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In fiscal year 1978, 22 Federal departments and agencies expect outlays of \$11.5 billion for environmental programs. The Environmental Protection Agency (EPA) accounts for about half of these outlays (\$6 billion). Although covering a wide range of activities, Federal environmental programs are classified in three broad categories: pollution control and abatement; understanding, describing, and predicting the environment; and environmental protection and enhancement. Findings/Conclusions: The strategy to control air, water, and noise pollution has centered on national uniform technology-based standards. This strategy may not be cost effective, efficient, or equitable, and it is being resisted by industry, States, and municipalities. Attention needs to be given to identifying alternative regulatory strategies and cost/benefit analyses. The environmental protection goals which are considered important include: developing effective environmental protection regulatory strategies; managing Federal environmental protection program contracts, loans, and grants effectively; minimizing the environmental protection program's economic impact on the public and private sectors; assuring effective institutional arrangements to implement environmental laws and to consider tradeoffs; protecting humans and the environment from harmful pesticides and toxic substances; protecting health and the environment from the effects of improper disposal of solid wastes; and insuring the purity and safety of drinking water in the United States. (SC)

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***STUDY BY THE STAFF  
OF THE  
U.S. GENERAL ACCOUNTING OFFICE***

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**Environmental Protection Issues  
Facing The Nation**

## FOREWORD

In recent years the need to protect human health and the environment from pollution has become clearly evident. The Federal Government has responded to this need by enacting far-reaching legislation which could cost an estimated half a trillion dollars over the next few decades. Questions have been raised on whether the environmental goals are too costly to achieve or whether the right balance has been struck between environmental objectives and energy, economic, and social "goals." These questions must be answered if a viable environmental program is to be achieved.

As part of our continuing reassessment of critical national issues, and as an aid in focusing our own objectives, we have tried to identify the environmental program areas most in need of attention. This study describes and identifies what we believe are the major environmental issues facing the Congress and the Nation. Each issue is tied into a series of goals representing crucial elements of the national environmental program. The issues and goals represent the perspective we used to plan our future auditing activities.

It is hoped that others will find this study helpful in planning their own activities and that a better understanding of environmental issues will result.

This document was developed by the Environmental Program Planning and Coordination Staff with the cooperation of other offices. Questions regarding this study should be directed to Roy J. Kirk, Assistant Director, (202) 275-5165.



Director  
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**ABBREVIATIONS**

EPA	Environmental Protection Agency
GAO	General Accounting Office

## CHAPTER 1

### INTRODUCTION

The U.S. economy each year absorbs billions of tons of natural resources to produce goods and services. Simultaneously, it produces polluted rivers and streams, the smog that characterizes major cities, hazardous wastes, radiation, and noise--all of which detract from the quality of life.

Pollution in its various forms has been an environmental concern for many years. Federal policy has gradually evolved to deal with it on a national basis, culminating in comprehensive legislation during the 1970s. This legislation substantially increased the Federal regulatory and funding role and committed the Nation to ambitious goals for a clean environment. If carried out, current laws will require estimated expenditures of up to \$500 billion over the next few decades. This study outlines the major goals and issues in the environmental protection area which we believe require additional consideration.

### LEVEL OF EFFORT COMMITTED TO ENVIRONMENTAL PROGRAMS

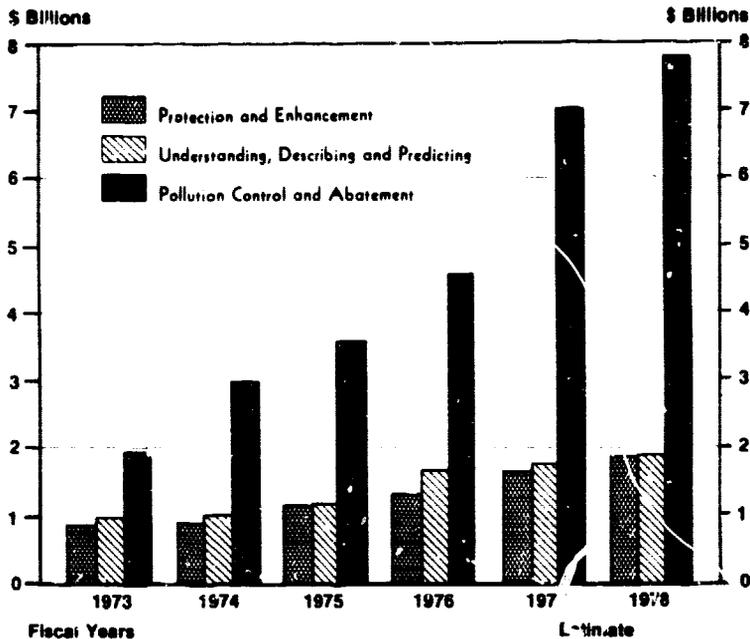
In fiscal year 1978, 22 Federal departments and agencies expect outlays of \$11.5 billion for environmental programs. The Environmental Protection Agency (EPA) accounts for about half of these outlays (\$6 billion). Although covering a wide range of activities, Federal environmental programs are classified in three broad categories: pollution control and abatement; understanding, describing, and predicting the environment (research on the effects of pollutants on the environment); and environmental protection and enhancement. Total Federal expenditures for each category are shown on the following page. Federal expenditures are only one indication of Federal involvement. The Council on Environmental Quality estimated that industry would spend \$23.6 billion in 1976 on pollution control, about half of it as a direct result of Federal environmental protection laws.

States and municipalities were expected to spend \$3.3 billion in 1975, not including Federal grants, on environmental protection programs.

### ENVIRONMENTAL PERSPECTIVE

If the environment had unlimited capacity to absorb or assimilate wastes, there would be no pollution problem. However, it does not. Further, because the environment is not owned or controlled by anyone, it is overused and abused.

## Environmental Outlays, by Category, 1973-1978



Source: U.S. Government  
Budget for fiscal year 1978

Action, therefore, must be taken by Federal, State, and local governments to limit the amount of pollution that can be tolerated without endangering ecological systems or the health and welfare of human beings. The key to effectively managing the environment is to know how much pollution it can assimilate, the abatement or control actions needed considering both economic and social costs, and the relationship between these actions and developing the Nation's natural resources and continuing general prosperity. Unfortunately, research, monitoring, and analytical efforts generally have not provided the precise information needed to answer these questions.

Therefore, the strategy to control air, water, and noise pollution has centered on national uniform technology based standards. This strategy may not be cost effective, efficient, or equitable and is being resisted by industry, States, and municipalities. In the future, attention needs to be given to identifying alternative regulatory strategies and cost/benefit analyses.

The strategy developed to control chemicals that may be harmful to humans and the environment requires manufacturers to test chemicals for toxicity before manufacture or use. The problem with this strategy is that it takes years

of health effects research to determine the toxicity of chemicals on laboratory animals. Further, it must be proven that chemicals toxic to animals are also toxic to humans. In the future, a lot more attention needs to be given to controlling toxic chemicals.

### RECENT TRENDS AND OUTLOOKS

The Congress, during the last several years, recognized the need to protect human health and the environment from pollution and enacted tough Federal laws with far-reaching consequences that would be felt for years to come. As a result, considerable air and water quality improvement has been or soon will be achieved.

But now that cleanup efforts have proceeded about as far as present technology and escalating costs can justify, the Government is faced with defending its actions in court. Much of EPA's staffing resources have gone into defending itself against more than a thousand suits, brought both by environmentalists seeking sterner enforcement and by companies seeking relief from what they regard as arbitrary and ruinous interpretations of the statutes.

Further, although the quality of the environment has improved, the Nation is having trouble achieving established short-range goals. At least half of the Nation's 247 designated air quality control regions are violating the minimum 1975 standards and it now appears that some major cities may never be in compliance. Similarly, fewer than half of the Nation's municipalities will meet the July 1, 1977, water pollution control requirements, and for some, compliance is well over a decade away. Many cities and States are flatly refusing to implement the elaborate traffic control and land use plans that were supposed to go into effect when less drastic measures failed to bring air quality to mandated levels. However, there is little EPA can do about these violations.

Another problem is that the statutes and resultant regulations, which now fill several 5-foot shelves, often overlap in their impacts, both physical and fiscal. The problem of fragmented, and often confusing, environmental regulations bears heavily on both industry and communities.

Mr. John R. Quarles, Jr., former Deputy Administrator, EPA, stated that:

"Anyone who carefully examines the tangle of requirements which apply to industrial growth will quickly conclude that the complexities of the current system are unduly burdensome and that the system should be simplified.

"The need seems obvious to pull together the mass of separate regulations into a streamlined, integrated single system. More flexibility (than the statutes now permit) is called for in applying many of the standards and criteria contained in existing regulations.

"Common sense would suggest that environmental and related factors should be balanced against economic and other social objectives in deciding whether further industrial growth should be permitted in a particular locality.

"But current regulations often obstruct or prohibit a balancing of such factors in the light of local needs and desires. Instead we have a series of single-dimension regulatory requirements, many created by Federal law imposing rigid national requirements."

There is a definite lack of flexibility in much of the environmental legislation and economic considerations are grossly underrepresented. It is far easier to calculate the costs of pollution abatement than the benefits. The Council on Environmental Quality estimated that almost half a trillion dollars will be spent by the Nation for pollution control during the period 1975 through 1984. However, it is difficult to place a price tag on clean air and clean water for there are many factors to be considered: health, recreation, land values near recreational sites, and aesthetic factors that resist quantifying. Therefore, it is largely unknown whether the compliance costs will exceed the benefits achieved.

To overcome problems with current regulatory strategies, there is talk about the desirability of departing from such strategies based on regulation to one using economic incentives such as imposing emission and effluent fees on polluters, providing subsidies for abating pollution, or assessing charges for failure to meet abatement schedules.

## Recent actions

Now that some progress is being made to clean up the most common pollutants, scientists are uncovering whole new families of pollutants harmful to humans and the environment: toxic substances, pesticides, and hazardous wastes.

Roughly, 1,000 new chemicals are produced every year. More than 12,000 compounds are already on the Government's toxic substances list; 1,500 are suspected of causing tumors; and 30 compounds currently used in industry are known to cause cancer. Up until now, the Government has not had the authority to find out the quantity or composition of new chemicals that are being used in manufacturing. This had made it almost impossible to regulate the production and use of toxic chemicals.

To remedy this deficiency, the Congress enacted the Toxic Substances Control Act of 1976. The act requires more rigorous testing and controls for use of new chemicals.

The volume of solid waste is huge and rapidly increasing. For example, each year municipalities spend over \$3.35 billion to collect and dispose of solid waste which contains hazardous substances. These substances are leaked from trash heaps by rain water into ground and surface water. It is unknown how much industry or consumers spend on solid waste disposal, but a lot of it contains hazardous substances. For example, one researcher estimated that there are 300,000 tons of polychlorinated biphenyls (PCBs) in U.S. junk yards and that 60,000 tons have already been leaked into U.S. waters. PCBs cause cancer in laboratory animals.

The Congress enacted the Resource Conservation and Recovery Act of 1976 which provided for Federal controls over hazardous waste disposal. The act mandates the establishment of Federal standards to regulate the generation, transport, storage, and disposal of hazardous wastes.

## Pending legislative changes

Major legislative changes being considered by the 95th Congress include amendments to the

- Clean Air Act to extend automobile manufacturers' emission standards and clarify the significant air quality deterioration issue (preventing industry from siting plants in clean air regions), and

--Federal Water Pollution Control Act to make midcourse adjustments based upon the National Commission on Water Quality's recommendations contained in its March 18, 1977, report.

A summary of the National Commission on Water Quality's recommendations follows:

"The Commission recommends that Congress provide specific legislative directive to keep the nation's water pollution control program on an effective course toward the objectives of the Act. The recommendations in this report sustain and enforce most of the major goals and objectives of Public Law 92-500. They suggest alterations in the implementing strategy to give the program a stability and continuity of funding and facilities design, and the necessary flexibility for more effective implementation. Essentially, the recommendations would:

1. Maintain the July 1, 1977, date for compliance with uniform treatment requirements by both industry and publicly owned treatment works, but provide some flexibility to grant extensions, and even waivers, on a case-by-case and category-by-category basis.

- 2.A. Maintain the 1983 interim water quality goal, while postponing the 1983 requirements for application of uniform technologies five to ten years, pending an assessment of progress in water quality improvement and review of these results by a new National Commission on Water Quality by 1985.

- B. Meet the 1983 interim water quality goal by application of the 1977 requirements to all dischargers, revisions of 1977 limitation, effluent limitations for the elimination of the discharge of toxic pollutants in toxic amounts beginning immediately, new source performance standards for all new point source discharges, periodic upgrading of permits for discharges into water quality limited waters, and application of control measures to combined sewer overflows, urban stormwater runoff, agricultural and nonpoint sources.

3. Decentralize regulatory and administrative functions of the national program by selective certification of states, based on satisfactory state plans and programs to control both point and nonpoint sources (including irrigated agriculture.

4. Stabilize the Federal construction grants program by assuring 75 percent Federal financing for priority treatment needs at a fixed amount (not less than \$5 billion nor more than \$10 billion per year) for a specified number of years (five to ten).

5. Redefine the goal of elimination of discharge of pollutants as one stressing conservation and reuse of resources.

6. Authorize flexibility in applying control or treatment measures to irrigated agriculture after an inventory of the problem, and support salinity alleviation projects to reduce salt loads from sources other than man's activities."

### ENVIRONMENTAL PROTECTION GOALS

The Nation has embarked upon an ambitious program to clean up the environment. The success or failure of this effort will depend to a large extent on how well Federal, State, and local governments are implementing environmental protection programs. However, questions still abound on whether environmental goals are too costly to achieve or whether the right balance has been struck between environmental objectives and energy, economic and social goals. The energy crisis coupled with a period of inflation and unemployment has led to a general reexamination of pollution control goals and strategies.

The environmental protection goals considered important to us are:

- Developing effective environmental protection regulatory strategies (air, water, noise, and radiation).
- Managing Federal environmental protection program contracts, loans, and grants effectively.
- Minimizing environmental protection program's economic impact on the public and private sectors.
- Assuring effective institutional arrangements to implement environmental laws and to consider tradeoffs.
- Protecting humans and the environment from harmful pesticides and toxic substances.

--Protecting health and the environment from the effects of improper disposal of solid wastes.

--Insuring the purity and safety of drinking water in the United States.

Major issues related to each of these goals are discussed in chapters 2 through 8.

## CHAPTER 2

### DEVELOPING EFFECTIVE ENVIRONMENTAL

#### PROTECTION REGULATORY STRATEGIES

##### (AIR, WATER, NOISE, RADIATION)

The Environmental Protection Agency is the Federal agency primarily responsible for implementing air, water, and noise pollution control laws. It also has a less well-defined role to protect the health and welfare of man and the environment from adverse effects due to radiation exposure. Basically, the regulatory process followed by EPA for controlling pollution involves

- deciding the environmental quality level desired,
- setting environmental quality standards,
- deciding on the abatement actions or methods to achieve the standards,
- monitoring compliance with standards and abatement schedules, and
- taking enforcement action against violators.

### LEGISLATION

#### Air pollution control

There has been serious concern about air pollution in U.S. cities since the end of World War II, when States mounted the first attack on air pollution. The Congress followed with a series of laws providing a framework for cleaning up the Nation's air in a concerted, comprehensive fashion. The Clean Air Act of 1967 and its 1970 amendments were the most important of these Federal laws.

The 1970 amendments provided for developing and enforcing two kinds of ambient air quality standards-- "primary" standards to protect human health and "secondary" standards to protect welfare, including property and aesthetics. The amendment's stated goal was to achieve primary standards nationally between 1975 and 1977.

The amendments also set forth a two-part strategy for attaining this goal: first, EPA was to establish air

quality standards for major pollutant classes. EPA issued these standards in November 1971 covering particulates, sulfur oxides, hydrocarbons, carbon monoxide, oxides of nitrogen, and photochemical oxidants.

Next, the States were to develop implementation plans, indicating how they intended to achieve the standards. Typically, each implementation plan is a compilation of State air pollution statutes and regulations and of pollution control strategies--including emission limitations, land use controls, and transportation controls. EPA is required either to approve the State implementation plans, thus making them part of Federal law, or to amend them in conformance with its criteria for attaining ambient air standards.

The Clean Air Act Amendments of 1970 were intended to minimize pollutant emissions from new sources. The agency established emission standards for major new "stationary" sources, such as powerplants, factories, and refineries, and for new "mobile" sources, such as automobiles and trucks that had not yet come off the production line. For example, the amendments required a 90-percent reduction in major pollutants from automobiles within 5 years.

### Water pollution control

The Federal Water Pollution Control Act Amendments of 1972 imposes federally set, nationally uniform effluent limitations on various categories of water pollution sources. One set of limitations ("best practicable control technology currently available") must be met by nonmunicipal sources by 1977, and a second, more stringent set of limitations ("best available technology economically achievable") must be met by 1983. The precise limitations are established by EPA on an industry-by-industry basis and are to be substantially uniform for all sources of a given technology, size, and age within each industry. No consideration can be given to the cost-benefit situation at any particular site.

Municipal sources of waste must achieve "secondary treatment" by 1977 and "best practicable waste treatment technology over the life of the works" by 1983. The 1983 limitations must be set with reference to a "national goal," stated in the statute, "that the discharge of pollutants into the navigable waters be eliminated by 1985." Each discharger must obtain a permit which limits the amount of pollution that may be discharged. The amendments also provide for regulating toxic pollutants.

The Ocean Dumping Act of 1972, as amended, regulates ocean dumping by ships and other ships leaving ports. EPA has jurisdiction over all materials dumped into the ocean. The Corps of Engineers has responsibility to control dredge and fill material. The Coast Guard has surveillance duties to prevent unlawful dumping. EPA's goal is to stop all dumping of harmful wastes within the next several years.

### Noise pollution control

Before 1972, major Federal activities in the field of noise control legislation were limited. The Noise Control Act of 1972 became law in October 1972. Under the act, EPA exercises primary regulatory authority for products distributed in commerce. It provided uniform Federal regulation of major noise sources, such as motors and construction, transportation, and electrical equipment.

EPA coordinates all Federal agency noise control programs, and when it believes that a proposed standard or regulation fails to protect public health and welfare, it may request an agency to report on the advisability of revising the standard or regulation. A more complex statutory procedure is applicable to aircraft noise, but the thrust is that EPA has a prominent role in issuing aircraft noise control regulations.

Although States and municipalities retain primary responsibility for noise control, they may not enact laws or regulations that conflict with Federal noise emission levels. They may, however, restrict the use, operation, or movement of any product or combination of products, including trucks engaged in the construction industry.

Under the Noise Control Act, EPA must develop criteria identifying the effects of noise on public health and welfare and must specify the noise reduction necessary for protection with an adequate safety margin. The agency concluded that virtually all the population is protected against lifetime hearing loss when annual exposure to noise, averaged on a 24-hour daily level, is less than or equal to 70 decibels.

### Radiation control

EPA assumed the Federal Radiation Council's radiation protection overview role under Reorganization Plan No. 3 of 1970. This role is being carried out by a number of inter-agency committees addressing specific problems of mutual concern to the involved agencies. Action areas being pursued include medical X-rays, occupational exposures,

plutonium cleanup and restoration, management of radioactive wastes, and publication of the Annual Report on Radiation Protection Activities. EPA exercises its authority under the Atomic Energy Act of 1954 to set generally applicable radiation protection standards; however, other Federal agencies are required to use their own authorities to implement or enforce these standards. EPA establishes and enforces radiation standards under the Federal Water Pollution Control Act, the Clean Air Act, and the Ocean Dumping Act. In the case of Federal guidance, each Federal agency must adopt the guidance and establish enforcement procedures.

### THE REGULATORY STRATEGY PROBLEMS AND ALTERNATIVES

The Congress adopted regulatory strategies to control air, water, radiation, and noise pollution. The strategies, basically, center on a standard-setting-monitoring-enforcement-regulatory process coupled with uniform effluent and emission limitation requirements. This process requires complicated interactions between the Congress, which establishes policies, goals, objectives, requirements, and the basic structure of the regulatory processes; administrative agencies, which define and implement the regulatory processes; and the courts, which review the administrative implementation of environmental protection laws at the behest of opponents and proponents.

Implementing this regulatory process is not an easy task. First, there is no way that the millions of Americans who are affected by environmental degradation can individually decide the level of environmental quality they want. Only collectively through Government can the desired level of environmental quality be decided and agreement reached on the amount of money citizens are willing to pay for the cleanup.

Second, decisionmakers need sound scientific research information on the effects of pollutants on man and the environment. This information is needed to establish reasonable environmental protection standards and requirements to effectively implement environmental protection legislation. Unfortunately, the Federal research effort has not adequately provided this information. The standards and requirements, therefore, are based on

--limited information on environmental trends and conditions,

- value judgments,
- social decisions,
- technology, and
- political considerations.

As a result, Federal environmental protection standards and requirements are coming increasingly under attack from some segments of the private and public sectors.

Third, once environmental protection standards are set, the method of achieving the standards becomes critical. For political and administrative reasons, the Federal strategy is to establish uniform, rigid pollution control requirements based upon control technology. This strategy is economically inefficient and in some cases is environmentally counterproductive. For example, the technology based uniform effluent limitation strategy mandated by the Federal Water Pollution Control Act Amendments of 1972 does not allow for cost-effective alternatives. For example, one alternative would be to allow discharge of primary treated waste water into the oceans which have the assimilative capacity to absorb it. This would in some cases prevent further degradation of the oceans, however, the pollutants removed during the treatment process remain. Disposal of these pollutants may be more environmentally damaging than dumping the untreated waste water directly into the ocean.

Fourth, Federal and State governments face monumental tasks in monitoring and enforcing actions against literally thousands of pollution sources. Because enforcement actions play an important role in pollution control policy, it may be wiser and cheaper for a discharger to appeal an environmental protection standard or requirement which he believes is not based on sound scientific information than to install pollution control equipment. With limited investigative resources, procedural and legal safeguards, and an overcrowded court system, enforcement actions by regulatory agencies would be difficult in the face of widespread resistance.

Like air and water pollution control programs, EPA's implementation of the Noise Control Act has generally been slow and beset with problems. Some of the deficiencies include failure to

- effectively coordinate the noise research and noise control programs of other Federal agencies including the Department of Transportation, the Occupational Safety and Health Administration and the Consumer Product Safety Commission;

- assist States and local governments in establishing noise control programs;
- assess the noise research done by other Federal agencies;
- issue timely regulations for reducing noise in our environment;
- provide sufficient health or welfare analyses in proposed aircraft regulations; and
- establish after almost 4 years a clearly defined noise strategy which sets forth EPA's goals, and timing and priority for actions.

Although not clearly defined, EPA has the Federal responsibility to protect the health and welfare of man and the environment from adverse effects due to radiation exposure. This responsibility is carried out by continuously reviewing scientific and technical information to assure that EPA's radiation protection philosophies, policies, and controls are sound. To this end EPA's strategy is to protect public health and the environment due to radiation exposure without the existence of offsetting benefits, and within this framework, to minimize risk in a cost-effective manner. EPA has broader responsibilities in the radiation area than it has in most other environmental areas for it may consider public health protection related not only to the environment, but also to medical and occupational exposures.

However, there is uncertainty as to EPA's role in the radiation area. This uncertainty has arisen because of

- proposed legislation which will require EPA to increase its research, monitoring, and compliance efforts;
- increased responsibilities for responding to and coordinating Federal efforts during accidents at nuclear facilities or during shipment of radioactive materials;
- policy or procedural changes resulting from judicial decrees arising from suits against EPA; and
- new initiatives from other involved Federal agencies, such as the Nuclear Regulatory Agency, the Energy

Research and Development Administration, and the  
National Oceanographic and Atmospheric Administration.

Alternative strategies

Are there alternative strategies to achieve air, water, and noise pollution control goals? Several have been proposed--primarily by economists. The more prevalent alternative strategy is to use effluent or emission fees. When properly used, effluent or emission charges will help secure economically efficient pollution cleanup. For example, a uniform fee--say 10 cents for each pound of sulfur a firm emits into the air--would induce firms to reduce sulfur emissions just to the point where removal costs equal the emission cost, i.e. 10 cents. Below this point, the costs of removing sulfur are less than the charge; whereas, beyond this point, it is cheaper to pay the fee than to remove the sulfur. The removal cost for each firm compared to the size of the fee, will therefore determine the percentage of sulfur which that firm will find profitable to remove. Firms that can control sulfur relatively cheaply will clean up more and pay less in the way of fees, while firms with higher control costs will clean up less and pay more in the way of fees. Effluent fees accordingly appear to offer the advantage of decentralizing cleanup decisions (which reduces Government's administrative costs and controls) in a way that minimizes the cleanup costs to society.

In contrast, the regulatory approach at first glance seems much less attractive. It requires EPA to promulgate rules governing the behavior of all waste resources, thus centralizing the burden of decisionmaking. Furthermore, desires for administrative simplicity and equality of treatment tend to produce inefficient regulations that require all polluters to reduce their emissions by the same extent, regardless of whether a firm's abatement costs are high or low. The resulting inefficiency can substantially increase the cost of achieving a given level of pollution control--by billions of dollars on a nationwide basis.

Why then have most environmental programs resorted to the regulatory approach? One reason is that fees entail some uncertainty about the level of cleanup that will be achieved unless (as is unlikely) polluters' reaction to a fee schedule can be exactly predicted in advance. Proponents of fees argue that this uncertainty can be dealt with by subsequently adjusting the initial fee upwards or downwards, as appropriate. But if polluters

know that the initial fee may be in force for only a short time, their immediate response will not be representative of their long-term behavior. Furthermore if polluters make significant capital investments (or other basic changes not easily reversed) in response to an initial fee, their responses to later changes in the fee schedule will be distorted in possibly wasteful ways. Thus, to be confident of promoting the desired level of cleanup, the fee-setting authority will have to know in some detail the cleanup costs of the relevant polluters; this necessity undercuts some of the claimed advantages of fees in decentralizing decision-making.

Regulation, in contrast, appears to promise greater certainty in the level of quality achieved, at the price of higher costs due to its inefficiency. Moreover, in the heyday of environmental enthusiasm between 1968 and 1972, considerations of costs were apparently less persuasive than getting the job done. Also, the legal background of most legislators and the political gains to be had from cracking down on polluters contributed to the almost universal choice in the Congress of the regulatory approach. Moreover, the appeal of fee schemes depends on the assumption that polluters will act to minimize their economic costs, an assumption that may be at odds with reality in many instances. For example, the managers of municipal waste treatment plants may not respond to economic incentives; and large firms with some market power may prefer merely to pay the fee, rather than reduce pollution.

On the other hand, fee schemes can make administration and enforcement more effective and less costly. Fee schemes provide a continuing incentive to control emissions, while typical regulatory sanctions encourage the polluter to postpone as long as possible the day on which he must choose between compliance and suffering a sanction.

It is unlikely in the near term that the Congress will substitute a fee system for the regulatory approach in view of the lack of operational experience with effluent and emission charges. In the long run though, a fee system may be the most viable, cost-effective, administratively efficient alternative to achieve and maintain the high levels of environmental quality the American people expect. If this is the case, then the Federal Government ought to be experimenting with such a strategy--perhaps in limited parts of the country or by introducing fees gradually into a regulatory approach.

Another strategy to achieve air and water pollution control is to establish regional standards with some sort of centralized regional management focusing on the most cost-effective methods of achieving air and water quality standards. For example, a public river basin authority, operating its own large-scale waste water treatment plant or plants, could charge every polluter a fee to treat its wastes. Such an authority could also undertake measures to directly alter conditions in the river, such as programming water releases to maintain minimum flows, or adding oxygen directly to a river to support the ecological balance.

### ISSUES TO BE RESOLVED

Effective implementation of Federal environmental protection legislation is contingent upon following a sound strategy to control pollution. The present regulatory strategy, however, is being challenged on the grounds that it is neither efficient nor cost effective. Issues which we believe should be addressed in developing an implementation strategy are:

- Are the chosen levels of environmental quality reasonable?
- How effective are the present regulatory strategies in achieving environmental protection objectives?
- Are there alternative strategies that may be more efficient, cost effective, and equitable?

### OUR PAST REVIEWS

Past reviews have concentrated on EPA's implementation of air, water, and noise pollution control programs.

#### Reports (issued since January 1, 1974)

Noise Pollution--Federal Program to Control It Has Been Slow and Ineffective (CED-77-42, Mar. 7, 1977)

Pollution from Cars on the Road--Problems in Monitoring Emission Controls (CED-77-25, Feb. 4, 1977)

Problems and Progress in Regulating Ocean Dumping of Sewage Sludge and Industrial Wastes (CED-77-18, Jan. 21, 1977)

Report on Effects of Detonation of a Nuclear Device--Radiation Monitoring Programs of EPA and NOAA (CED-77-6, Oct. 26, 1976)

Implementing the National Water Pollution Control Permit Program: Progress and Problems (RED-76-60, Feb. 9, 1976)

Federal Programs for Research on the Effects of Air Pollutants (RED-76-46, Dec. 11, 1975)

Control of Aircraft Noise and Air Pollution: Meetings Between FAA and the Public (RED-75-384, Jun. 19, 1975)

Cleaning up the Great Lakes: United States and Canada Are Making Progress in Controlling Pollution from Cities and Towns (RED-75-338, Mar. 21, 1975)

Implementation of Federal Water Pollution Control Act Amendments of 1972 is Slow (RED-75-291, Dec. 20, 1974)

Research and Demonstration Programs to Achieve Water Quality Goals: What the Federal Government Needs to Do (B-166506, Jun. 16, 1974)

#### OUR ONGOING REVIEWS

Current reviews center on evaluating the reasonableness of air and water pollution control goals and strategies, determining why Federal agencies are having problems implementing air and water pollution control programs, and surveying EPA's radiation control program.

Evaluation of national air and water pollution control goals and strategies.

Review of water pollution control activities on the Mississippi River.

Review of control over chlorine discharges by industries and municipalities.

Review of nonpoint sources of water pollution.

Survey of EPA radiation programs for standard setting and monitoring.

Survey of EPA's fuel economy testing program.

## CHAPTER 3

### MANAGING FEDERAL ENVIRONMENTAL PROGRAM

#### CONTRACTS, LOANS, AND GRANTS EFFECTIVELY

The Environmental Protection Agency administers a wide variety of pollution abatement and control grants, loans, and contracts. Recipients include:

- Municipalities, for constructing waste water treatment facilities.
- Regional agencies, for areawide planning.
- States, for developing ways to clean up lakes, administering air and water pollution control programs, and conducting manpower and training programs.
- Universities and private firms, for research and development.

#### LEGISLATION

The Federal Water Pollution Control Act Amendments of 1972 set a national goal to eliminate all pollutant discharges into navigable waters by 1985. By 1983, however, the water quality should be suitable for fish, shellfish, and wildlife and for swimming and other recreation uses.

The Congress gave EPA the contract authority to obligate \$18 billion during fiscal years 1973-77 for the construction of municipal waste water treatment and collection facilities. An additional \$480 million was appropriated under the Public Works Employment Act. From these funds EPA makes grants to municipalities of 75 percent of the eligible design and construction costs.

The Public Works Employment Act also authorizes the Economic Development Administration to make grants--aggregating not more than \$2 billion for fiscal year 1977--to State and local governments. The grants are to be used to finance the construction costs of local public works projects, including waste treatment facility projects, in high unemployment areas. The grant shall be equal to either 100 percent of the project cost or the amount needed to increase the total Federal contribution to 100 percent.

Recently the Federal Water Pollution Control Act was amended (Public Law 94-558, Oct. 19, 1976) authorizing EPA to guarantee loans to States or municipalities which are unable to finance at reasonable interest rates the non-Federal share of construction costs. The EPA-guaranteed loans will be made by the Federal Financing Bank.

### THE MANAGEMENT PROBLEM

During fiscal years 1973-77, EPA provided \$466.5 million to States to implement air and water pollution programs, \$370 million to regional planning agencies for areawide water pollution control planning. EPA plans to obligate \$18 billion in grant funds to municipalities for constructing municipal waste water treatment facilities. The National Commission on Water Quality recommended in a March 18, 1976, report to the Congress that an additional \$5 to \$10 billion annually be authorized and appropriated for a period ranging from 5 to 10 years for constructing waste water treatment facilities.

Recently, there has been a push from the Congress and the administration to rapidly obligate this money to help stimulate the sluggish economy. EPA, however, does not have an effective research and development program, adequate management controls over the grant program, or the staffing capability to properly administer an expenditure of \$68 billion over a 10- to 15-year period.

The problem, in part, is the financing structure of the grant program and the staffing capabilities of EPA and State agencies to administer the dramatic increases in the construction grant program. Additionally, the Federal Water Pollution Control Act Amendments of 1972 substantially revised and imposed complex new grant award requirements.

Staffing has not kept pace with the program's rapid expansion. In fiscal year 1968, 320 EPA construction grants program employees obligated \$191 million. However, in 1975, 595 employees (less than a twofold increase) obligated \$4 billion (more than a twenty fold increase). Although the States are expected to assume more program responsibility, they generally have similar staffing shortages. The responsibility for waste treatment facility design and construction is placed in that unit of government which often has the least technical expertise and financial input--the municipality.

EPA awards grants to municipalities subject to grant regulations and conditions and to State and EPA approval. Municipalities in turn rely on architect and engineering firms to

- select the treatment process,
- design the treatment facility,
- supervise construction, and
- represent the municipality before EPA and State officials.

The architect and engineering firms, however, assume little responsibility and can be held legally responsible only in those cases involving gross negligence. Further, the firms are reluctant to try new or improved treatment processes or methods because of their basic conservative nature and because many States will recommend only the most developed technologies for Federal fundings.

Our past and present reviews show that

- excessive construction costs are being spent on extraneous items, such as ornate structures, fountains, and reflecting pools, that are not necessary for the treatment of waste water;
- waste treatment plants are inoperable or not operating at design standards;
- new, less costly treatment processes are not being developed;
- construction of treatment facilities is not being properly supervised;
- treatment facilities are not being properly operated and maintained; and
- there is minimal control over the financial management of the program.

In addition to EPA, other Federal departments and agencies, including the Farmers Home Administration, Department of Agriculture; the Economic Development Administration, the Department of Commerce; the Department of Housing and Urban Development; the Department of Transportation; and the Small Business Administration administer grants, contracts, and loans which have an impact on pollution control activities. Although there is wide-ranging involvement in pollution control activities, no focal point exists with knowledge of the total picture and only minimal coordination has taken place.

## ISSUES TO BE RESOLVED

Because huge sums of money are being spent on pollution control, priority attention should be given to how well these funds are being managed and whether intended results are being achieved. Important issues which should be addressed include:

- Are Federal funds for environmental programs being used in the most effective, efficient, and economical manner?
- Are Federal funds being used only for the purposes intended and are they properly being accounted for?
- Are there alternative uses of Federal funds which will result in achieving environmental protection objectives at less cost, more effectively, and promote the development of new and innovative technology?
- Are the various Federal agencies effectively coordinating their grant and loan programs for waste water treatment facilities to avoid duplication and overlap?

## OUR PAST REVIEWS

Past reviews have concentrated on the effectiveness of EPA's water pollution research and development and construction grant programs before or soon after the enactment of the 1972 amendments; the potential of value analysis to reduce the cost of waste water treatment facilities; delays in awarding construction grants; and Federal, State, local and public roles in constructing municipal waste water treatment facilities.

## Reports

Delays in Constructing Waste Treatment Facilities After Awarding Construction Grants--Improvements Made (CED-77-1, Nov. 10, 1976)

Effects of EPA's New Regulations for Procurement of Architect-Engineer Services under the Construction Grant Program (RED-76-112, June 1, 1976)

Federal, State, Local, and Public Roles in Constructing Waste Water Treatment Facilities (RED-76-45, Dec. 5, 1975)

Report on Potential Problems in EPA's Administration of the Waste Water Treatment Construction Grant Program (RED-76-31, Oct. 24, 1975)

Review of EPA's Compliance with User Charge Requirements in the Construction Grant Program (RED-76-17, Aug. 25, 1975)

Potential of Value Analysis for Reducing Waste Treatment Plant Costs (RED-75-367, May 8, 1975)

Review of EPA Administrative Procedures in Approving Grants for Sewage Treatment Plants (B-166506, Aug. 9, 1974)

EPA's Approval of Selected Waste Treatment Construction Grant Obligations (B-166506, Feb. 7, 1974)

### OUR ONGOING REVIEWS

Present reviews concentrate on the administration and financial management of the construction grant program; municipalities' operation and maintenance of treatment facilities; methods for reducing the cost of waste treatment facilities; municipalities' efforts to implement user charge and industrial cost recovery systems; and certain legal matters.

Review of administration of the construction grants program.

Review of financial management of the waste treatment construction grant program.

Effectiveness of industrial cost recovery and user charge system.

Review of water pollution control activities on the Mississippi River.

Review of Suffolk County, New York, Sewer System.

Survey of methods for reducing costs of waste treatment facilities.

Survey of municipalities efforts to implement user charge and industrial cost recovery systems.

Review of Chicago's acquisition of a tunnel and reservoir system.

## CHAPTER 4

### MINIMIZING ENVIRONMENTAL PROTECTION PROGRAM'S

#### ECONOMIC IMPACT ON THE PUBLIC AND PRIVATE SECTORS

Federal policy has gradually developed to deal with pollution on a national basis, culminating in comprehensive legislation during the 1970s. This legislation substantially enlarged and strengthened the regulatory and subsidy parts of Federal environmental policy and committed the Nation to ambitious goals for a clean environment.

As previously stated current environmental laws will require estimated expenditures of up to \$500 billion over the next few decades. Such expenditures could place a substantial economic burden on individual industries and in turn on the public. The severity of the impact will depend on such factors as the state of the economy, the development of low-cost abatement technologies, the stringency of the abatement requirements, and the flexibility that the Federal and State environmental protection agencies have in implementing environmental control laws. If national standards and rapid timetables are rigorously enforced for all polluters, the economic impact could be very high. If, on the other hand, there is enough flexibility in setting and enforcing abatement requirements, taking into consideration costs and benefits at specific geographical locations, the economic impact may be lessened.

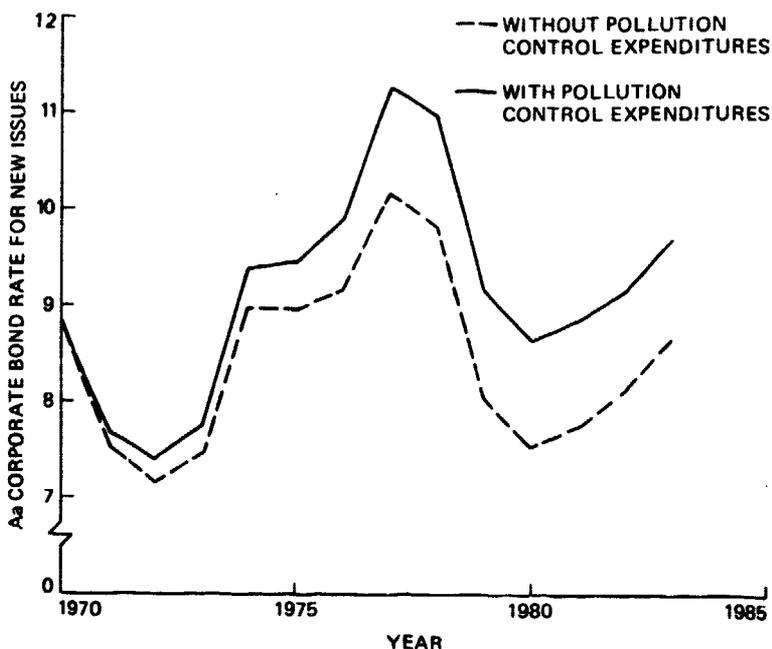
#### POLLUTION ABATEMENT COSTS

Total pollution abatement expenditures, according to the Council on Environmental Quality, will amount to an estimated \$486 billion during the period 1975-84. Of the total, \$175 billion and \$248 billion will be spent on air and water pollution, respectively. In 1976 the United States was expected to spend an estimated \$34.8 billion on environmental improvement, or \$82 per capita. Industry pays approximately 47 percent of this figure, whereas the Government pays 34 percent, and the consumer directly pays 19 percent.

Concern about sufficiency of capital to support these expenditures has grown during the last year. Will the economy be able to generate enough capital to make all the investments needed to satisfy our society's many goals--e.g., for a cleaner environment, energy self-sufficiency, more goods and services, and better housing? The answer is probably no. Interest rates are expected to remain at relatively

high levels, fluctuating around recent levels, discouraging many investments that might be made if interest rates were lower. The following figure shows how interest rates may be influenced by the pollution control investment being made over the next decade.

**Figure 1. Estimated interest rates with and without control expenditures.**



Source: Council on Environmental Quality

### ECONOMIC IMPACT OF ENVIRONMENTAL IMPROVEMENT

The cost of environmental improvement is not cheap. Each American must pay through higher taxes and costs for goods and services. For example, through 1975 the paper industry, consisting of some 222 firms in the United States, claims to have spent approximately \$3 billion to curb process-related air and water pollution. These costs were usually passed on to the customer.

Although the total pollution abatement expenditure appears reasonable when calculated on a per capita basis, the costs in some geographical areas may be excessive. For example, Suffolk County in Long Island, New York, is constructing

a waste water treatment system with Federal, State, and local funds. It is estimated that the average cost to finance the local share will be about \$18,000 for each household using the system. Furthermore, these households are being asked to pay for constructing sewers which are needed for future expansion. Efforts are underway to halt construction and find an alternate, less costly method of pollution control.

The burden on the homeowner is a major concern of local governments--especially smaller communities with legal limits on their borrowing authority. Some communities see reducing community services as the only way to provide funds needed to meet environmental requirements. However, many communities believe that the requirements--such as secondary treatment of municipal sewage--are excessive and rigid.

A healthy economy and a clean environment are national goals which must complement each other. EPA has concluded that from an overall standpoint, current environmental programs and policies are consistent with a strong, viable economy and that--in the private sector--compliance with environmental regulations results in an economic gain rather than a loss. An EPA consultant reported that total environmental spending by industry and government provides over a million jobs. Studies of the construction grants program to build waste water treatment facilities, for example, show that each \$1 billion of expenditures creates 20,000 construction jobs and another 30,000 to 60,000 indirect jobs to support the construction work.

However, specific industrial and regional sectors of the economy can be significantly affected by environmental programs even though the effect on the total economy is not great. Industries which are affected most are those which have high capital requirements, old facilities, and high pollution control expenditures.

According to EPA statistics, 82 plants employing 17,800 people closed during the period January 1971 to June 1976, allegedly due to pollution abatement costs, and the number is expected to increase. However, such plants are typically old, inefficient, and marginally profitable; environmental regulation merely accelerated closures. Furthermore, many people who are laid off are hired back by the same or different companies within the industry. Still, the plant closing problem should not be overlooked because there is some geographical concentration of plant closures--many located in old, industrial towns already suffering from high unemployment--and certain industries such as electroplating are affected more than others.

To minimize the economic impact of environmental programs, EPA performs economic impact analyses of significant EPA actions and modifies its guidelines and standards appropriately. For example, EPA recognized that several iron and steel plants in Ohio's Mahoning River Basin could not meet national standards for the industry. Enforcing the standards could have resulted in closing the plants and losing about 25,000 jobs (14 percent of the region's total work force). However, EPA allowed these plants to meet less stringent requirements at least until 1983.

EPA also monitors plant closings and layoffs allegedly caused by environmental regulations through its Economic Dislocation Early Warning System and notifies the Department of Labor, the Small Business Administration, and the Economic Development Administration of potential and actual plant closings.

Industry disagrees with EPA that environmental protection regulations do not have an adverse economic impact on Americans. Industry claims that pollution abatement expenditures displace investments intended to expand productive capacity and contribute to heavy demands on the money market which keeps interest rates high.

Industry is also concerned that environmental regulations require large expenditures for unproductive equipment which precludes plant relocation, expansion, and modernization; higher profits; and more jobs. For example, industry spokesmen think that the 1972 Federal Water Pollution Control Act's approach of technology based standards--having all plants in the same industry meet the same requirements--is too rigid and is counterproductive. They say that some waters have higher assimilative capacities than others--which they do, especially marine waters and fast-flowing rivers--and, therefore, industrial wastes do not require uniform high-treatment levels. Thus, the cost of the controls needed to reach such levels is unproductive, inflationary, and excessively costly in relation to the benefits to be gained.

#### ISSUES TO BE RESOLVED

Because our pollution control legislation has stressed that everyone clean up the same amount with little regard to efficiency considerations, much of the analysis needed to address the economic impact has been left undone. Many observers are becoming convinced that we cannot afford to delay these analyses any longer; that we have to make sure that every dollar we spend on improving environmental quality is

being spent in the most effective way; and that the benefits we get are at least worth the amount we are spending. Issues we believe should be addressed to determine whether modifications to the existing regulatory systems are needed include:

- Do environmental protection programs have major adverse economic impacts on the consumer and private industry or specific segments of these groups?
- Do the costs of environmental protection programs clearly outweigh benefits in terms of improved environmental quality?
- Are there alternatives to minimize the adverse economic impacts of environmental protection programs?

### OUR PAST REVIEWS

Past reviews centered on economic analyses of implementing the Toxic Substances Control Act and the costs and benefits of advanced waste water treatment plants.

#### Reports

A Comparison of Three Estimates of the Cost of the Proposed Toxic Substances Control Act (OPA-76-6)

Further Analysis of the Toxic Substances Control Act (OPA-76-12)

Better Data Collection and Planning is Needed to Justify Advanced Waste Treatment Construction (CED-77-12, Dec. 21, 1976)

### OUR ONGOING REVIEWS

Current reviews concentrate on reviewing the impact of environmental protection regulations on industrial capital formation, an analysis of the effects of charging users of throwaway beverage containers for external economic and social costs, and the impact on local communities in financing their share of waste water treatment facility construction costs.

## CHAPTER 5

### ASSURING EFFECTIVE INSTITUTIONAL ARRANGEMENTS

#### TO IMPLEMENT ENVIRONMENTAL LAWS AND TO CONSIDER TRADE-OFFS

The structure of Federal, State, and local governments has an impact on the formulation and implementation of environmental laws. The most visible impact has been the outpouring of new environmental protection legislation during the last decade. These laws were enacted to control specific pollutants--air, water, pesticides, toxic substances, noise, radiation, and hazardous wastes--without fully considering the interreaction among these pollutants or the effect these laws have on other national priorities. Further, serious concerns have been expressed that Federal, State, and local governments are unable to effectively implement all of these laws with the staffing resources available.

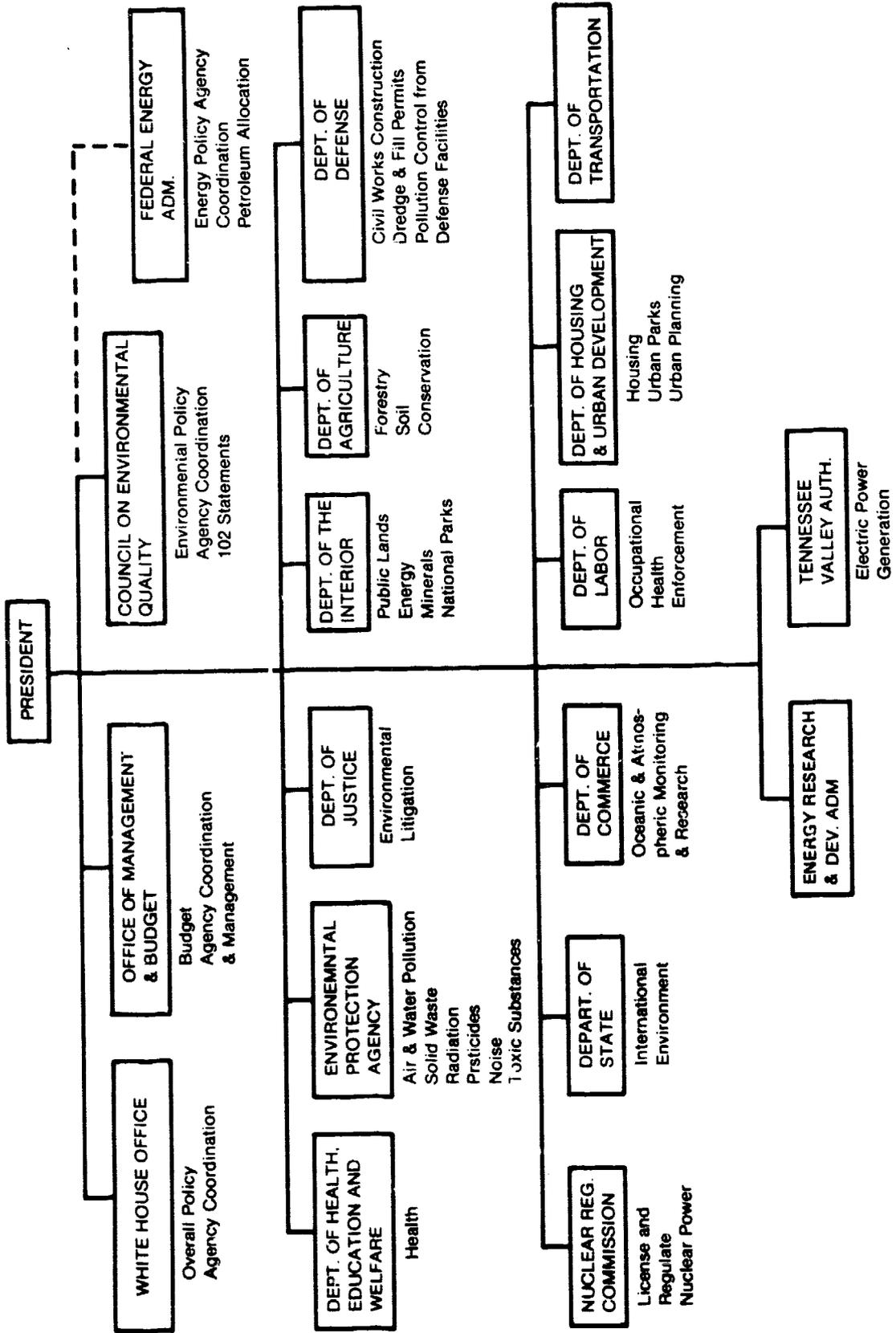
#### THE EXECUTIVE BRANCH

The National Environmental Policy Act of 1969 markedly influenced the organizations of executive branch agencies. The institutions for the development and implementation of Federal environmental policy have undergone remarkable change, particularly within the executive branch. New organizations, such as the Council on Environmental Quality and the Environmental Protection Agency have been created and existing agencies, such as the Department of the Interior and the Department of Transportation have been reorganized to deal with new environmental responsibilities.

EPA was created in 1970 to integrate the various pollution control activities into a coordinated and comprehensive program. The new agency consolidated some nine programs from five different departments and agencies. Since EPA's mission is to protect health and the environment against pollution, it does not always adequately consider the effect its regulatory decisions have on other Federal policies and programs. The agency also implements most pollution control laws, including the

- Clean Air Act
- Federal Water Pollution Control Act
- Safe Drinking Water Act
- Marine Protection, Research, and Sanctuaries Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Noise Control Act
- Toxic Substances Act
- Resource Conservation and Recovery Act

FIG. 1 — MAJOR EXECUTIVE BRANCH AGENCIES WITH ENVIRONMENTAL RESPONSIBILITIES



Although EPA implements most pollution control laws, many other Federal agencies--22--are involved in environmental activities. The departments and agencies shown in Figure 1 propose and implement substantive environmental laws. In contrast to EPA, however, these agencies have functions that are not always identified with environmental concerns. In fact, their missions sometimes directly conflict with environmental interests, such as the need to use more coal--our most abundant energy source--which causes a sulfur oxide air pollution problem.

Coordinating these activities within the executive branch is a constant and troublesome problem. Much effort is spent trying to resolve conflicts among agencies and attempting to harness the collective power of the Federal Government to work for common ends taking into consideration other national objectives, such as full employment, a strong economy, and energy self-sufficiency.

#### Criticisms of EPA's implementation of environmental legislation

The dramatic changes in Federal environmental institutions over the past few years had an impact on formulating and implementing environmental policy. The most visible impact has been the outpouring of new legislative proposals from the executive branch.

EPA's implementation of these statutes has often been criticized and fraught with controversy. Particularly decisions and regulations regarding air and water pollution controls, ocean dumping, and pesticides. Some critics charge that EPA has been too stringent, others that it has been too lenient--sometimes with respect to the same decisions. Further, because EPA's regulations are in fact mandated by media--air, noise, water, solid waste, pesticides, and toxic substances, EPA has essentially organized along media lines and it is unable to effectively address pollution problems as a whole.

Critics have proposed a number of controls to insure that EPA's rules and regulations conform to certain values and priorities. Recently, those who believe that EPA has been too strict and inflexible have urged the Congress to assume veto power over EPA's rules and regulations. This proposal has received considerable support. Other charges have focused on three major issues.

--The adequacy of controls to protect health and the environment.

--The energy impact.

--Federal land use planning.

### The adequacy of controls to protect health and the environment

Some EPA critics charge that the agency's regulations are too stringent and go beyond what can be justified by scientific proof of hazard. For example, EPA's sulfur oxide emission regulations have been challenged, in part, as a result of controversies over the scientific adequacy of the Community Health Effects Surveillance System (CHESS) study, an epidemiological assessment of the adverse effects of sulfur oxides. EPA's ocean dumping regulations have been criticized both for being too lenient and for prohibiting ocean dumping in cases where it would be the most environmentally safe disposal method.

### The energy impact

This issue emerged during the energy crisis of 1973 to 1974, and has led to two major allegations against EPA programs: that auto emission controls have been a major cause of reduced fuel economy, and that pollution controls imposed on coal-fired electric generating plants inhibit domestic coal use and reduce electrical output. However, the extent pollution controls contribute to these problems is disputed.

### Federal land use planning

This issue is a part of the larger question of EPA's relationship to State and local pollution control programs. The Clean Air Act contains several provisions which some critics contend have led EPA to engage in activities not intended by the Congress and which represent unacceptable interference in the use of private property. These provisions include programs designed to reduce auto pollution through transportation controls, including various parking management proposals and indirect source review, e.g., shopping center locations; and programs to prevent "significant deterioration" of air cleaner than national ambient air quality standards.

No one of these issues is cut and dried; no single solution to the problem exists. Because they involve valid concerns, the Congress has probed the issues and has made efforts to resolve them. In a number of cases, a problem originates not from EPA essentially, but from the requirements of the statute itself; for example, the Clean Air Act sets auto emission levels. In some cases EPA's actions have been dictated by the court's interpretation of statutes; for example, extending water discharge controls to small feedlots, and requiring no significant air quality deterioration. In some cases, the Congress can, and sometimes has, amended the statute, as when the auto emissions deadline was extended.

But in many instances, the critics' attentions are focused on EPA's interpretations of the statutes and on its use of discretionary powers. Congressional options for overseeing and controlling these activities include: abolishing EPA; "sunset laws" requiring reauthorization of EPA programs; requiring EPA to prepare environmental impact statements; giving other agencies a voice in EPA actions; and giving the Congress a veto over proposed administrative regulations.

### THE ROLE OF THE COURTS

The Federal court system has played an extraordinarily active role in shaping Federal environmental law and in revising the methods by which Federal agencies deal with environmental issues. However, the role which the Federal court system has undertaken or had forced upon it has caused many observers to object both to specific decisions and to the entire notion of using the courts to decide environmental questions. Because environmental protection is a highly technical subject, observers question whether it is proper for a court, which lacks expertise on the subject to have such an effect.

### THE STATE ROLE

State and local governments have, in recent years, become increasingly involved in environmental protection. This involvement is frequently manifested through the development of Federal programs whose goals bear directly or indirectly on the quality of the environment. The growing diversity of these programs and their separate management structures have caused an interest in greater coordination among environmental programs and the development of an integrated system of environmental planning and management. This is particularly true in State government, where much of the responsibility for the implementation of environmental programs and policies is now lodged.

State governments are also very concerned about the increasing number of Federal environmental pollution programs which they are being forced to implement without adequate Federal financial assistance and with undue Federal involvement, causing duplication and overlap.

The fact that the Federal Government enjoys and is increasingly exercising broad power to protect the environment has recently brought to center stage a constitutional issue: the proper allocation of roles between State and Federal levels of government in controlling pollution concerns common to both. The scheme of our Federal system, as set forth in the Supremacy Clause of the Constitution clearly assigns to the Federal Government the upstage role by making the Constitution and Federal acts "the Supreme Law of the Land."

One factor leading to increased Federal involvement in environmental affairs is that pollution problems are not confined to any local, State, or even regional political boundaries. Thus, the primary pollution control responsibility should, and in fact, does lie with the Federal Government.

Further, Federal environmental law has outpaced the development of State and local laws and institutions. Pollution control traditionally has been a State and local responsibility. Many States managed significant air and water pollution control programs long before the Federal Government began playing a very active role in the 1970s. Particularly in these States, but to some degree in nearly all States, there has been a reluctance to accept Federal authority, especially when it appeared to be of such a massive nature that it overshadowed State efforts. States believe that the Federal Government should provide national direction but this should be done without undue Federal control and duplication of effort.

Further, industry is concerned because the enlarged Federal participation has created new and growing bureaucracies at the Federal, State, and local levels. The resulting corporate paperwork associated with environmental laws and regulations--not to mention the countless hours spent at internal meetings and public hearings--impose heavy burdens on the highly skilled manpower in private industry capable of dealing with it. Some States have also imposed different or more stringent environmental requirements than the Federal Government.

## ISSUES TO BE RESOLVED

The Federal Government has not been organized to balance tradeoffs between environmental protection goals and other national priorities or to comprehensively address pollution problems. Nor do the institutional arrangements established between Federal and State governments provide the necessary coordination and financial support to effectively implement pollution control laws, to solve pollution problems efficiently and economically, and to avoid overlap and duplication of efforts. Issues which we believe need further study include:

- Is the structure of the Federal Government organized to effectively consider tradeoffs between environmental protection goals and other national priorities or to comprehensively address pollution problems as a whole?
- Do the institutional arrangements established between Federal and State governments provide for the necessary coordination and financial support to effectively implement pollution control laws, to solve pollution problems in the most efficient and economical manner, and to avoid overlap and duplication of efforts?
- Are there alternative organizational structures and institutional arrangements that would be more effective and economical in solving the Nation's pollution problems?

## OUR PAST REVIEWS

Past reviews concentrated on determining whether there has been effective coordination of pollution control programs among Federal agencies.

## OUR ONGOING REVIEWS

Ongoing reviews center on Federal agency coordination of radiation programs and EPA's permit procedures. In addition, reviews underway on air and water pollution control goals and strategies will address the issue of whether the right balance has been struck between environmental goals and energy and economic interests and whether there is a need for change in the judiciary's handling of environmental matters. (See ch. 2.)

Survey of EPA radiation programs for standard setting and monitoring

Review of the National Pollution Discharge Elimination System (NPDES) permit procedures associated with the proposed Seabrook nuclear powerplant project

## CHAPTER 6

### PROTECTING HUMANS AND THE ENVIRONMENT

#### FROM HARMFUL PESTICIDES AND TOXIC SUBSTANCES

Several events during the past few years--the Kepone incident and the discovery that PCBs, vinyl chloride, and fluorocarbons are hazardous to human health--emphasize the problem in dealing with toxic substances and harmful pesticides. Not only are many of the problems unanticipated because of a lack of research into the effects of chemicals, such as chloroform, but also because access to and coordination of existing information are lacking, as in the case of Kepone.

#### LEGISLATION

The Congress, recognizing the need to protect humans and the environment from toxic chemicals and hazardous pesticides, enacted the Toxic Substance Control Act of 1976 and the Federal Environmental Pesticides Control Act of 1972. EPA is responsible for implementing both of these laws.

The Toxic Substances legislation was resisted by industry primarily because industry's costs to implement were uncertain. Cost estimates for premarket testing new chemicals and testing toxic chemicals already in commerce ranged from \$79 million to \$2 billion a year. Industry representatives argued that such costs would ultimately be borne by the consumer and that developing new chemicals to meet changing needs may be unnecessarily inhibited. It was only after several years of discourse and compromise that the President finally signed the Toxic Substances Control Act of 1976 into law on September 28, 1976.

The Toxic Substances Control Act provides EPA with regulatory authority to control chemicals which may harm humans or the environment. Specifically, the act gives EPA authority to:

- Require manufacturers to provide 90-day premarket notice of their intent to sell a new chemical or to sell an existing chemical for a significant new use.
- Prepare, publish, and keep current a list of all existing chemicals.

- Require, where necessary, premarket testing of new chemicals and testing of chemicals on the market.
- Require chemical manufacturers to furnish information and a complete list of toxicity tests performed on the chemical.
- Regulate the manufacture, processing, use, distribution in commerce, and disposal of chemicals which may harm human health or the environment.
- Establish an interagency committee to supervise a chemical data retrieval system within EPA.

The Toxic Substances Control Act specifically exempts chemicals being regulated by other Federal laws and as such is a law which "fills in the cracks" left by existing laws. EPA, however, can take action under certain circumstances if another Federal agency, such as the Food and Drug Administration, fails to take action.

The act also mandates or allows the participation of nine other Federal departments or agencies--the Department of Health, Education, and Welfare, the Federal Trade Commission, the Department of Justice, the Department of Commerce, the Small Business Administration, the Council on Environmental Quality, the Department of Labor, the Department of the Treasury, and the Department of Defense--in implementing the act. Thus, the regulation of chemicals and other toxic substances will require considerable coordination among these Federal agencies in order to effectively implement the Toxic Substances Control Act.

Also, one of the most important steps in implementing the act involves establishment of an interagency committee, advisory to the EPA Administrator, which will identify hazardous chemicals and other toxic substances, set priorities for testing of these substances, and keep the priorities list up to date. The committee, administered by the EPA Administrator, includes representatives from:

- Environmental Protection Agency
- Occupational Safety and Health Administration (Department of Labor)
- Council on Environmental Quality
- National Institute for Occupational Safety and Health (Department of Health, Education, and Welfare)

- National Institute for Environmental Health Sciences  
(Department of Health, Education, and Welfare)
- National Cancer Institute (Department of Health,  
Education, and Welfare)
- National Science Foundation
- Department of Commerce

The Toxic Substance Control Act also requires EPA to conduct a study of the indemnification provisions of all Federal laws administered by EPA and to submit a report on the study to the Congress by October 1978. We are required to review the adequacy of EPA's study in a report to be submitted to the Congress 6 months later.

The Federal Environmental Pesticides Control Act of 1972 authorized EPA to regulate the manufacture, distribution, and use of pesticides. All pesticides were to be registered or reregistered by EPA by October 1976.

#### THE CONTROL PROBLEM

Chemicals are all around us--in our air, water, food, and in the things we touch. Chemicals play an important role in protecting, prolonging, and enhancing our lives. Synthetic fibers are used to replace human tissue and to create our easy-to-wear wardrobe. Plastics are used in almost every phase of our activities--in transportation, communication, and industrial and consumer goods. Our leisure time has been enhanced, for example, by durable, low-maintenance pleasure boats and other recreational equipment. Also, the chemical industry makes a significant contribution to the national economy, with sales exceeding \$100 billion annually, representing more than 6 percent of our Gross National Product. Millions of workers are employed by the chemical industry or chemically dependent industries.

Pesticides are substances used to control harmful insects, diseases, rodents, weeds, bacteria, and other pests that attack man's food and fiber supplies and threaten his health and welfare. Pesticides are beneficial because they save lives by controlling disease-bearing insects; minimize crop damage due to insects, weeds, and other pests; and protect households from infestations of flies, roaches, rats, mice, and other pests. Because of these benefits, pesticides have become increasingly important in agricultural production, public health and sanitation, protection of

natural resources, and improvement of man's well-being. However, most pesticides are poisonous to people, animals, and the environment and there is no question that their use needs to be regulated by the Government.

### Toxic substances

There are more than 30,000 chemicals and 2 million mixtures, formulations, and blends in commerce in the United States; annually an estimated 1,000 additional chemicals are introduced. Each year some of these chemicals once thought innocuous are found to be toxic to man or the environment under certain conditions--some are sufficiently hazardous to cause widespread environmental concern.

Because the total number of toxic chemicals is unknown, the public has been lulled into a false sense of security concerning their safety. Once a new chemical or compound has been introduced it becomes virtually anonymous as only one of thousands of chemicals to which man and the environment are exposed daily. This makes problem chemicals which cause insidious adverse effects, such as cancer or species mutations, almost impossible to identify. For example, cancer, the incidence of which has been steadily rising in recent years, may result from a one-time exposure to a specific chemical. However, the adverse effect of this exposure may not be apparent for 20 to 30 years.

Because toxic chemicals are difficult or impossible to identify and because of their long latency period, total human exposure and the resulting cancers could be enormous. The problem of identification is further hampered by a multitude of factors, such as

- variations in human susceptibility,
- length of one-time or daily exposures, and
- nontoxic chemicals becoming toxic in the presence of other chemicals through various types of interactions.

The difficulty of identifying carcinogenic chemicals is vividly illustrated in the vinyl chloride case. Vinyl chloride, a chemical that was once considered innocuous, is a gas used in the manufacture of polyvinyl chloride (the most commonly used clear plastic) and in pesticides and cosmetics as an inert propellant in aerosol containers. Manufacture of vinyl chloride was begun in 1939; by 1974 production exceeded 7 billion pounds annually.

During 1974 chemical manufacturers discovered that a number of vinyl chloride workers were suffering from angiosarcoma, an extremely rare form of liver cancer. Researchers conducted studies which showed that vinyl chloride caused similar cancers in rodents. Thus, after 35 years this chemical was identified as being toxic and action was taken to ban the gas from pesticide and cosmetic aerosols and to set standards restricting the concentration of vinyl chloride in workplaces. The full extent of vinyl chloride cancer is not yet known because many vinyl chloride workers and other exposed individuals, such as cosmetologists, have not yet exceeded the latency period and other exposed individuals have not been identified.

The full extent of the cancer hazard was put into perspective by the American Cancer Society's estimate that 25 percent of all living Americans will develop cancer. Perhaps even more astounding is the estimate of the Secretary of Health, Education, and Welfare that 80 to 90 percent of all cancers result from environmental exposure to chemicals and other toxic substances. Presumably, a large percentage of these cancers could be prevented if carcinogenic chemicals were identified and either banned or used under conditions which would not result in worker exposure. During the period January 20, 1975, to April 15, 1976, the National Cancer Institute and the National Institute for Occupational Safety and Health issued 10 alerts implicating toxic chemicals in the workplace as carcinogens.

Cancer is only one of a number of hazards posed by chemicals introduced into the environment. Some chemicals and the serious problems they have caused recently include:

--Kepone--(1) is neurotoxic and carcinogenic in animals and possibly is carcinogenic to workers and (2) has caused widespread contamination of the James River and Chesapeake Bay, resulting in closure for aquatic sports and fishing.

--Leptophos--is neurotoxic to workers.

--Polychlorinated byphenyls (PCBs)--(1) are carcinogenic in animals and are possibly carcinogenic in humans and (2) have caused widespread contamination of many waterways causing bans on fishing.

--Fluorocarbons--destroy the ozone layer of the atmosphere which could cause ecological changes in the environment and increased human skin cancer.

Incidents with these chemicals have created increasing concern among ecologists and certain other sectors of society. However, only recently has sufficient evidence been gathered to arouse the general public, primarily through publicity on the vinyl chloride, PCBs, fluorocarbon, and Kepone cases.

### Pesticides

Pesticides are widely used chemicals. In 1973 (the latest year of available data), 1,289 million pounds of pesticides with a value of \$1,493 million were produced in the United States. About 1 billion pounds are used domestically each year--55 percent for agriculture; 30 percent for industrial, institutional, and governmental use; and 15 percent for home and garden use.

Approximately 29,000 pesticide products--including insecticides, rodenticides, herbicides, fungicides, and disinfectants--made from 1 or more of about 1,800 chemicals were registered with EPA as of January 1975. These pesticides are identified as follows.

	<u>Number</u>	<u>Percent</u>
Insecticides	14,210	49
Rodenticides	928	3
Herbicides	5,046	17
Fungicides	4,002	14
Disinfectants	<u>4,814</u>	<u>17</u>
Total	<u>29,000</u>	<u>100</u>

Pesticides are hazardous because they are poisonous to people, animals, and the environment if used improperly or without sufficient knowledge of their side effects. Pesticides can contaminate water, air, or soil and can accumulate in man, animals, and the environment. In addition, persistent pesticides can create potential future hazards to man and wildlife because residues may build up in the food chain and cause widespread contamination of the environment.

The 1972 pesticide amendment expanded EPA's pesticide registration authority to include pesticides sold intrastate as well as those sold in interstate commerce. Additionally, it required EPA to promulgate regulations by October 1974 and to reregister all pesticide products in accordance with the new regulations by October 1976. EPA, therefore, during a 2-year period, was to reregister about 46,000 pesticides in

addition to its normal workload of processing 10,000 new pesticide registrations, 14,000 amended registrations, and 72,000 supplemental registrations for a total of 142,000 registrations. EPA was not able to register most pesticides by October 1976 and the Congress had to extend the deadline to October 1977. It is doubtful that the new deadline will be met.

The registration process has been hampered by (1) delays in promulgating registration regulations, (2) staffing deficiencies, and (3) lack of many required health studies that have not been completed by the manufacturers for many registered pesticides. EPA cannot insure that human health and the environment are being adequately protected until required studies are completed.

In January 1977, the Senate Subcommittee on Administrative Practice and Procedure criticized EPA in a committee report for:

"\* \* \* failure to validate testing data \* \* \* has caused needless and costly delay in determining to what extent pesticides currently on the market cause such adverse effects as cancer, birth defects, and interference with biological reproduction."

#### ISSUES TO BE RESOLVED

The vast number of harmful pesticides and toxic substances coupled with a lack of information on their harmful effects severely limits the Federal Government's ability to protect human health and the environment. Issues we believe must be addressed if this problem is to be solved include:

- Does the Federal Government adequately implement requirements that manufacturers make the necessary tests to make sure that man and the environment are not unnecessarily exposed to pesticides in harmful quantities?
- Is the Toxic Substances Control Act being effectively implemented by the Environmental Protection Agency?
- Have proper procedures been established to effectively coordinate the Toxic Substances Control Act with other Federal programs that regulate chemicals and pesticides?

--Does the Federal Government have adequate safeguards to prevent importation and exportation of toxic chemicals and hazardous pesticides banned in the United States?

### OUR PAST REVIEWS

Toxic substances is a new environmental area and few of our past reviews directly addressed them. However, we have reviewed the adequacy of EPA's pesticides registration program, which has provisions similar to the toxic substances act.

### Reports (issued since January 1, 1974)

Adequacy of Safety and Efficacy Data Provided to EPA by Nongovernmental Laboratories (RED-76-63, Jan. 26, 1976)

Federal Pesticide Registration Program: Is It Protecting the Consumer Adequately From Pesticide Hazards? (RED-76-42, Dec. 4, 1975)

Review of the Boll Weevil Eradication Experiment (RED-75-381, June 23, 1975)

Questions on the Safety of the Pesticide Maleic Hydrazide Used on Potatoes and Other Crops Have Not Been Answered (RED-75-276, Oct. 23, 1974)

Pesticides: Actions Needed to Protect the Consumer from Defective Products (B-133192, May 23, 1974)

EPA's Ban on DDT and on Emergency Use of DDT on the Tussock Moth (B-133192, Feb. 26, 1974)

### OUR ONGOING REVIEWS

Current reviews center on the registration of pesticides and the need for pesticide tolerances for tobacco products.

Review of EPA's special registration program.

Survey of the manufacture and exportation of pesticides not registered for use in the United States.

Survey of the need for pesticide tolerances for tobacco products.

Other reviews deal with the effects of toxic chemicals on consumers and workers.

Review of OSHA and State Enforcement of Worker Health Standards.

Survey of Federal Efforts to Educate Workers About Occupational Health Hazards.

Review of Chemical Hazards in the Federal Workplace.

Review of the Effectiveness of OSHA and NIOSH in Developing Worker Health Standards.

Review of NIOSH Health Hazard Evaluation Program.

Review of Federal Programs for Regulating Residues of Drugs, Pesticides, and Environmental Contaminants in Foods.

## CHAPTER 7

### PROTECTING HEALTH AND THE ENVIRONMENT FROM

#### THE EFFECTS OF IMPROPER DISPOSAL OF SOLID WASTE

The volume of solid waste is huge and rapidly increasing. Each year municipalities spend over \$3.35 billion to collect and dispose of 134 million tons of municipal solid waste, primarily by landfill and incineration. Solid waste contains material, energy, and nutrients, which, if recovered, would not only help supply the Nation with scarce natural resources but would also help solve the solid waste disposal problem.

The recently enacted Resource Conservation and Recovery Act of 1976 provides Federal controls over hazardous waste disposal and accelerates EPA's resource recovery research, development, and demonstration program. Effective implementation of this law would go a long way toward solving the Nation's solid waste disposal problem.

#### LEGISLATION

The Solid Waste Disposal Act of 1965 provided for technical and financial assistance to States, local governments, and interstate agencies to plan, develop, establish, and conduct solid waste disposal programs. The Resource Recovery Act of 1970 which superseded the 1965 act shifted the emphasis from the use and discard approach to a closed cycle of use, salvage, reprocess, and reuse. The approach is the only long-term solution to the solid waste problem. EPA is responsible for implementing the act and provides specific assistance to State and local governments on a limited basis through planning grants and assistance.

The Resource Conservation and Recovery Act of 1976 established several major new programs including Federal controls on hazardous wastes. It provides for a hazardous waste permit program together with State implementation grants, State grants for developing and implementing solid waste management plans, and an accelerated resource recovery research, development, and demonstration program. It also requires phasing out open dumps within 7 years, provides special financial assistance to rural communities, and directs EPA to study the solid waste management problem. The hazardous waste provision mandates establishing Federal standards to regulate the generation, transport, storage, and disposal of hazardous wastes and authorizes

\$25 million in grants to States to develop and administer hazardous waste control programs.

EPA also conducts research under the Federal Water Pollution Control Act Amendments of 1972 to develop new or improved methods to dispose of sewage sludge and to control runoff from animal feedlots.

### THE DISPOSAL PROBLEM

Solid waste is the residue of production and consumption. It includes (1) sludge as a result of treating municipal waste water, (2) household garbage, bottles, cans, and paper, (3) automobiles and appliances that have served their useful life, (4) general litter, and (5) wastes from agricultural, animal, and mineral processes.

EPA estimated that in 1973, solid waste amounted to over 4 billion tons--up almost 1 billion tons since 1967. Underlying this increase are some basic economic factors: rising population, increasing affluence, and a trend toward convenience packaging and disposable products. Also, increasingly stringent air and water pollution control standards cause wastes that previously were burned or dumped into the Nation's waters to accumulate or to be disposed of in other ways.

Each year municipalities spend over \$3.35 billion to collect and dispose of 134 million tons of municipal solid waste, primarily by landfill and incineration. However, many major urban areas are, or soon will be, no longer able to use landfill and incineration for waste disposal because landfill space is being exhausted and incineration is being restricted to avoid air pollution.

Solid waste contains material, energy, and nutrients which are in short supply. Recovering these items would not only improve the Nation's supply of scarce resources but would also help solve the solid waste disposal problem. The importance of resource recovery cannot be overemphasized. It

--reduces air pollution;

--enables disposal of waste without using quantities of scarce land, particularly in urban areas;

--produces energy from a source that was previously ignored;

- enables recovery of scarce material resources, particularly the nonrenewables like iron and aluminum;
- results in energy conservation because in most instances the production process for secondary materials requires less energy than that for virgin materials; and
- provides an excellent source of nutrients for fertilizers.

### RECOVERY OF RESOURCES FROM SOLID WASTE

Many States and localities have actively investigated waste disposal systems that serve a second purpose--the recovery of energy and other valuable resources. Scarcity of landfill sites, high costs of disposal, and rising energy and materials prices encourage the adoption of resource recovery technologies.

Currently, about 25 communities have resource recovery facilities in operation, under construction, or out for bid. At least another 25 have design or feasibility studies underway.

Technical problems have hampered some systems already in operation. A solid waste/steam generation system in Nashville, Tennessee, intended to provide district heating and cooling downtown, has frequently resorted to fossil fuels because of inadequate emissions control and deterioration of boiler tubes from corrosive solid waste fuel. At the federally sponsored Baltimore-Monsanto pyrolysis demonstration plant, emissions failed to meet Maryland's strict particulate standards. That plant also encountered technical problems and cost overruns in scaling up from a small prototype.

Design changes are underway at the Nashville plant to resolve the problems that have occurred; however, the Baltimore plant has discontinued normal operations. Connecticut's ambitious State-wide resource recovery system, after a temporary slowdown for contract renegotiation, is proceeding apace with the signing of the first contract for a resource recovery system for the Greater Bridgeport area.

Because many of the technologies are being tried for the first time on a commercial scale, technical problems, cost overruns, and institutional difficulties can be expected, and are common.

Other problems confronting resource recovery include

--the possible discrimination in freight rates, a major cost element in recovered materials;

--Federal procurement policy toward products containing recovered and recycled materials;

--taxes which favor virgin materials over secondary materials; and

--the need to develop technology to economically convert sewage sludge and animal wastes into usable products, such as fertilizers.

### Materials

The United States, with about 7 percent of the world's population, consumes almost half of the world's industrial materials. In 1972 the National Commission on Materials Policy stated that it was becoming increasingly evident that the gap between our Nation's materials requirements and the remaining easily accessible world supplies was widening. A 1973 Department of the Interior report noted that our Nation's trade deficit for such materials--which in 1972 was \$6 billion--could grow to nearly \$100 billion a year by the year 2000.

### Energy

Nonrenewable fossil fuels--coal, oil, and natural gas--from domestic and foreign sources provide 96 percent of the economy's total energy. The U.S. annual energy consumption is expected to almost double from 1970 to 1985 and to increase by an additional 50 percent from 1985 to 2000. According to government officials, the Nation's reliance on imported energy sources--estimated to be 50 percent of our oil needs by 1985--could adversely affect our economy and security.

Approximately 70 to 80 percent of residential and commercial solid waste is combustible, and has on the average an energy content of about 9 million British thermal units (Btu) per ton. Table 1 shows that if all of the solid waste in the United States had been converted to energy in 1973, the Btu's generated per year would equal more than 206 million barrels of oil per year. Growth in population and per capita waste generation would cause this figure to increase considerably by 1980. It is highly unlikely that the theoretical maximum will ever

be recovered, since most energy recovery systems, to be economical, require large quantities of waste, and thus appear feasible only for densely populated areas.

**TABLE I. Energy potentially recoverable from residential and commercial solid waste (Source: U.S. Environmental Protection Agency)**

Recovery	1973			1980		
	Btu <sup>a</sup> (trillion)	B/DOE <sup>b</sup> (thousand)	B/YOE <sup>c</sup> (million)	Btu <sup>a</sup> (trillion)	B/DOE <sup>b</sup> (thousand)	B/YOE <sup>c</sup> (million)
Theoretical Available <sup>d</sup>	1,194	564	206	1,440	680	248
Projected	889	424	154	1,085	512	187
	—	—	—	85	40	15

<sup>a</sup> Btu: British thermal unit.

<sup>b</sup> B/DOE: Barrels per day of oil equivalent (assuming 5.8 million barrel of oil and 365 days per year).

<sup>c</sup> B/YOE: Barrels per year of oil equivalent.

<sup>d</sup> Based on all Standard Metropolitan Statistical Areas.

If recovery were practiced in all major urban areas, the energy produced would be equivalent to

- about 1.5 percent of the Nation's total energy consumption,
- the Nation's entire energy consumption for residential and commercial lighting,
- more than one-half of the 1972 direct oil imports from the Middle East, and
- almost one-third of the energy that will be delivered by the Alaskan pipeline.

### Nutrients

Sludge is the semi-liquid matter separated from waste water by the treatment process. Sludge volume greatly increases with each increase in the level of treatment. For example, going from primary to secondary treatment will more than double the volume of sludge. The Federal Water Pollution Control Act Amendments of 1972 require all municipalities to achieve secondary treatment by July 1, 1977, which will probably result in doubling the volume of sludge.

Municipalities dispose of sludge by using it for landfill, by burning it, or by dumping it into the oceans. All of these methods are being challenged as harmful to the environment. Landfilling sludge, which contains bacteria and viruses, may pollute ground and surface waters from leachate 1/ and runoff and conflicts with land-use priorities. Burning sludge contributes to air pollution. Dumping it into the oceans may be harmful to marine life.

Sludge does contain nutrients--phosphorus and nitrogen--and can be used as a fertilizer or soil conditioner on a broad scale if the harmful bacteria, viruses, and heavy metals are removed and if the offensive smell is eliminated.

Technology to recover nutrients from sludge has not yet been demonstrated to be economically feasible on a broad scale. Developing such technology would not only help municipalities solve one of their major solid waste problems but would also provide fertilizers for producing our Nation's food and fiber.

#### ISSUES TO BE RESOLVED

The Resource Conservation and Recovery Act of 1976 raises many complex strategy and implementation issues which must be addressed if the solid waste disposal problem is to be eliminated. The following issues, while not all inclusive, deserve special attention.

- Is the Federal Government taking effective action to help solve the Nation's solid waste disposal problem, including regulating the disposal of hazardous substances?
- Can material, energy, and nutrients be economically recovered from solid waste to help supply the Nation with scarce natural resources?
- Should the Federal Government adopt a tax policy favorable to the recovery of secondary materials?
- Has the Federal Government taken a leadership role in procuring products containing recovered or recycled materials?

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1/Liquid that has percolated through soil.

## OUR PAST REVIEWS

Past reviews focused on improvements needed in Federal solid waste management programs, the need to recover material and energy from solid waste, the need to increase Federal purchases of recycled products to promote energy conservation, and the problems and progress in ocean dumping of wastes.

### Reports

Opportunities for More Effective Use  
of Animal Manure (RED-76-101, June 14, 1976)

Report on EPA's Comments to Congressional  
Committees Concerning GAO's Evaluation of  
the Delaware Resource Recovery Project  
(RED-75-369, June 5, 1975)

Using Solid Waste to Conserve Resources  
and to Create Energy (RED-75-326, Feb. 27, 1975)

## OUR ONGOING REVIEWS

Present reviews concentrate on waste treatment plant sludge disposal and the economic and health effects of leachate from disposal sites.

Review of the environmental, economic, and health effects of leachate from land disposal sites.

Survey of Federal and State control over hazardous waste disposal.

## CHAPTER 8

### INSURING THE PURITY AND SAFETY OF DRINKING WATER IN THE UNITED STATES

Safe drinking water standards are undergoing considerable change as a result of new knowledge. The discovery of asbestos fibers in the water supply of Duluth, Minnesota, and of 66 organic chemicals, some of which are also carcinogens, in New Orleans, Louisiana, drinking water spurred the quick passage of the Safe Drinking Water Act in December 1974.

#### LEGISLATION

The Congress, after 4 years of deliberations, enacted the Safe Drinking Water Act of 1974. The objective of the act is to provide safe drinking water supplies throughout the United States by establishing and enforcing national drinking water standards. This task is a large one because the act seeks to protect from contamination (1) drinking water delivered by an estimated 240,000 community systems to the residences of 180 million people and (2) the Nation's ground waters which currently supply, with little or no treatment, 100 million people.

The Environmental Protection Agency is responsible for implementing the act's requirements which include developing primary drinking water regulations to protect the public health, secondary regulations relating to odor and appearance of drinking water, and measures to protect underground drinking water sources. Also, EPA must perform (1) research to evaluate health, economic, and technological problems and (2) a survey of the drinking water situation in the Nation's rural areas. To assist EPA, the National Academy of Sciences is required to conduct a study of the maximum contaminant levels which should be allowed in drinking water.

Other Federal agencies which have a role in safe drinking water, such as research and development and funding of facilities, include the Public Health Service, Farmers Home Administration, Department of Housing and Urban Development, and the Economic Development Administration.

The act provides that States should assume primary enforcement responsibility with respect to Federal drinking water regulations. States must adopt (1) adequate

surveillance and enforcement procedures and (2) regulations which are at least equally as stringent as national primary regulations. If a State fails to assume primary enforcement responsibility or to adequately carry out its programs, EPA must administer the State's safe drinking water program. Currently, Indiana and Pennsylvania will not accept primary enforcement responsibility because of limited resources. To help States and small public water supplies meet Federal standards, the act provides grants to States and loans to public water supplies.

### THE DRINKING WATER PROBLEM

Despite the existence of State drinking water standards, serious deficiencies in the safety and purity of drinking water supplies throughout the country have been documented. These deficiencies often occurred in major urban areas, threatening large numbers of people. In 1962, national drinking water standards were established to regulate drinking water supplies for interstate carriers, such as buses, planes, trains, and ships.

From 1961 to 1971, however, 130 outbreaks of disease or poisoning attributable to drinking water were reported. These resulted in 46,374 illnesses and 20 deaths. In August 1970, the Department of Health, Education, and Welfare completed a national survey of 969 public water systems. Major findings of the study were that:

- 41 percent of the systems delivered water of inferior quality to 2.5 million people.
- 36 percent of 2,600 tap water samples contained one or more bacteriological or chemical constituents exceeding safe drinking water limits, and 9 percent of these samples were described as potentially dangerous.
- 56 percent of the systems evidenced physical deficiencies in plant operations.
- 77 percent of plant operators were inadequately trained in fundamental water microbiology.
- Most systems provided no protection against cross-connection of pipes with sewage or storm drainage pipes.
- 79 percent of the systems had not been inspected by State or county authorities in 1968.

In November 1973, we reported on an examination of 446 mostly small public water supply systems in six States. The results were similar to those above. For example, only 60 of the 446 systems complied with both Federal bacteriological and sampling requirements.

In addition to problems caused by bacteria in water, more than 12,000 chemical compounds are now being used commercially--not counting variants and fractions--and could end up in the water supply. Moreover, about 500 new chemical compounds are added each year and little is known about the health effects of chemicals, although many are suspected carcinogens.

#### ISSUES TO BE RESOLVED

Effective Federal and State implementation of the Safe Drinking Water Act is the key to insuring the purity and safety of drinking water in the United States. Accordingly, issues which we believe should be addressed include:

- Are public water supply systems capable of meeting Federal drinking water standards within the resources currently available to them?
- Has the program to protect the Nation's ground waters identified ground water contaminated from the underground injection of wastes to prevent further contamination?
- Is drinking water quality being monitored and enforced by State and Federal agencies?
- Is there effective coordination among Federal agencies having a role in insuring the safety and purity of drinking water, including research and development?

#### OUR REVIEWS

We issued one report entitled, "Improved Federal and State Programs Needed to Insure the Purity and Safety of Drinking Water in the United States" (B-166506, Nov. 15, 1973).

Currently, we are surveying EPA's implementation of the Safe Drinking Water Act.

MAJOR LEGISLATION HAVING AN IMPACT ON  
ENVIRONMENTAL PROTECTION PROGRAMS

National Environmental Policy Act of 1969  
Clean Air Act of 1970, as amended in June 1974  
Federal Water Pollution Control Act Amendments of 1972  
Safe Drinking Water Act of 1974  
Federal Insecticide, Fungicide and Rodenticide Act, as  
amended by the Federal Environmental Pesticides Control  
Act of 1972  
Atomic Energy Act of 1974  
Marine Protection Research and Sanctuaries Act of 1972  
Noise Control Act of 1972  
Energy Supply and Environmental Coordination Act of 1974  
Federal Energy Administration Act of 1974  
Flood Disaster Protection Act of 1973  
Occupational Safety and Health Act  
Toxic Substances Control Act of 1976  
Resource Conservation and Recovery Act of 1976

PRINCIPAL FEDERAL AGENCIES

Department of Agriculture

Department of Commerce (National Oceanic and Atmospheric Administration)

Department of Defense

Department of Health, Education, and Welfare

Department of Housing and Urban Development

Department of the Interior

Department of Justice

Department of Labor

Department of State

Department of Transportation

Energy Research and Development Administration

Federal Energy Administration

Nuclear Regulatory Commission

Office of Management and Budget

Tennessee Valley Authority

White House Office

LISTING OF OTHER ORGANIZATIONS  
CONCERNED WITH PROTECTING THE ENVIRONMENT

COMMISSIONS AND COUNCILS

National Commission on Water Quality  
River Basin Commissions  
Water Resources Council

SCIENTIFIC GROUPS

National Science Foundation  
National Academy of Sciences  
National Academy of Engineering

PUBLIC AND PRIVATE GROUPS

American Fisheries Society  
Washington, D.C.

American Littoral Society  
Sandy Hook  
Highlands, New Jersey

Conservation Foundation  
Washington, D.C.

Environmental Defense Fund, Inc.  
Washington, D.C.

Garden Club of America  
New York, New York

General Federation of Women's Clubs  
Washington, D.C.

Izaak Walton League of America  
Glenview, Illinois

League of Women Voters  
Washington, D.C.

National Association of Counties  
Washington, D.C.

PUBLIC AND PRIVATE GROUPS (cont.)

National Association of Environmental  
Professionals  
Washington, D.C.

National Association of Soil and Water  
Conservation Districts  
Washington, D.C.

National Audubon Society  
New York, New York

National Council of State Garden  
Clubs, Inc.  
St. Louis, Missouri

National Wildlife Federation  
Washington, D.C.

Natural Resources Defense Council  
Washington, D.C.

Sierra Club  
San Francisco, California

Sport Fishing Institute  
Washington, D.C.

Trout Unlimited  
Denver, Colorado

UAW-CIO Department of Conservation and  
Resource Development  
Detroit, Michigan

Wildlife Management Institute  
Washington, D.C.

Wildlife Society  
Washington, D.C.

CONGRESSIONAL COMMITTEES AND SUBCOMMITTEES

The Senate, on February 4, 1977, voted to consolidate most environmental issues under the jurisdiction of a new Environment and Public Works Committee. The subcommittees with jurisdiction over environmentally related programs include the Subcommittee on:

- Environmental Pollution.
- Resource Protection.
- Transportation.
- Nuclear Regulation.

Other Senate Committees having an impact on environmental protection programs include the Appropriations Committee, the Governmental Affairs Committee, the Energy and Natural Resources Committee, the Budget Committee, and the Committee on Agriculture and Forestry.

On the House side, the prominent committees and subcommittees having jurisdiction over environmentally related programs include the Committee on:

- Appropriations
  - Subcommittee on HUD-Independent Agencies
- Agriculture
  - Subcommittee on Livestock and Grain
- Budget
- Government Operations
  - Subcommittee on Conservation, Energy and Natural Resources
- Interior and Insular Affairs
  - Subcommittee on Energy and the Environment
- Interstate and Foreign Commerce
  - Subcommittee on Consumer Protection and Finance
  - Subcommittee on Health and the Environment
  - Subcommittee on Energy and Power
- Merchant Marine and Fisheries
  - Subcommittee on Fisheries and Wildlife Conservation and the Environment

--Public Works and Transportation  
    Subcommittee on Investigations and Review  
    Subcommittee on Water Resources

--Science and Technology  
    Subcommittee on Environment and the Atmosphere

--Small Business  
    Subcommittee on Energy and Environment