issues. There is, for example, the question of who keeps the money received from the sale of emission rights. It could be kept by government and used to offset declines in other sources of revenue. It is vital, however, that the objective of attaining the socially-determined acceptable level of environmental quality not be subordinated to the natural desire of government to maximize revenue to fund operations. Alternatively, the money could be periodically refunded to those emitting pollutants, but the formula would have to be based on something other than emissions, since to do so would nullify the incentive to abate. The environmentalists and industrialists of the National Coal Policy Project in their plan recommended a refunding formula based on useful output (from "Where We Agree," *Report of the National Coal Policy Project*). A

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scheme of distributing emission rights without charge to existing emitters also avoids the collection of revenue by government, though at the cost of rewarding those whose abatement efforts have lagged.

The Clean Air Act has been criticized on many grounds. Much of this criticism is unconvincing. Congress, with all its faults, is probably the best body we have to make the kinds of value-laden trade-offs that lead to specific standards and allowable increments (as with prevention of significant deterioration in areas with relatively clean air). The fiction of ambient threshold concentrations below which no adverse effects occur is troublesome, though it has proven convenient in establishing air quality goals that

are probably about right (though the omission of certain key pollutants should be remedied).

The Act's most serious defect, at least insofar as it has been implemented to date, lies in the mechanisms chosen to meet the goals and standards. Is this a fatal flaw? I'm not sure. But a market-oriented approach to implementation holds promise of greatly reducing the burden of information-gathering and decision-making required of government, and, at the same time, improving effectiveness and economic efficiency. It deserves a fair trial. □

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FREEZE CONFERENCE & KENNEDY-HATFIELD RESOLUTION

On February 19-21, several hundred supporters of the Bilateral Freeze Campaign (to halt the testing, production and deployment of nuclear weapons systems) met in Denver for the second annual meeting. Ten days later, on March 2, Senators Edward Kennedy and Mark Hatfield circulated a "Dear Colleague" letter asking for co-sponsors for a resolution asserting that:

1. As an immediate strategic arms control objective the United States and the Soviet Union should:

- (a) pursue a complete halt to the nuclear arms race;
- (b) decide when and how to achieve a mutual and verifiable freeze on the testing, production, and further deployment of nuclear weapons, missiles and delivery systems; and
- (c) give special attention to destabilizing weapons whose deployment would make such a freeze more difficult to achieve.

2. Proceeding from this freeze, the United States and the Soviet Union should pursue major, mutual, and verifiable reductions in strategic nuclear weapons, missiles and delivery vehicles, through percentage annual reductions or comparable means, in a manner that enhances stability.

The introduction of this resolution and the serious treat-

ment it is being given by its backers is a major turn in the fortunes of the Freeze Campaign which has already become the major grassroots arms control movement.

The Freeze Campaign now has organized supporters in 43 states and is strong in 20 of them. In California, a campaign to put the freeze on the ballot as a referendum has, already, 400,000 of the 500,000 signatures needed to qualify. Respected polls in California show that 60% of the population already support the freeze campaign! Nevertheless, Harold Willens, state coordinator of the campaign, advised FAS that a \$2 million to \$3 million budget was planned to put the campaign over; it would include ads throughout the country.

FAS members will be pleased to see that the Kennedy-Hatfield resolution incorporates the notion of "percentage reductions" in which both sides would scale down their strategic forces in some equitable and proportional way with the least desired weapons being thrown away first by the two sides. This notion, which attracted unanimous support in the Senate Foreign Relations Committee in 1979, embodies a method of reaching, by stages, such goals as the (subsequently enunciated) 50% cut of Professor George Kennan.

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