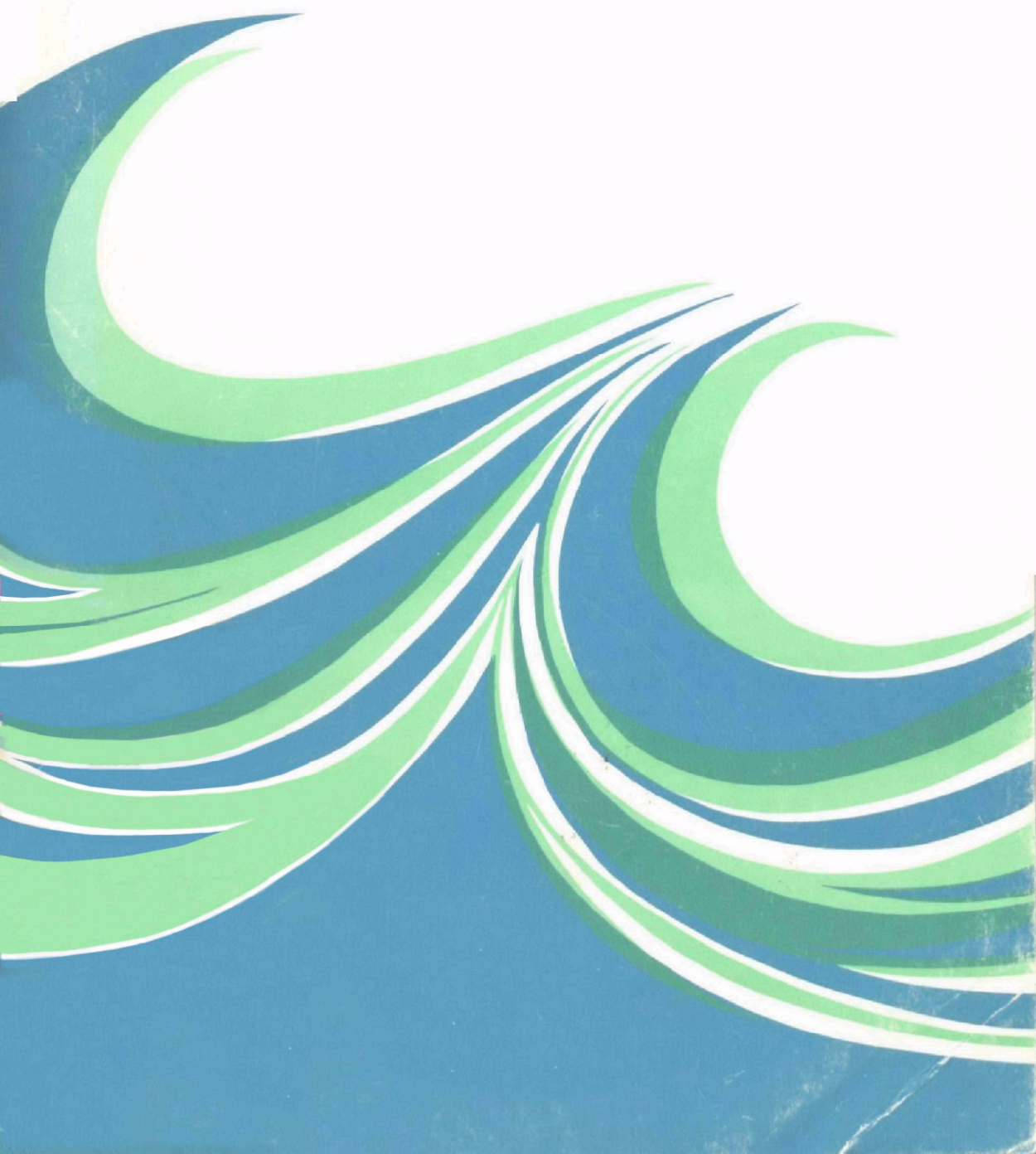


a citizen's guide to

# clean water



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# Foreword

Citizen action to prevent the degradation of the Nation's waters is hardly new. For almost 50 years, citizen activists from Galveston Bay to Lake Superior have steadily, and in increasing numbers taken their concerns to county board meetings, State legislatures, enforcement conferences, Congress and the courts. Public demand has created water pollution control agencies in every State. Public pressure has led to increased Federal activity and spending for water pollution abatement—and public frustration led to the resurrection of the Refuse Act Program, prompting more than 400 civil and criminal convictions against polluters.

In 1972, this public pressure convinced Congress that “steps were necessary to restore the public's confidence and to open wide opportunities for the public to participate in a meaningful way in the decisions of government. . . .” In passing the new Water Pollution Control Act of 1972, Congress specifically provided mechanisms by which interested citizens could be involved in the Act's major programs. The U.S. Environmental Protection Agency (EPA), the States and local agencies are now required to provide for public participation in the “development, revision and enforcement of regulations, standards, plans and programs.”

In particular, the Environmental Protection Agency, which is charged with administering the new Federal water program,

must publish guidelines to insure that public involvement is provided for by State and local authorities. In proposing these guidelines, EPA called for:

- (a) Public meetings, information and educational programs on water quality
- (b) Transmittal to citizens of timely and accurate information on significant agency decisions
- (c) Publication of a summary report on public participation in connection with promulgation of regulations, standards, and effluent limitations; the submission of planning recommendations
- (d) Required public hearing at specific junctures in the administration of the total program. In many instances, public hearings are made mandatory prior to important agency decision-making.

EPA guidelines, however, represent only minimum requirements for citizen activity; they are intended as a basis for citizen involvement at State or local levels where the most important implementation decisions are made. Whether these guidelines will result in a process that is responsive to the public's right to know and be involved will ultimately depend on how well the citizen uses these initial tools.

The task begun by citizens must now be continued and strengthened by informed judgment and timely action by all Americans. As in the past, environmental decision making must not be left to Government and industry alone. The job now rests with citizens to learn about the Act—its terminology and its implementation—so that available money, manpower and technology can *best* be used to “restore and maintain the quality of the Nation’s waters.” Clean Water? It’s still up to you—now you must be up to it!

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# 1

# Introduction

On October 18, 1972, the Federal Water Pollution Control Act Amendments became Public law 92-500. Considered to be one of the most complex and comprehensive measures enacted by Congress, the Act represents the synthesis of more than 24 years of experience—mostly disappointing—under previous State and Federal statutes. The new law creates a program based on three major elements: uniform nationwide standards, enforceable regulations, and a permit program based on effluent limits and geared to specific goals.

## **MAJOR OBJECTIVES OF THE ACT**

The primary aim of the Act is to “restore and maintain the chemical, physical and biological integrity of the Nation’s waters.” By July 1983, wherever possible, water quality is to be suitable for recreational contact and for protection and propagation of fish and wildlife. To achieve these objectives, the Act establishes a national goal that discharges of pollutants be eliminated by 1985.”\* In addition, the Act emphasizes the special need for controlling or eliminating discharges of toxic pollutants. These national goals will be implemented by two

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\*However, the Act does not make the 1985 goal a legally binding requirement.



programs. The first is an expanded system of Federal grants to plan and construct publicly owned waste treatment plants. Secondly, a permit program will be established and geared to restricting pollutant discharges from point sources—that is, from factories, municipalities and large agricultural operations where pollutants enter the Nation's waters through an outfall pipe, sewer or other conduit. In addition to controlling point source pollution, the Act authorizes major research and demonstration programs to work toward the goal of eliminating pollutants from runoff, acid mine drainage and other non-point sources.

## **STANDARDS TO BE ACHIEVED**

### **Effluent Limitations**

The law creates a new system to limit discharges of all pollutants from point sources. These minimum limits will be set in two steps by EPA based upon the availability of proven pollution control technology. Different limitations will apply to municipal treatment plants and industries, and both will have to meet increasingly stringent limitations by the 1977 and 1983 deadlines set in the Act. EPA also will set National Standards of Performance to limit effluents from newly constructed facilities, will set pretreatment standards to be used by industries that discharge their wastes into municipal treatment plants, and will set toxic effluent standards for sources that discharge toxic pollutants.

### **Water Quality Standards**

The water quality standards program will be expanded to include intrastate standards as well as those for interstate waters. Existing standards will be revised to tie in closely with the major goals and deadlines in the Act. All water quality standards will provide a yardstick to measure the effectiveness of effluent limitations. Where limitations are inadequate to protect high quality bodies of water, EPA will prescribe more stringent limitations.

Standards under the Act represent goals to be achieved and

maintained. The main mechanisms for meeting these standards are the permit program and the Act's planning processes.

## **MEETING THE STANDARDS**

### **The Permit Program**

The National Pollutant Discharge Elimination System (NPDES) will be the major mechanism to regulate discharges from point sources. All such sources must obtain a permit from EPA or a Federally approved State program. These permits will contain compliance schedules requiring the source to reduce pollutants step-by-step over a specified period of time. Sources also must monitor and report their discharges on a continuing basis. Violation of the compliance schedule or of any requirement in the permit is a violation of the Act and enforceable by fines or court action. Thus, the permit program is the key to enforcement of the entire Act. It is also one of the most important areas for citizen participation and involvement.

### **Plans**

Four major systems of planning—municipal, areawide, State and regional—have been set up to clarify Federal, State and local roles in planning and management.

- Municipal planning will be directly related to the building of publicly owned treatment works. Municipal facilities plans must provide ways to prevent, dispose and store wastes and must consider alternatives other than conventional structural facilities to reduce municipal wastes.
- Areawide planning will concentrate on comprehensive ways to control urban-industrial pollution. Areawide planning agencies will have responsibility for obtaining Federal grants for construction of waste treatment plants and for managing and collecting money to maintain and upgrade existing plants.
- State planning will relate water quality data to permits and assure that the compliance schedule under the permit is stringent enough to protect the quality of the receiving waters.
- Regional planning—to be conducted by Federal and State agencies—is intended to relate water pollution control and water resource management efforts.

## **WHO DOES WHAT**

### **The Federal Role**

The law requires that EPA publish procedures and regulations to be followed by States, local authorities, grantees and all others affected by the Act. In addition, EPA must define the degree of pollutant control that must be achieved by municipalities and industries to meet the standards. EPA also must publish a report on the latest technology available for preventing and reducing pollutants. The law also requires EPA to submit to Congress annual progress reports on major program areas such as planning, research, and the status of State programs, as well as evaluations and recommendations on special programs such as that to control acid-mine runoff.

EPA, through its ten regional offices, must also approve and periodically review State permit programs and plans, provide technical assistance to State and local governments, and enforce pollution controls where other authorities fail.

### **The State Role**

Reflecting basic State responsibility for water pollution abatement, the Act requires the States to develop water quality standards for all interstate and intrastate surface waters. States must establish maximum daily loads of pollutants so as to protect the propagation of fish and wildlife. States are also required to develop a continuing planning process, the data from which will be used by EPA in making its 1975 report on the Nation's progress in the clean-up effort. In addition to operating a permit program and having major responsibility for enforcement, States must review applications for Federal grants to municipalities for sewage treatment plants.

### **Local Role**

Working under Federal and State supervision, local water pollution control authorities will have primary responsibility for planning and management of wastes. Replacing the strategy under previous legislation of waste disposal with that of a management and use strategy, the new Act requires municipalities and industries to enter into regional planning agreements to generate income for communities. Innovative strate-

gies requiring the inclusion of additional public and private organizations will be needed so that waste control systems account for land use priorities, provide economic incentives and serve other environmental purposes such as recreation, shoreline protection and wildlife enhancement.

### Citizen's Role

Both the States' and EPA's performance will depend largely upon the effectiveness with which citizens organize for action and press for pollution control. In some instances, data will be technical, and citizen groups may wish to seek expert advice from professional organizations or help from the States and EPA through their community support programs. Making certain that local and State agencies have the latest technical data, sufficient professional staffing, and enough available funding will also be a key citizen role to insure effective implementation of the water pollution control program. Using the State and local planning and permit hearings as a rallying point, citizens can influence State and local agency decisions. Once initial permits are issued and planning efforts are well underway, citizens should begin checking on compliance schedules to make certain that industries and municipalities are making adequate progress.

The law permits citizens with direct interest to bring suit against any person or corporation alleged to be violating an effluent limitation or permit, or against the Administrator of EPA if he fails to perform any non-discretionary acts. However, legal action is expensive, time-consuming, and sometimes not the best way to penalize a polluter. Informing your State and EPA can save legal expenses particularly since the courts are free to award the costs of litigation to either party. If, however, legal advice is needed, there are a number of public interest law firms that specialize in assisting citizens in environmental litigation.\*

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\*One organization, the Natural Resources Defense Council, has established a "clean water project" to monitor the implementation of the Act and assist citizens to oversee the performance of their State and local water pollution control agencies. The Council is publishing several citizen guides relating to particular sections of the Act as the need arises. NRDC may be able to put citizens in touch with a number of cooperative attorneys throughout the country who can give citizens more direct help with pressing legal problems. Citizens may write to the Natural Resources Defense Council, 1710 N Street, N.W., Washington, D.C., 20036 for more information.

# 2

## Standards for Pollution Control

To participate effectively in the new water pollution control program, citizens need to know some of the basic concepts of the Act. This chapter introduces the fundamental terminology and standards used in the law. Each of these standards represents a goal to be achieved or maintained.

### **EFFLUENT LIMITATIONS INTRODUCTION**

*An effluent limitation* is a maximum allowable rate of discharge, concentration or amount of a pollutant which may be released from a point source\* into any body of water.

Under previous water pollution legislation, the water pollution control authorities looked to the quality of lakes, rivers, and streams—rather than to the pollutants being discharged into them—as the basis for abatement and enforcement action. This procedure required that States analyze the water, determine the sources of pollution, and develop an implementation plan to restrict pollutant discharges. However, carrying out this last procedure was nearly impossible for States because Federal regulations on how or whether to restrict pol-

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\*Point source—any discernable, confined, conduit including pipes, ditches, channels, sewers, tunnels, vessels or other floating craft from which pollutants are discharged.

lutant discharges were either vague or totally absent. This meant that States either had to trace each pollutant back to the discharger, and prove he was causing sufficient damage to the river or to public health to warrant special restrictions or assign some arbitrary control program to point sources. The old way was cumbersome, difficult to enforce and often inequitable between similar industries on different bodies of water.

To remedy these difficulties, Congress selected the national effluent limitation as the primary tool for water pollution abatement and enforcement action. In introducing the concept of national effluent limitations, the Senate Public Works Committee stated that:

“The concept of effluent limitations clearly establishes that the discharge of pollutants is unlawful. Unlike its predecessor program, which permitted the discharge of pollutants under specific conditions, this legislation would clearly establish the fact that no one has a right to pollute—that pollution continues because of technological limits, not because of any inherent right to use the Nation’s waterways for the purpose of disposing of wastes.”

The effluent limitation is based upon the notion that our use of treatment technology has lagged far behind what has been shown to work. This concept will insure that if the technology is available to reduce pollution, then industries and municipalities must construct or improve their production or treatment processes to meet minimum Federal requirements for pollution control. For this reason, the effluent limitation has been termed “a technological control.” Since different “classes and categories” of industries may discharge various types and amounts of pollutants, the effluent limitation will be geared to account for these variations.

### **Importance for Qualitative and Quantitative Control**

EPA will establish precise and uniform effluent limitation controls to apply to industries and municipalities nationwide—irrespective of different water quality conditions that may exist from State to State and body of water to body of water. This will prevent partiality to certain industries because of

location and deter plants from relocating in those States with less stringent pollution requirements.

Under the effluent limitation program, industries and municipalities will have to monitor and report pollutant discharges on a continuing basis. For the first time, water pollution control officials will know qualitatively and quantitatively the pollutants discharged into waterways, and because effluent limitations are clearly enforceable, they place the burden of the clean up where it rightfully belongs—upon those who can clean up and upon those who are major sources of pollution.

However, because effluent limitations are based upon levels of technology rather than water quality goals, not every national effluent limitation will necessarily improve the quality of every body of water. However, effluent limitations are not the only regulatory means to improve water quality. The law states that effluent limitations shall only be a “minimum of compliance.” Hence, if effluent limitations alone won’t do the job, tougher restrictions must be imposed by the State or EPA to achieve the desired water quality in a particular river, stream, or lake.

## **STANDARDS FOR INDUSTRIES**

The new legislation establishes a two-level program for the application of effluent limitations for *existing industrial sources*. The first level calls for the achievement of “best practicable technology currently available” and the second for limitations based on “best available technology economically achievable.” A third level program is established for *new sources*. These new source limitations will insure that plants are designed from the ground up, with the expressed purpose of minimizing pollutant discharges. Each of these limitations functions much like auto emissions under the Clean Air Act—EPA must set the standards and the industry chooses how it will meet these restrictions.

### **Level I—Best Practicable Technology by 1977**

This level of technology is considered to be the minimum of compliance under the law and must be achieved by all plants

not later than July 1, 1977. "Best practicable technology" will represent the average of the best existing performance by well operated plants within each industrial category or subcategory. In industrial categories where existing treatment measures are generally inadequate, EPA will set more stringent standards if the technology can be made available through good engineering practice at a reasonable cost.

Best practicable technology emphasizes treatment at the end of the manufacturing process. However, industries are not required to undertake any such treatment as long as their effluent discharges meet the required limit by 1977. In some plants, controlling leaks in pipes, purchasing higher quality raw materials, substituting chemical additives or making changes in process operations may be sufficient to meet the effluent limitation, without need for construction of an individual industrial treatment plant.

### **Level II—Best Available Technology**

Best available technology will be based upon the very best control and treatment measures that have been or are capable of being economically achieved. July 1, 1983 is the date by which all industries must conform to Level II technology. In general terms, the application of the best available technology should support two major objectives:

- (a) Achievement of the greatest amount of uniformity among categories of industries
- (b) Reduction in pollutants so that reasonable progress is being made to achieve the 1985 national goal of "no discharge"

In prescribing effluent limitations for Level II, EPA must consider a far broader range of technological options than for Level I. In addition to end-process treatment measures, EPA will assess in-plant controls and recommend equipment modifications that may be easily adapted to other industries. Variances in these levels must be considered only if they represent the highest degree of control up to and including no discharge of pollutants and, represent efficient or maximum use of technology.



By October 1973, EPA must publish information on possible equipment or process modifications which will meet the 1983 goal. The range of options for best available technology, however, will depend upon the extent of industrial and academic research conducted between now and the final 1977 deadline for Level I technology. For some classes and categories of industries, EPA will be able to describe possible Level II control measures when initial guidelines are published in 1973. Such early detailed information on the best available technology will be most helpful when any plant is modified, and will encourage the installation of controls that will meet the 1983 levels and thereby possibly avoid the need for two separate modifications. After technological capabilities have been determined, EPA will periodically up-date the guidelines.

### **EPA Development of Guidelines— Level I and Level II**

The law requires that EPA take into account certain factors in developing its guidelines to meet the 1977 and 1983 goals. Interested citizens should know that these considerations include:

- Age of equipment and facility
- Process changes
- Engineering aspects in applying control technology
- Cost and other economic, social or environmental impacts of these controls as the Administrator determines appropriate

By October 1973, EPA will also publish information on all types of pollutants, their effect on public health and welfare, on aquatic life, on recreation, and their characteristics when combined with other pollutants under varying conditions. This information will be a basis for EPA's reports on the measures necessary to improve water quality to meet the 1983 goal. This is also certain to be valuable scientific information for citizens interested in pushing for more stringent effluent limitations at State and local levels.

## **Level III—National Standards of Performance for New Sources**

### **What is a New Source?**

The term “new source” means a plant or facility the construction of which begins after EPA proposes standards for that particular industrial category (January 1974). If a plant or facility is constructed before the standards are published or if no standards are established for that industry, the plant is not a new source and will be subject only to the effluent limitations for existing sources. Modification of an existing source, however, may make it a “new source” under the law.

In January 1973, EPA published a list of specified categories of industrial and commercial sources for which standards of performance will be established. EPA has until January 1974 to propose standards for new sources within each category. After an opportunity for public comment, EPA must promulgate the standards.

### **Broader Options to Minimize Pollution**

When an existing plant has to clean up, it has only a limited number of choices of how to go about it. Some changes in raw materials or manufacturing process may be economically feasible, while others will be costly. Pollution control in existing plants may tend to take the form of adding on treatment facilities at the end of the manufacturing process. A new plant, however, enjoys far broader options. It can be designed from the ground up to minimize pollution achieving the required effluent reduction at a lower cost.

In practice, new source standards will be similar to the 1983 effluent limitations, but with an added emphasis on further gains in effluent reduction obtainable through changes in the production process itself. This will be especially true where the standards would interfere with the attainment of water quality goals in a specific portion of navigable waters. Unlike effluent limitations for existing sources, which are modified every five years, the law provides that new sources will not be subject to any more stringent standards for either ten years or the period of depreciation, whichever is shorter.

### Level I, II, III—Costs to Industries

Constructing industrial treatment plants and renovating or purchasing equipment for in-plant manufacturing processes will be expensive undertakings for all industries. The law requires EPA to consider for each industrial category the cost of meeting effluent limitations prior to setting any limitation representing the best practicable technology and best available technology.

For Level I technology, the Act says EPA must weigh the costs of proposed controls against the benefits to be achieved by the effluent reduction.

For Level II and Level III technology, EPA is not required to balance the costs against the benefits. Costs will be considered only in terms of their overall effect on an industrial category's economic status, rather than any effects on water quality. EPA thus may set tough standards without having to estimate all water quality improvements that might result.

### Means of Expressing Effluent Limitations

The manner in which industrial effluent limitations are expressed will depend upon the nature of the discharge. Continuous discharges may be limited by daily load figures and in most cases will be expressed in terms of pounds of pollutant per pounds of product manufactured. (This will allow for assignment of a single figure despite variations in sizes of various manufacturing plants.) Batch discharges may be more particularly described and limited in terms of *frequency* (e.g., not to occur more than once a week), *total weight* (e.g., not to exceed 300 pounds per batch discharge), *minimum time for completion of discharge* (e.g., not to be discharged over a period of more than six hours), and *concentration* (e.g., discharge not to exceed more than 15 parts per million of BOD).

The following is a hypothetical example of what Federal-set effluent limitations might look like for the dairy industry. In all cases, Federally-set limitations will be expressed in terms of both an average daily loading figure and a maximum daily discharge level. It will be up to the individual permit agency (State or Federal) to assign the specific effluent limit to the individual industry.

**Effluent Limitations—Dairy Industry (Limitations—Expressed  
in Terms of Pounds of Discharge per 1,000 Pounds  
of Product)**

1,000 lbs. of product	lbs. of BOD*		lbs. of SS**	
	a/d	m/d	a/d	m/d
BUTTER	.03	.13	.01	.11
ICE CREAM	.02	.09	.02	.13
MILK	.03	.12	.03	.12
DRY MILK	.03	.11	.02	.09
COTTAGE CHEESE	.11	.95	.13	.95
CHEESE	.02	.12	.01	.11

\*BOD—biochemical oxygen demanding wastes (see appendix  
for further explanation)

\*\*SS—suspended solids  
a/d—average daily  
m/d—maximum daily

### Citizen Education

Effluent limitations will be based upon highly technical studies of industrial processes. Much of the data used to set these limitations will come from industry itself. Even the most knowledgeable citizens may need professional help to evaluate the effect of these limitations on water quality. One way citizens can find out about the impact of these limitations is through the State basin planning process (explained in Chapter 4). The law requires State planning agencies to evaluate the impact of effluent controls on water quality. Citizens should find out which basins are being studied and select those for which industrial pollutants are causing major water quality problems. The State basin planning agency should be able to enumerate the basins which will not meet water quality standards, despite the application of effluent controls, as well as those which will be substantially improved by these limitations. By looking at the industrial sources along both basins, citizens can observe which industries are making the most progress in pollution control.

Citizens' groups may also wish to invite industry to spell out precisely how these controls will affect their operations: what pollutant reductions will be required of them by 1977 and whether or not they are doing any research to develop ad-

vanced techniques to meet the 1983 or 1985 goal of no discharge. Industries should be urged to present citizens with figures on comparative costs for installing and operating various available technological alternatives to meet 1977 and 1983 goals. Citizen groups should then ask these industries to explain the advantages of improving or constructing treatment plants as opposed to changing in-plant production processes and whether, for example, the least cost alternative will also represent efficient use of technology and energy. Gathering information on industries using the latest pollution control techniques and comparing these efforts with those on the local level may also be an effective means to judge the true impact of these restrictions.

Even though effluent limitation guidelines may be technical, it is important that citizens attempt to comment on proposed effluent limitations when they are published in the *Federal Register*. To facilitate review and analysis of these documents, citizens should begin early gathering background information. From EPA Regional offices, citizens can request Effluent Guidance Documents, prepared originally as interim standards.

EPA's benefit/cost analyses on best practicable technology, as well as its cost evaluation for best available technology and new sources, should be subject to careful public scrutiny. There are economic firms throughout the U.S. which provide low-cost services to citizens wishing assistance on the more technical aspects of such evaluations.\* Citizens may also obtain information on upcoming EPA reports or publications through the *Citizens Bulletin*. Copies may be ordered from the Public Affairs Office of EPA.

Much of the information published on effluent limitations may appear too technical in guideline form. On the other hand, the implied guarantees of the Act's public participation policy explicitly provides for citizen involvement in the "development and inforcement of standards and limitations." Citizens, therefore, have both a right and responsibility to ask questions and expect answers in "English."

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\*The Public Interest Economic Center is now setting up a nationwide network of economists. Citizen referrals should be directed to: Public Interest Economic Center, 1714 Massachusetts Avenue, N.W., Washington, D.C., 20036.

## TOXIC EFFLUENT STANDARDS

The mercury scare of 1970 alerted the public to the danger of the presence of heavy metals and other toxic substances in the Nation's waters. In writing the 1972 Act, Congress recognized the special threat posed by toxic pollutants and singled them out for special and stringent controls.

Toxic pollutants are defined as those which will, "on the basis of information available to the Administrator, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions . . . or physical deformations" in "any organism" or its offspring. The term "toxic pollutant" is extended to include substances that cause toxic effects after concentration in a food chain or in combination with other substances.

EPA must prepare a list of pollutants for which it will establish toxic standards, considering: the toxicity of the pollutant, including its persistence or degradability, its effect on various organisms, the importance of the affected organisms, and their presence in any waters (including those far downstream from the receiving waters.) After a public hearing, EPA must set an effluent standard for each listed pollutant. The standard may prohibit or merely limit discharge of the substance, but must provide an "ample margin of safety."

The standards, which must take effect by January 1975, will be subject to review at least once every three years; additional substances can be added to the list as required.

The standards for toxic materials do not depend upon economic feasibility nor the availability of treatment technologies; technological and economic convenience must bow before an overriding threat to public health and welfare in the protection of aquatic life.

As the House Public Works Committee stated: *"that the discharge of toxic pollutants (is) much too dangerous to be permitted on merely economic grounds."*

## MUNICIPAL TREATMENT

In the last century, the nation's ability to pollute has outstripped our capacity to provide adequate municipal treat-

ment. Currently, municipal wastes account for more than 20 percent of the organic pollutant load in streams, which in turn is responsible for oxygen depletion in the water. In addition, the phosphorus in these wastes is thought to be the principle cause of eutrophication in many waters. The municipal sewage problem is compounded by the more than one trillion gallons of industrial wastes annually discharged through publicly owned treatment facilities.

To cope with the expected increased in the volume of municipal and industrial wastes handled by publicly owned facilities, the Act sets up an ambitious program to upgrade existing plants and construct new facilities. As with industrial sources, existing municipal sewage plants must comply with a two-level program of national effluent limitations. In the first phase, all waste treatment works constructed before June 30, 1974 must attain a minimum of secondary treatment by July 1, 1977. By July 1, 1983 all publicly owned treatment facilities must achieve "best practicable waste treatment technology." For new treatment facilities, the Act establishes a comprehensive construction grant program that will improve the planning, design and operation of public plants.

Industries that discharge their wastes through publicly owned treatment facilities will be subject to a special set of limitations. These "pretreatment standards" are designed to regulate the introduction of complex industrial wastes that either pass through or damage the biological treatment system. EPA will base the pretreatment standards on the principle that the quantity and quality of industrial waste discharge from a joint treatment system must not exceed the level that would be permitted if the industry were discharging into the receiving waters.

### **Upgrading Existing Plants**

Unlike the individual industrial source, the municipal treatment plant must handle quantities and concentrations of pollutants that may change from hour to hour depending upon variations in discharge and unusual combinations of pollutants that combine to form new substances. Heavy runoff, by diluting the sewage and increasing its volume, reduces treat-

ment efficiency, overloads the plant and often requires “by-passing” of raw wastewater directly into the stream. Cold weather can slow the action of the bacteria used in secondary treatment processes and reduce the efficiency of waste treatment.

To establish a uniform system of standards, while allowing for local variations, the Act provides for:

- Separate sets of limitations for municipal sewage and industrial wastes that enter a treatment facility
- Adjustment of pretreatment standards and municipal effluent limitations by local or State authorities
- Reporting of sudden variations in discharge and occasional temporary violations

Adjustment of the standards can be made on a case-by-case basis during the permit issuance process. Citizens may request information on the operations of treatment plants and comment upon the adequacy of proposed standards before a permit is issued. Before commenting on municipal permits, the citizen should review the Federal effluent standards and learn about the operation and maintenance of the local treatment plant, including the volumes and concentrations of industrial and municipal wastes and runoff that it can handle.

### **Treating the Municipal Half—Secondary Treatment**

The law requires EPA to publish information on the effluent reduction attainable through secondary treatment. This information is based upon studies of well-run secondary treatment operations using the activated sludge process, trickling filters, and oxidation ponds. (More information on these treatment alternatives may be found in the appendix.) Maximum levels of discharge for municipal waste water receiving secondary treatment are stated in terms of the following pollutants:

	monthly average	weekly average	units
biochemical oxygen demand	30	45	mg/liter
suspended solids	30	45	mg/liter
fecal coliform bacteria	200	400	number/ 100 milliliters
pH	between 6.0 and 9.0		



In certain instances, secondary treatment works may have been designed to attain a higher level of effluent quality than specified under regulation. In such instances, higher treatment requirements will be set during the permit issuance process based upon performance data supplied by the municipality. Other pollutants such as phosphorus and certain heavy metals, which can be adequately removed by only a few plants, are not covered by the secondary treatment standards; however, effluent limitations for these and other pollutants may also be written into the municipal facility permit.

### **Best Practicable Waste Treatment Technology— The Second Step in Municipal Treatment**

The law requires that all municipal treatment plants provide best practicable treatment by July 1, 1983. Regulations on best practicable waste treatment technology, expected in mid-1973, are to suggest alternative processes that municipalities may use to achieve better controls. This information will focus on three categories of advanced treatment processes and will outline the specific conditions to which each process is best suited. These alternatives include:

- (a) Treatment and discharge to receiving waters (includes conventional treatment plants that employ advanced biological or physical-chemical processes)\*
- (b) Treatment and re-use of waste water constituents
- (c) Spray irrigation or other land disposal methods

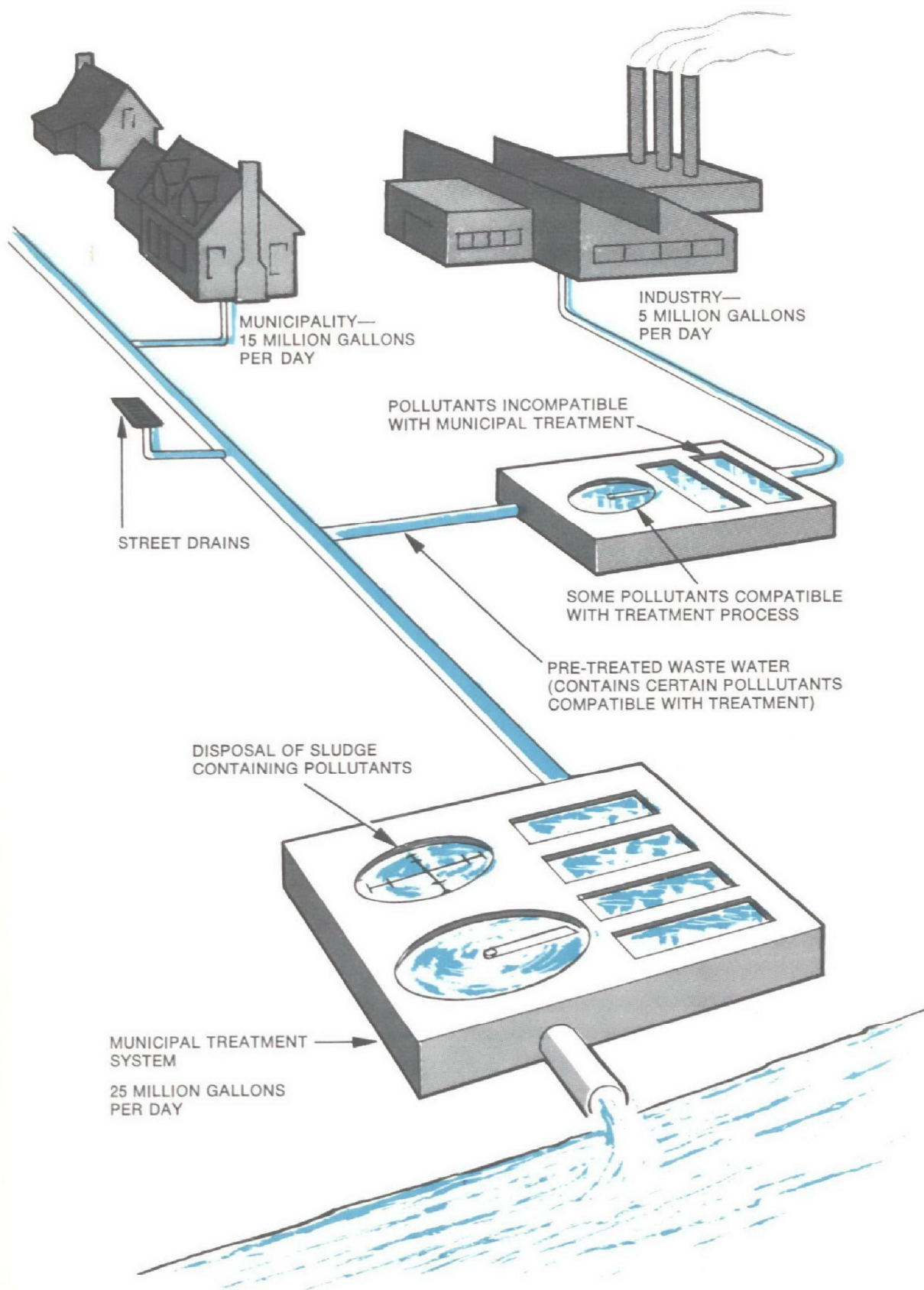
EPA will update its definition of best practicable treatment technology as research breakthroughs occur.

The definition and the application of both secondary treatment and best practicable technology will be complex technical matters. However, there are ways for citizens to insure that their local treatment plants are achieving the highest possible treatment levels. For example, it is a well-known, but seldom publicized fact that many of our treatment plants operate at efficiencies well below those for which they have been designed. With the operation of many treatment plants in a primitive condition, gross failures are all too fre-

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\*Treatment alternatives explained in appendix.

# Treating Industrial and Municipal Pollution



quent. To improve operation and maintenance of waste treatment facilities, we recommend that citizens:

- Learn what personnel, laboratory controls, and records are needed for efficient and reliable plant operations
- Find out what procedures can be used to prevent, detect, and correct plant operation and maintenance problems
- Request from EPA a copy of its latest guidelines on minimum requirements for the design operation and maintenance of treatment facilities
- Make certain that local authorities have an updated file on the latest treatment alternatives. EPA's Technology Transfer Division publishes both a series of pamphlets on new treatment processes that can upgrade the efficiency of existing plants and technical manuals for municipal engineers, summarizing the latest developments in treatment technology.

### **Pretreatment Standards—Treating the Industrial Half**

Understaffed, overloaded, and relying on delicate biological processes, treatment plants are easily put out of commission by the introduction of industrial wastes that damage the works, clog the filters or kill the bacteria. Other pollutants are not susceptible to biological treatment and simply pass through untreated. To alleviate this problem, the 1972 Act requires that, within approximately four years, all industrial discharges into publicly owned treatment works must be pretreated to prevent the introduction of any wastes which would "interfere with, pass through, or are otherwise incompatible with the treatment process."

The pretreatment standards are *not* intended to discourage the use of joint municipal-industrial treatment systems—often the most cost-effective approach. Nor will pretreatment be required for effluents (such as organic wastes from breweries) that are compatible with the treatment processes of publicly owned plants. They are designed to protect the integrity of the municipal treatment system by placing on the discharger the burden of removing incompatible and untreatable wastes.

The pretreatment standards, promulgated by EPA in 1973, after an opportunity for public hearings, must take effect by

July 1976. These standards will be subject to periodic review and revision as control technologies, operating methods, and production processes change.

EPA guidelines will not spell out exactly how much of each pollutant must be removed by pretreatment before these wastes enter the municipal plant. Unlike other types of effluent limitations, the pretreatment standards will suggest ways for municipalities to determine pretreatment requirements for major industrial users.

The standards will specify the minimum "unit operations"—such as coagulation, solids separation, and neutralization—necessary to remove pollutants incompatible with each of the three major types of secondary treatment. The municipal agency will then be responsible for translating the standards into the specific levels of pollutant removal necessary: (a) to protect its particular treatment process and (b) to reduce concentrations of untreatable pollutants to a level at which direct discharge would be permissible. The pretreatment requirements for each incompatible pollutant will be written into the municipal facility's permit—with the municipality being responsible for establishing specific pretreatment effluent limitations for each industrial user.\*

**New Plants and Pretreatment.** Pretreatment standards for new sources must take effect by May 1974, at the same time that the new source standards of performance must be met by industries that discharge directly into receiving waters. This will insure that owners of new sources will not choose to tie into a municipal system in order to avoid stringent "new source" requirements.

## CONSTRUCTION GRANTS

A program of Federal grants for construction of municipal waste treatment facilities was established by the Water Pollution Control Act Amendments of 1956 and gradually enlarged by subsequent legislation. The 1972 Water Pollution Control Act Amendments both expand and change the Federal role.

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\*See "Pretreatment and Permits" in Chapter IV.

Citizens who have become accustomed to working with provisions of the previous Acts should be aware of a number of important innovations:

### **Increased Funding**

The 1972 Act authorized the expenditure of \$18 billion for the construction of new publicly owned waste treatment works over the next three years—\$5 billion for fiscal 1973, \$6 billion for fiscal 1974 and \$7 billion for fiscal 1975. EPA, however, announced that it would hold funds to \$2 billion for fiscal 1973 and \$3 billion for fiscal 1974, saying that spending the full \$11 billion would have an inflationary impact.

Some States and municipalities disagreed, contending that the lower level of funding would be insufficient to meet deadlines for municipal clean-up established in the Act. Taking the issue to the courts, the cities of New York and Detroit received a favorable ruling from U.S. District Court Judge Oliver Gasch on May 7, 1973. The judge's decision, while not requiring EPA to spend all \$11 billion, does require the Agency to consider applications up to that amount. The case was not finally resolved when this booklet went to press.

### **Eligible Projects Redefined**

Federal assistance will now be available for many types of projects that were previously ineligible for grants, including: combined storm and sanitary sewers; sewage collection systems for existing communities; facilities for storage, recycling, and reclamation of wastes; the acquisition of lands needed for the facilities themselves or for the disposal of residues.

These changes are intended to encourage the use of innovative techniques such as the land disposal or "living filter" method in which waste water is sprayed on the land and treated by natural processes in the soil. New methods of dealing with storm water runoff and the wastes from combined storm and sanitary sewers can also be funded if the method is shown to be the most cost-effective alternative; Chicago is developing such a system designed to prevent overloading of treatment plants through storage and subsequent phased-treatment of storm runoff. Replacement and rehabilitation of

sewage collection systems may qualify for Federal funding in existing communities. EPA funding for all newly eligible treatment plants, however, will ultimately depend upon State priority certification.

### **The Federal Share**

Under the previous legislation, the maximum Federal share of the cost of new local treatment facilities was 55 percent. Many States distributed the Federal funds among many projects, with each receiving less than the maximum allowable percentage. The new Act provides for a flat 75 percent Federal share for qualifying projects.

### **Contractual Obligation**

When EPA approves a grant application, the Federal government accepts a contractual obligation to pay 75 percent of the costs of the project. This provision assures that construction can proceed and that obligated monies will be available when needed. This will mean that cities can make grants without having to worry about how much money Congress appropriates. Each phase of construction—such as feasibility studies, design, engineering and actual construction—will be considered as a separate project that must be approved and funded by EPA.

### **Allotment by Need**

Each State's share of the Federal appropriation will be determined by the ratio of the cost of the sewage treatment facilities needed in that state to the cost of all facilities needed nationally. Large, industrialized States, such as New York and Michigan will be relatively favored; less highly developed States, such as Texas, West Virginia, North Carolina and Arizona will be relatively disadvantaged compared with their previous allocations which were based on population and per capita income.

### **Reimbursement For Past Construction**

Some communities that constructed waste treatment facilities in the past without receiving their full share of Federal

assistance will be repaid part of their costs *if* the project were approved by the State water pollution control agency and met Federal requirements at the time of construction. Projects begun after June 1966, but before July 1972, are eligible to receive the difference between the actual Federal contribution and 50 percent of the costs, or 55 percent if the project was part of a comprehensive metropolitan plan. \$1.9 billion has been appropriated for this purpose.

### **An Integrated Approach**

Historically, sewage treatment has been the responsibility of the individual municipality—pollution control was highly fragmented and inconsistent—each town operating in isolation from the others and from recent technological advances. To reduce the inefficiency and duplication of this approach, the Act emphasises areawide integration of waste treatment management and planning, and the use of advanced techniques of pollution control. Specific goals include:

- The application of the best practicable waste treatment technology over the life of the works
- Facilities that produce revenues (offsetting treatment costs) through recycling, reclamation of waste water, the confined disposal of pollutants and reuse of sludge as fertilizer
- Facilities yielding a net profit through integrating sewage treatment and recycling with the disposal of solid wastes and thermal discharges
- Sewage treatment facilities that allow open-space development and yield recreational benefits
- Areawide planning and management of waste treatment providing an efficient approach to control all point and nonpoint sources

### **State Priority List**

Before Federal funds allotted to a State may be obligated for a specific construction project, the State water pollution control agency must certify that the proposed treatment facility has priority over other projects. Each State must develop and annually revise a municipal facilities priority list. After June

30, 1973, no Federal grant may be given to any municipality which is not on an approved priority list.

States are to give priority to construction projects that will most rapidly improve waste treatment to meet the applicable State and Federal standards, taking into account the population to be served and the relative cost-effectiveness of the proposed facility.

Citizens should request that the State agency prepare a fact sheet explaining its procedures for determining priority and including a simple definition of "cost-effectiveness" and "need." The States' interpretation of these critical terms can be checked against the EPA priority list guidelines, to be published by July 1973.

### **User Charges and Cost Recovery**

Under the new Act, each user of a municipal treatment facility must pay his full share of the costs. To obtain a grant after March 1, 1973, a municipality will have to adopt a system of user charges insuring that all recipients of waste treatment services pay their proportionate share of the costs of operation and maintenance.

In addition, each industrial user of the municipal plant must repay a proportion of the Federal grant corresponding to its percentage use of the plant's total capacity. This industrial cost recovery system is intended to encourage industries to choose the most cost-effective solution to their waste treatment problems whether it be independent treatment or the use of public facilities.

The municipality may retain 50 percent of the portion of the Federal share recovered from the industrial users. The amount kept by the city will provide a fund for future expansion and reconstruction of the facility. These provisions are designed to make the municipalities' waste treatment facilities financially self-sustaining.

### **Conditions on Federal Grants**

To qualify for a Federal construction grant, applicants must also:

- Assure proper management of the works, including maintenance personnel, and operating plans



- Show that the plant will be of sufficient size to handle the waste load, including adequate reserve capacity
- Until July 1974, show that the plant will provide a minimum of secondary treatment
- After July 1973, demonstrate that the facilities' sewage collections are not subject to "excessive infiltration"
- After July 1974, show that the proposed facility:
  - Will provide for the application of the best practicable treatment over the life of the works
  - Is the best of several alternative waste management techniques
  - Will permit the later application of advanced technology designed to recycle waste water and eliminate discharge of pollutants
- Once the State plan has been established, show that the facility conforms to that plan
- Once an areawide plan has been approved and an operating agency designated, show that the plant conforms to the areawide plan; after November 1976, grants will be made only to the designated operating agencies.

### **The Environmental Financing Authority**

While the new Act increases the Federal share to 75 percent, it also removes the requirement for State assistance in meeting the cost of construction. In some cases, the increase in the Federal share may be more than offset by a drop in the State share, increasing the proportion of the cost that must be borne by the municipality.

To insure that municipalities are able to finance the construction of needed treatment facilities, the Act created a public corporation, the Environmental Financing Authority to purchase municipal treatment plant construction bonds that could not be sold on the open market. Bonds will not be purchased unless EPA guarantees payment of the obligation and certifies that the municipality is unable to obtain credit at reasonable terms and that the project is eligible for a Federal construction grant.

## Trained Personnel

Even the finest waste treatment facility is of little use if the people operating it are not technically trained. The Act provides for grants to assist educational institutions in developing improved instruction in design, operation, and maintenance of treatment plants and other quality control facilities. In addition, EPA may award scholarships to attract recent high school graduates to the waste treatment management field. EPA itself maintains a large training program in several cities throughout the country.

## WATER QUALITY STANDARDS

Water quality standards were first established under Federal law in the Water Quality Act of 1965. The standards defined planned uses of interstate and coastal waters and were intended to limit the amount and distribution of pollutants permitted in these waters. States were to adopt standards, hold public hearings and submit these plus an implementation and enforcement plan to Federal authorities for approval. Once approved, standards became part of the Federal program, and enforceable by Federal officials.

Water quality standards have four major components:

- (a) *stream use classifications*: There are four categories expressed in terms of recreational uses of the water. For example, class A, commonly known as swimmable waters is the highest water quality standard; it indicates that people can conduct any recreational activity in or on the water without injury to health.\*
- (b) *criteria*: These are scientific measurements of the specific amount and quality of each pollutant that can be tolerated in the water at any given time,

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\*Official designations:

*Class A* Primary water contact recreation

*Class B* Propagation of desirable species of fish and wildlife

*Class C* Public water supplies (before purification)

*Class D* Agricultural and industrial uses

depending upon its designated use. Limits on pollutants such as bacteria, heavy metals or organic pesticides are expressed in terms of maximum concentration. Other types of pollutants have their limitations expressed narratively, (i.e., "no residue attributable to waste water, no visible film, oil or globules of grease.")

- (c) *anti-degradation statement*: A statement certifying that degradation of water quality is prohibited except as a result of necessary economic development.
- (d) *implementation and enforcement plan*.

### Standards in the 1972 Act

The 1972 law requires States to continue to apply interstate standards established under the 1965 Act, and to establish additional standards for intrastate waters. States have one year to adopt standards, hold public hearings to review the standards and submit them to EPA for approval. Once standards are approved by EPA, they will not require a further review until 1975 or 1976.

Water quality standards are closely integrated with the 1983 interim goal of protection of fish, shellfish and wildlife, and recreation in and on the water. To meet this goal, States will be required to raise every stretch of water to either class A, which provides for recreation in and on the water or class B, which provides for the propagation of desirable species of aquatic life and is safe for recreation on the water.

EPA will judge the adequacy of standards in terms of their consistency with those for waters of downstream or adjacent States. EPA will standardize use classifications and criteria so that States bordering the same body of water aim toward the same standard. Until 1977, EPA will accept classifications in the C and D ranges if each standard is accompanied by a justification. After that time only waters which are naturally polluted or which cannot be cleaned up by technology will qualify for "excepted classifications." Where a State fails to adopt adequate standards or refuses to abide by new conditions in standard setting, EPA, within six weeks, will promulgate stand-

	TYPE OF SOURCE	LEVEL OF TECHNOLOGY	DATE EFFECTIVE	BY WHOM ESTABLISHED	ENFORCEMENT MECHANISM	SCOPE
Water Quality Standards	NOT a "source" rivers, streams, lakes—all surface waters	Not level of technology—water which provides for recreation in & on water	July 1983	States  EPA	Permits  State programs for non-point sources	All surface waters, (except those specifically approved by EPA for less stringent classifications)
Best Practicable Technology	Industry major feedlots (existing)	Level I average of the best technology currently available	July 1977	EPA	Permits	Add-on treatment technology—includes process changes
Best Available Technology	Industry major feedlots (existing)	Level II very best economically achievable technology	July 1983	EPA	Permits	Add-on treatment technology—greater emphasis on production changes
New Source Standards	Industry major feedlots (constructed after May 1974)	Level III very best technology to be constructed	May 1974	EPA	Permits	Add-on, in process controls, plant design, raw materials, —all aspects—

<b>Pretreatment Effluent Standards</b>	Industries introducing wastes into publicly owned treatment works	Not a precise level of technology —generalized unit processes	July 1976 existing plants  May 1974 new plants	EPA  Municipalities	No permits —monitoring	—unlimited— any unit process controls needed to prevent excess of pollutants into treatment plant
<b>Toxic Effluent Standards</b>	All sources	Not a level of technology —whatever is needed to get out toxics	January 1975	EPA	Permits	—unlimited— any changes needed to prohibit/limit toxics
<b>Secondary Treatment (Public treatment plants)</b>	Publicly owned treatment plants (constructed by July 1974)	Average of well-run waste treatment plants using secondary treatment	July 1977 existing  July 1978 plants constructed prior to 6/30/74	EPA  States	Permits	Add-on tightening process control
<b>Best Practicable Waste Control Technology (Public treatment plants)</b>	All publicly owned treatment plants	Average of best advanced treatment systems	July 1983	EPA	Permits	Construction of new treatment systems and additional process controls

ards for the State. Most water quality standards are scheduled for adoption or revision just prior to the issuance of guidelines on effluent limitations (Oct. 18, 1973).

Implementation of water quality standards will be through the State Continuing Planning Process and through the permit program. Basin studies (described in more detail in the Planning Chapter) must show the impact of both point and non-point sources of pollution and recommend measures to be taken to bring water quality up to the desired standard.

In the permit program, water quality standards will serve as a mechanism to judge the adequacy of effluent limitations in meeting the goals of the Act. Where effluent limitations are judged not sufficient to meet water quality standards, EPA or the State may upgrade the limitations and impose them in the permit. In such instances, however, the revised effluent limitation will be the operative control mechanism.

#### Citizen Input—Three Year Review Process

All water quality standards are to be reviewed by the States at least once every three years, with the first review by October 1975. Public hearings must provide an opportunity for citizen recommendations on improvements or modifications of water quality standards. All new standards must provide for a minimum of protection: for public health and welfare; for enhancement of water quality; and, for use by all "legitimate" interests. Citizens should use these hearings to request improvements in the water quality standards. EPA will publish a revised edition of the "Greenbook" *Water Quality Criteria*, that will provide useful background information to citizens wishing to participate in these hearings.

# 3

## Planning

Under previous legislation, planning for water pollution control has generally been inadequate, fragmented and underfunded. The 1972 Act greatly expands the emphasis given to planning and establishes a comprehensive program to improve coordination between various water pollution control activities at different levels of government. Ten separate sections of the law deal specifically with planning programs. Under the new structure, the specific proposals of the most elementary urban industrial unit are incorporated into more comprehensive State, interstate, and national plans. From the most specific engineering designs for sewerage allocations to broad socio-economic plans for river basins, these plans will influence where industries will be situated, where highways and subdivisions will be built—in short—how and where people will live in the next 20 to 50 years. In effect, citizen participation in these plans will be involvement in the creation of tomorrow's communities.

The citizen's role in these plans must first be to insure that public disclosure mechanisms are built into planning systems from the beginning. All plans must be subject to continuing public scrutiny, and planning agencies should be required to seek out the views of citizens long before programs go into effect.

Because plans will define the water pollution goals to be

met by each community, specify public agency requirements and contain a complete schedule of deadlines, the plan itself can outline key points of access for citizen participation. Interested individuals may use the planning system as a vehicle to focus public attention on the critical stages of agency decision making. Once plans are under way, citizens can direct attention on agency progress reports required under some of the broader planning processes. These reports will evaluate agency successes and failures in meeting the Act's requirements and indicate what further measures must be taken to cope with water pollution problems in the future.

*This chapter discusses the four major planning schemes in the Act.*

## **MUNICIPAL FACILITIES PLAN— EPA GUIDELINES**

Municipal facility planning is designed to provide orderly development and submission of applications for Federal funding of waste treatment plants. Administered by currently designated municipal authorities, this planning system will insure minimal interruptions of facility planning until the areawide system for more complex planning areas is approved by EPA (expected between July 1975 and July 1976).

### **Procedure**

In developing a municipal facility plan, local agencies must assess all available alternatives for waste treatment and select the type of treatment that best suits the local situation while minimizing cost and manpower. The plan's content will depend upon whether the proposed facility will be tied into a complex of other municipal systems or will be a discrete geographically separated plant. Only those facilities that are systematic and provide an efficient approach to controlling wastes will be approved by EPA. At a minimum, all municipal facility plans will include:

- (a) A cost-effectiveness analysis comparing biological, physical-chemical, and land disposal processes—to select the



most efficient treatment for the needs of the municipal area

- (b) An evaluation of alternatives for advanced sewer systems, including an analysis of possible interceptor connections to other municipal systems
- (c) An evaluation of alternative sites and service areas
- (d) An environmental assessment (impact statement) of the effects of the recommended treatment works on air, land, water, and other resources
- (e) A complete analysis of costs of all elements in the system, (including any rainwater collection system) to meet water quality standards for a 20-year period following construction

If the cost of construction is estimated to be substantial over the first few years, EPA will require additional planning measures, including:

- (a) An analysis of the facility's compatibility with land use and transportation needs
- (b) Development of maps showing all connecting interceptors, sewer lines and other treatment works and systems
- (c) An areawide assessment of the nature and extent of all types of water pollution

Citizens familiar with shortsighted, fragmented planning schemes under previous legislation can appreciate the inclusion of an environmental assessment as an integral part of the local plan. EPA has published regulations describing minimum requirements for municipal facility plans including measures to minimize costs and helpful information on preparing an environmental impact analysis.

## **SPECIAL PLANS FOR HIGH-DENSITY AREAS**

To support existing planning processes in complex metropolitan areas, the law calls for an integrated planning and management scheme. This "areawide" planning process will

supplement information gathered by the State and provide a separate authority that can act when a State fails to meet its responsibilities.

### **Creation of Areawide Planning Agencies**

Following EPA guidelines, the Governor of each State must identify areas where urban-industrial concentrations have caused major water quality control problems. The Governor then has four months (six months for interstate areas) to meet with local officials, designate the boundaries of these areas, and name the single, most capable organization to assume responsibility for developing the plan. The Governor may either select an existing agency or establish a new agency for this purpose, subject to EPA approval. In either case, each unit of local government must be represented on the planning board.

### **Planning Process**

Each planning agency has one year from the time of its designation to establish an apparatus for developing an area-wide plan (continuing areawide planning process). Within two more years, the initial plan must be completed, certified by the Governor, and forwarded to EPA for approval. This plan and its annual revisions must be submitted and certified by the Governor as being consistent with the State basin plan for that area.

Until June 30, 1975, EPA is authorized to grant 100 percent of the costs of developing and operating the continuing planning process as well as the agency's administrative costs. After that time, grants of up to 75 percent can be awarded to local agencies to continue their planning operations. Areawide plans will include:

- (a) Identification of all wastes generated in the area and all treatment works necessary to handle municipal and industrial wastes over the next 20 years
- (b) Analysis of proposed alternative treatment systems, land acquisition needs and the necessary collection and storm sewer systems. Development of a plan for financing all elements of the treatment system

- (c) Development of a regulatory program to control the modification and construction of all treatment works, insuring that any industrial discharges entering the facility meet pretreatment effluent standards, and identifying the regulatory agencies
- (d) Identification of processes to control:
  - non-point sources of pollution, including urban-agricultural run-off
  - saltwater intrusion
  - the disposal of all wastes (including solid wastes into landfills)
  - disposal of sewage sludge

All areawide plans must be consistent with State basin plans and any other water resources plan developed for that area by other agencies. Wherever possible the plan must provide for an integrated facility that can hook up to other operations in the region.

### **Management Operations**

Assuring proper administration of areawide plans is theoretically the State's responsibility, yet actual implementation of the plan will be on the local level. Governors must consult with planning agencies and select the management agency or agencies for each area by the time the first areawide plan is submitted to EPA. The regional EPA office will evaluate the expertise of each management agency to insure that it will be able to cope with the substantial water quality problems particular to urban industrial areas. To be approved by EPA, a management agency must have authority to:

- (a) Design, construct, operate, and maintain all treatment works
- (b) Obtain and utilize grants and other revenues from communities and industries discharging into treatment facilities
- (c) Obtain permits to discharge wastes and insure that discharges meet all applicable standards
- (d) Refuse to accept waste from any new source if it would

cause the facility to violate any applicable effluent standard

### Public Participation

The Act fails to specify opportunities for citizen involvement in the development of either the municipal facilities plan or the areawide planning process. Yet, Section 101(e) requires public participation in the development of all plans. It is anticipated that EPA will require municipal agencies to develop programs for public participation, including a series of public hearings. Citizen preparation for these hearings should involve, at a minimum:

- (a) Encouraging local officials to keep the public fully informed about what they and the planning board are doing. With elected officials represented on planning boards, citizens have the unique opportunity to insure that planning agencies are held accountable for their efforts.
- (b) Building a broad basis of support for environmentally and economically sound treatment projects. (Past experience has shown that without citizen pressure newly constructed projects often turn out to be inadequate, forcing outlying industries and residents to tie into other systems.) Since both municipal facility and areawide plans must be agreed to by all local officials, consensus building will be a key citizen activity during the preparation of the plan.
- (c) Informing residents of the need for new treatment plants, and campaigning for local support to finance the municipal share of the construction.
- (d) Requesting that summary reports of all meetings and hearings be made available for public review at local planning agency offices.

## THE STATE CONTINUING PLANNING PROCESS

In past years, States had the primary role for setting and enforcing water quality standards. In the new Act, States re-

tain this responsibility, yet have the added duty of making certain that no effluent limitation written into a permit is inadequate to protect the water quality standard. Because of the complex relationship between effluent discharges and water quality, it is important that the permit issuance process be coordinated with an overall study and planning program on water quality. The State Continuing Planning Process is designed to meet this need.

Through this process the State must develop:

- a program to attack water pollution where it is most serious
- priorities for state manpower and funding
- a means to assemble and utilize data on water quality as a basis for issuing permits

Without a Federally approved State planning process, no State will be allowed to operate a permit program.

## Water Evaluation

The State must undertake an adequate monitoring program to gather accurate information on water quality, and to tailor abatement programs to individual stream conditions. Each segment of every river and lake must be monitored at regular intervals to determine ambient water quality variations. Both point and non-point source discharges will be evaluated in terms of their impact on water quality. From this information, each segment will be classified into one of two categories, indicating the severity of pollution and the difficulty in achieving the desired water quality standard. These two categories are:

- *Water Quality Limited*—in which the condition of the water precludes attainment of the water quality standard, even if all point sources provided the levels of treatment required under Federal guidelines
- *Effluent Limited*—in which the water quality standard is now being met or there is reasonable assurance that such a standard will be met by the application of Federal effluent guidelines

Where a segment is classified as "effluent limited," the State must develop an overall management plan to maintain water quality. For any segment that is classified as "water quality limited," the State must assign maximum daily load limits restricting the introduction of pollutants into the segment as a whole. These limits, a Congressional report said, should be sufficiently stringent to insure that a balanced population of indigenous aquatic life can live in the stream.

### Individual Basin Plans

The primary functional unit under which water quality data will be gathered will be through studies of individual basins. Basin planning areas may contain both water quality and effluent limited segments. EPA wishes basin area boundaries to correspond to the 267 major and minor basins identified in *Priority Basin Accomplishment Planning*. By May 1973 States will be expected to submit designated boundaries and agencies to EPA.

The details of a particular basin plan will depend upon the complexity of problems in each segment within the basin. At a minimum, however, all basin plans must include:

- Detailed and major descriptions of each body of water in the basin
- Identification and analysis of all pollutant sources
- A ranking of each segment of water in order of priority for improvement
- An analysis of measures to be taken to improve or maintain water quality
- Establishment of timetables for State actions

Since the individual basin plan is the central decision making mechanism for all water quality programs, citizen participation in these studies is essential. In fact, unlike many other of the Act's programs, a public hearing is *required* before a basin plan is approved. In addition, basin planning agencies are required to "encourage public participation at the earliest stages of the planning process." In our opinion, this plan offers perhaps the most significant avenues for substantive public

input into governmental decision making at the ground level. Involvement in this planning process will also help citizens acquire important background information which can be used later in preparing comment for permit applications.

## Reports

At the beginning of each fiscal year (beginning in 1974), a State will submit its revised Planning Process to EPA for review. This report will describe all major milestones to be achieved during the year and resources available to complete these tasks.

Thereafter, States will report periodically to EPA on their progress toward meeting the goals for the continuing planning process. These reports will reveal whether States are setting realistic timetables for their activities—a major fault under previous legislation. In addition, the State's success or failure in meeting program deadlines will enable EPA to judge whether abatement actions will be sufficient to meet the 1977 and 1983 goals. EPA will also use this data in making its annual report to Congress on the nation's overall progress in the water clean-up effort.

## Public Participation In State Continuing Planning Process

Although the State's Continuing Planning Process is certain to have a profound effect on every other water program in the State, EPA regulations do not specify what the State must do to provide for citizen involvement. The State must only submit an annual "brief description of any public participation in the development or revision of any planning process." To insure adequate opportunities for public participation, citizens should:

- Urge the State to make the official semiannual report available to the public and to publish an annual summary of progress on its success in meeting planning deadlines
- Request that the State hold a series of workshops to solicit public opinion prior to the completion of each phase of the planning process

## **LEVEL B PLANNING—A SUPER LEVEL**

Because the uses made of land and water resources are intimately connected with and often determine water quality, the Act establishes what it calls comprehensive "Level B" plans. These plans will encourage cooperation among a broad spectrum of State and Federal agencies with statutory responsibility for water pollution control, land use, and related environmental programs.

While Level B plans may be developed around hydrological basins (similar to State basin plans), the data base will include more than information on water quality. Factors such as economic growth patterns, treatment facilities, and projects developed by the Corps of Engineers and other agencies will be examined. Program alternatives will be developed, based upon projected needs over the next 15 to 25 years. Subsequently, proposed alternatives will be evaluated for consistency on a regional level before final recommendations are sent to the President. The law requires that "Level B" planning for all determined regions be completed by 1980.

### **Recommendations for Public Participation**

- (a) Citizens should contact their Governor to request the name and address of the designated agency or organization (i.e. River Basin Commission, Interstate Coordinating Committee) as well as the names and affiliations of individual participants.
- (b) Citizens should urge that specific programs for citizen participation be established at the outset in the planning process. Citizens wishing to make a substantive impact should press for financial support. For example, in New England a citizen's advisory committee has been funded on a reimbursement basis for travel, phones, and other expenses incurred while reviewing the Level B plan for the Connecticut River.
- (c) Citizens should urge that all proposed recommendations be accompanied by an environmental impact statement as recommended in the February 10, 1971 publication, "Environmental Statements—Framework Studies and As-



sessments and Regional or River Basin Plans.” (Citizens may write to the Water Resources Council for copies of this booklet.)\*

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\*Currently, CEQ guidelines do not require impact statements on these studies. Nevertheless, some of the major participants are Federal agencies whose projects are subject to the NEPA requirements. An impact statement requirement would help insure that the intent of the Water Pollution Control Act is carried out. Besides providing an opportunity for interagency and public comment, an impact statement would save citizens from having to independently check to see that program objectives of the various plans do not conflict.

# 4

## The Permit Program

Even the best standards will not clean up our waters by themselves. If the national effluent limitations are to be meaningful, we need a mechanism that will tell each discharger what he must do to establish deadlines for action, that will also provide for enforcement. The permit system, just such a mechanism, is the key to the success of the Act.

The permits now issued under the National Pollutant Discharge Elimination System (NPDES) will regulate discharges into navigable waters from all point sources of pollution, including industries, municipal treatment plants, large agricultural feedlots and return irrigation flows. Industries discharging into a municipal system need not obtain a permit but must meet the pretreatment standards discussed previously.

The permits, to be valid for up to five years, can include abatement measures required to meet the effluent limitations for 1977 and 1983, the new source standards, toxic effluent standards, and any more stringent limitations based upon water quality standards. The core of the permit will be a specific "*schedule of compliance*," which prescribes an enforceable sequence of actions or operations leading to compliance with an effluent limitation, other limitation, prohibition or standard. For example, such a schedule might set dates for design, engineering, construction, or process changes. These dates—no more than nine months apart—become

check-points for measuring progress toward compliance with the effluent limitations. Failure to meet any requirement cited in the permit document—including any compliance schedule will constitute a violation of the permit and a violation of the Act.

Responsibility for administering the permit program rests jointly with EPA and the States. EPA must establish the effluent limitations on which the permits will be based, with the first such limitation due October 1973. Until these limitations are set, the permits will be based either on water quality standards or on EPA's interim "guidance system"—an approximation of the final effluent limitations. The permits may be issued by either EPA or the States under one of two programs:

- (a) The Federal permit program, under which EPA issues permits after certification from the State
- (b) A State permit program, under which the State issues the permits following approval of the State program by EPA. In this case, EPA retains veto power over the issuance of individual permits and monitors the adequacy of the overall State program

### Citizen Action: The Permit Program

The new permit system offers greatly expanded opportunities for citizen participation. No permit may be issued nor any final State permit program approved without opportunities for public hearings and consideration of written public comments. In addition, permit applications, monitoring reports, and issued permits must be available to citizens for reading and copying. Access to the permit documents, which contain effluent data, schedules of compliance, and monitoring requirements, should enable citizens to effectively monitor the enforcement process.

There are three phases of the permit process that are particularly conducive to citizen action:

- When a State applies to the Regional EPA office for approval of its proposed NPDES program
- When the State or EPA issues the first round of permits, specifying effluent limitations, schedules of compliance, and monitoring requirements

- When the State issues its quarterly report describing every permit holder who has fallen behind in meeting his compliance schedule. (Through continuous monitoring of these compliance reports, citizens can insure that the terms of the permits are being enforced.)

## **THE STATE PERMIT PROGRAM**

EPA can delegate to the State its authority to issue NPDES permits if the proposed State program meets stringent Federal requirements. Any State wishing to operate its own permit program must submit a complete description of its proposed NPDES program to EPA for approval. EPA will have 90 days in which to review the State program, consider citizen comments, hold public hearings, and approve or deny the State's proposal.

### **Requirements for State Participation NPDES**

In general, to satisfy the NPDES requirements, a State must promulgate formal regulations so that the permit agency has authority to:

- Issue permits which comply with all requirements of the Act
- Modify or revoke permits if there is a violation of the law
- Control disposal of pollutants into wells
- Inspect, monitor, and enter the premises of all dischargers
- Require reports from all permit holders and industrial users of municipal treatment works
- Insure that all interested or potentially interested parties have an opportunity to comment on an application prior to issuance of a permit
- Abate violations of permits through civil and criminal penalties
- Insure that industrial users of treatment works comply with pretreatment standards, user charges, and inspection and monitoring provisions required under the Act

The State must also have an approved "continuing planning process" and an enforceable law prohibiting any discharge of pollutants not authorized by the permit.

### **Surveillance**

States must develop a program of surveillance so that water quality and point source discharges may be sampled regularly. Major discharges must be inspected at least once a year to see if they conform to compliance schedules; irregular spot checks must be conducted to catch and prosecute intermittent violators; and all stretches of water must be sampled at least once every six years.

In addition, States must be able to follow up on evidence of violations and notify any owner of a point source who has failed to submit his interim compliance report. Four times a year, States must inventory all point sources and send EPA a list of every factory or municipality that has failed to meet its interim compliance deadlines.

### **Monitoring**

States may develop their own procedures on the use and maintenance of monitoring equipment by permit holders. The monitoring, however, must provide a clear understanding of the characteristics (i.e., batch discharge or continuous discharge) and fluctuations in flow that occur on a regular basis. The State must have authority to gain access to monitoring data, equipment, to inspect and copy records, and to sample effluents at any time.

The State must require any owner of a facility that discharges toxic pollutants or that averages more than 50,000 gallons per day to monitor and record his effluent on a daily basis, and submit all monitoring reports at frequent intervals, e.g., once a month. Smaller discharges may only be required to submit data on an annual basis. All discharges will be required to retain copies of monitoring reports and related data for at least three years.

### **Money and Manpower**

A complete inventory of manpower and financial resources available to the State permit agency must be submitted with the State's proposed program. EPA will judge the adequacy of these resources in relation to both the number and size of point sources to be monitored and inspected and the severity of the pollution problem in the State.

No member of the board of a State permit agency may receive a significant portion of his income from holders of, or applicants for a permit. This requirement is intended to minimize conflicts of interest in issuing permits. Many States will be forced to change their regulations specifying that agency boards include representatives from industry, agriculture, and municipalities.

### **Subsurface Disposal**

States participating in the permit system must develop procedures for the control of subsurface disposal methods sufficient to "protect the public health and welfare and to prevent pollution of ground and surface water resources." The vast bulk of the Nation's fresh water is stored in the porous rocks of the earth's crust, and this vital resource is threatened by the subsurface disposal of liquid pollutants—some of them highly toxic—through deep well and leaching from fill areas into the water table. Regulation of subsurface disposal may become more critical as surface disposal is more strictly regulated and polluters find deep well injection an increasingly attractive alternative to waste treatment.

By October 1973, EPA is to issue technical information on "processes, procedures, and methods to control pollution" from well disposal. However, the Act does not give EPA clear authority to set substantive national standards for subsurface disposal; therefore, the States may retain broad authority to determine their own standards for issuing injection well permits. Citizens concerned about subsurface disposal might urge their States to consider the strong regulatory policy issued in an EPA order of October 15, 1970.

For the oil and gas industry, subsurface injection, as traditionally employed, will not be regulated under the Act if the well is approved by the State authority, and the State "determines that such injection will not result in the degradation of ground or surface water resources."

### **Permits to Control Thermal Pollution**

States must be capable of evaluating the effects of thermal discharges on water quality. While the law requires EPA to establish Federal limitations on thermal pollution, these may

be waived by the State permit agency if the discharger shows that the standard is more stringent than necessary to protect important species of fish and shellfish. In practice then, limitations on thermal standards will be established on a case-by-case basis. Once a thermal discharge limit is written into the permit, the discharger will not be subject to any more stringent standard for a ten year period or the period of depreciation, whichever is shorter. Responsible State decisions on thermal discharges will be heavily dependent upon scientific information on the effects of thermal pollution on different aquatic environments. Citizens may write to the Lake Michigan Federation, 56 West Jackson, Chicago, Illinois, 66604 for additional studies on thermal pollution.

### Citizen Action: Approval of a State Permit Program

When a State applies to EPA for final permit authority, its entire proposed NPDES program will be subject to public comment. Careful citizen review at this stage is vital. The effectiveness of citizen action in the issuance, monitoring and enforcement of permits will depend on the foundation laid down in the approved permit program.

Initially, the public should participate in the enactment of the new State laws and regulations that will be required before the State can qualify for permit program authority. Then, when the State submits its formal application to EPA, the Regional Administrator of EPA is required to hold a public hearing on the application, following at least 21 days notice. The hearing will provide for:

- written comment by any person
- full, open discussion of the issue
- discussion between witnesses and the hearing panel
- a transcript to be submitted to EPA along with the application
- the exclusion of repetitive oral testimony
- five days for submitting additional statements or rebuttals

Before participating in the hearing, the citizen should check his State's proposed permit program against the Federal re-

quirements for State NPDES participation,\* giving particular attention to:

- membership of the State permit board
- existence of adequate State legal authority
- procedures for public notification and hearings
- requirements for complete, exhaustive permit applications
- provisions for public access to NPDES forms and documents
- monitoring and enforcement procedures.
- procedures to control subsurface disposal of wastes

### **Issuing Permits: The State Program**

Once its program is approved, the State can start to issue permits, following a procedure established by EPA regulations. The major steps in the process are:

- (1) The discharger submits a permit application, providing all data requested on the application form.
- (2) The State agency submits a copy of the application to the regional EPA Administrator for review within 90 days. (The regional Administrator may waive his right to review permits for certain categories of sources.)
- (3) The State prepares a tentative draft permit containing proposed effluent limitations, compliance schedules, and monitoring requirements.
- (4) The State issues public notice of the application at least 30 days before the permit is to be issued and provides public access to the permit forms and other related data.
- (5) When the permit application covers a discharge of more than 500,000 gallons per day or a discharge of toxic substances, the State must issue a fact sheet describing the conditions of the proposed permit and the procedures for public comment on the application.

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\*Available from EPA, ask for a copy of the 40 CFR part 124 regulation, published in the *Federal Register*, December 22, 1972.



- (6) The State sends copies of the fact sheet to interested citizens on its mailing list.
- (7) Citizens request for hearings on the permit application.
- (8) The State issues public notice of a hearing and holds the hearing in the area where the discharge will occur.
- (9) The regional administrator may comment on the proposed permit within 90 days of notice.
- (10) The State issues the permit for a maximum of five years.

### **Public Hearing Procedures**

Whether a State actually holds a hearing will depend upon the interest expressed by private citizens. EPA regulations call for hearings if there is "significant public interest," and stipulate that "instances of doubt should be resolved in favor of holding a hearing." The following information may be helpful in understanding the hearing procedure.

#### **Notification**

- Notice for public hearings must be given at least 30 days prior to the hearing in the local newspaper, at the post office, and near the applicant's plant or facility.
- The State will send notices of all permit applications, hearing notices and fact sheets to interested persons and groups. Those wishing to receive this information should request that the State permit agency place them on the mailing list.

#### **Requesting a Public Hearing**

- Citizens may either petition for a hearing or submit an individual written request, stating clearly why a hearing is warranted.
- Petitions or requests should be followed up with a phone call to insure that the official responsible for calling the hearing has received the request.

#### **Understanding Your State's Hearing Procedure**

Since many States have their own procedures for holding

public hearings, citizens should ask the following questions:

- Is there a deadline date after which a citizen's written comments will not be accepted?
- Will citizens be able to request that a public hearing be limited to a single, complex application? Many public hearings will consider more than one permit application. If combined hearings are required, can some other means, such as a public meeting be provided so that citizen concerns can be considered prior to the hearing? Will the number of witnesses or the time allotted to each witness be limited?

### **Preparing for the Hearing**

Active citizen involvement in permit hearings is essential to insure that stringent compliance schedules and monitoring requirements are written into the permits and that these assure compliance with all applicable effluent limitations, including water quality standards. Citizens should prepare for the hearing by:

- Familiarizing themselves with the basic effluent limitations and standards contained in the EPA Effluent Guidance Documents, the State water quality standards, and the various EPA regulations establishing effluent limitations.
- Screening the proposed permits by comparing the suggested limitations in the fact sheets against Federal and State standards in the above documents.
- Concentrating on those permits that seem most deficient. If the fact sheet does not provide sufficient information, citizens should examine the permit forms and other data, available at the State permit office for reading and photocopying. Reports that both EPA and the State agree reveal trade secrets will not be available—except that all effluent data must be made public.
- Assuring themselves that the permits contain enforceable, detailed compliance schedules and specific monitoring requirements as well as adequate effluent limitations.
- Coordinating their activities through citizens groups, in order to distribute the work load and insure that every questionable permit is subjected to public scrutiny.

## **STATES WITHOUT PERMIT PROGRAMS**

State participation in the NPDES is not mandatory. States may decide not to participate in the NPDES—leaving all permit enforcement decisions and operations to the regional EPA office under the Federal permit program.

Citizens should carefully evaluate whether Federal expertise can compensate for the reduction in some of the State's role in the water pollution abatement effort. Citizens should ask that States publish an analysis of the "pros and cons" of State participation in the NPDES. Such a statement is available from the Virginia State Water Control Board, 4010 West Broad Street, P.O. Box 1143, Richmond, Virginia, 23230.

## **THE FEDERAL PERMIT PROGRAM**

If a State does not participate in the NPDES, permits will be issued by EPA under the Federal permit program. EPA will follow procedures very similar to those required of the States that do have NPDES authority with the exceptions of the following additional major provisions:

### **State Certification**

Before a Federal permit is issued, the State must have certified that the proposed permit will fully comply with all applicable standards and effluent limitations. The State may suggest monitoring requirements needed to insure compliance with these standards. Citizens should inquire whether their State will provide an opportunity for public comments or hearings before issuing the certification.

No permit can be issued if the State denies certification. However, EPA may act without State certification if the State fails to report on the application "within a reasonable period of time"—three months to a year.

## **Federal Permit Hearings**

Two sets of public hearings will be permitted on Federally issued permits. The first is intended to be much like those held by the State permit office in that "significant public interest" must be shown before the Regional Administrator grants a hearing. In addition, either before or after a public hearing is held, any person may request an Adjudicatory hearing. This hearing will only be held to consider substantial legal issues or changes in the permit and witnesses will be required to testify under oath. All parties of interest have the right to appeal the Regional Administrator's decision; however the appeal must be in the form of a brief. Citizens should contact their Regional Office to obtain further information on these hearings.

Like the State permit agency, each Regional Administrator will prepare a quarterly list of all violations of Federal permits. This list will be made available at the Regional Office for public inspection and photocopying.

## **Federal Ocean Discharge Permits**

Discharges into waters of the territorial seas and the water of the contiguous zone are subject to special ocean discharge permits, intended to restrict discharges of toxic and hazardous substances. These permits will be based on EPA guidelines known as ocean discharge criteria (information on the effects of pollutants on water quality in the oceans). In restricting ocean discharges, EPA will also explore alternatives to ocean disposal including feasible land disposal methods. Permit issuance for ocean discharges will remain largely a Federal program.

### **Enforcement of Permit Conditions: Citizen Action**

During the initial two year period when permits are issued to existing sources, citizens may have a difficult time keeping abreast of the many thousands of permits issued in their State. Once the first round of permit hearings has ended, however, citizens have the equally important job of seeing that permit terms and conditions are faithfully carried out by permittees. Citizens can focus pressure on permit violators by requesting

copies of the State's quarterly report to EPA listing each permittee that has failed to meet its nine month interim compliance requirement. Particular attention should be focused on those sources which have been repeatedly delinquent in either submitting monitoring reports or in notifying the State or Federal permit agency of progress in meeting specified compliance requirements.

The list can also serve as an indicator of the State's enterprise in finding and reporting violations. For example, if most of the violations were discovered through spot checks by the State agency, there is a good chance that it is doing an adequate job of surveillance.

Citizens may monitor industrial effluents and report the results to EPA or the State agency. Although single effluent sample is not sufficient evidence to prove a violation, a sample may demonstrate a need for extensive State monitoring or provide the basis for an EPA compliance order. Citizens interested in monitoring industrial outfall pipes should work with their State in developing procedures to insure that prompt follow-up action will ensue when citizen samples indicate violations.

## Permits and Pretreatment

An industrial user of a municipal treatment plant will not be required to obtain a permit. However, the municipal facility into which the industrial user pipes its wastes *will* be required to have a permit, which will specify maximum levels of effluent discharges for both the industrial and municipal components of the joint treatment system according to the national effluent limitations.

As the permit holder, the municipality will be responsible for imposing pretreatment standards adequate to prevent the wastes entering the facility from damaging the works or passing through the plant untreated. In addition, the municipality will require each major industrial user to monitor its own effluent. However, because these pretreatment standards are both set and enforced by the municipality, EPA will not bring suit against industrial users for violation of the municipal permit unless the discharge also results in a violation of the national effluent limitations. Thus, if an industrial user discharged a

substance that damaged the municipal plant's equipment, but the discharge did not exceed national effluent limitations, then the municipality itself would be responsible for locating the violator and stopping the discharge.

In order to reduce the administrative load on the municipal agency, States may require that individual industrial users of public treatment works obtain State permits, specifically listing the pretreatment standards the manufacturer must meet. Under such a system of pretreatment permits (already used by Virginia), the State enforcement agency can proceed directly against a noncomplying user on the basis of an easily demonstrated violation of the specific permit conditions.

**Dischargers:** Any owner of a discharge who has filed a valid application within the required deadlines\* (either under the Refuse Act or under the new permit program) and has not received a ruling from EPA or the State permit agency, is not subject to any enforcement actions until December 31, 1974.

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\*For all discharges beginning prior to July 15, 1973, the owners must file permit applications before April 16, 1973. All other dischargers must submit an application at least 180 days prior to the proposed commencement of the discharge, unless otherwise granted by the permit agency.

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## Legal Action

### **FEDERAL ENFORCEMENT OF THE ACT**

The 1972 amendments thoroughly revise enforcement procedures, replacing the highly inefficient, three-stage enforcement conference and the lengthy 180-day notice of the Water Quality Act of 1965. Modeled on the strong Federal control in the 1899 Refuse Act and the 1970 Clean Air Act, the new enforcement procedures provide for fast, straightforward action, while allowing EPA and the States procedural flexibility.

Under the 1965 Act, Federal jurisdiction was restricted to interstate waters; it has now been expanded to include all navigable waters.\* However, it is the Act's explicit intent to assign the bulk of enforcement actions to the States, utilizing Federal authority only in instances where States are unable or unwilling to vigorously enforce the law.

#### **ENFORCEMENT OF THE ACT MAY PROCEED UNDER TWO GENERAL CONDITIONS:**

- For violation of a permit
- For violation of any standard or limitation

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\*The Act asserts Federal jurisdiction over "all navigable" waters. The Conference Report states that the legislators "fully intend that the term 'navigable waters' to be given the broadest possible constitutional interpretation . . ."

## How Federal Enforcement Works

### Types of Violations

Specifically, Federal enforcement *must* be initiated any time EPA finds there has been a violation of any of the following:

- New-source performance standards
- Inspection, monitoring, and entry requirements
- Toxic-effluent standards
- Any term or condition of a permit (including compliance schedules)
- Pretreatment standards

Federal discovery of violations, however, will depend upon State officials making spot checks, tracking down violators, and promptly reporting their findings to Federal authorities. EPA, therefore, requires States to prepare a quarterly list of all dischargers in violation of any compliance schedule.

### Types of Enforcement Actions

Upon learning of a violation, the law requires the Administrator of EPA to:

- Issue a compliance order
- Notify the discharger and the State of the violation
- Bring a civil suit or criminal proceedings

The “compliance order” mechanism can strengthen EPA’s enforcement capabilities. When the Administrator believes a discharger is violating the terms of his permit, but does not view the violation as sufficiently severe to warrant a suit, he can issue a compliance order requiring the discharger to cease.\* This order serves as a warning to the discharger. If the alleged violator fails to comply with the order, the Administrator can bring suit. This time, however, the Government’s case will be strengthened by the fact that it has done everything in its power to rectify the situation prior to initiating legal action.

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\*However, when the Administrator issues a compliance order for violation of monitoring or inspection requirements, the order will not take effect until the polluter has had an opportunity to confer with EPA about the alleged violation.



In line with Congress' intent that States assume the greater portion of enforcement authority, EPA will usually notify the State and the discharger rather than issuing orders or bringing suit itself. If the violator does not voluntarily comply and if the State fails to initiate enforcement procedures within 30 days, EPA must issue a compliance order or bring a civil action. The 30-day waiting period is *not* required if the violation is threatening the public health or welfare.

In issuing compliance orders and bringing civil action, the Administrator is granted broad authority to request any necessary interim relief. This may include obtaining a temporary restraining order or a preliminary injunction to halt pollution until the case is decided in court. Penalties for civil actions run as high as \$10,000 per day, however, the law does not set any minimum fine.

Willful or negligent violators will be subject to more stringent penalties. Those who falsify permit applications, records, or documents, misrepresent information, or tamper with a monitoring device may receive a \$10,000 fine per day and/or six months in jail if convicted. Criminal violations of any standard, limitation, or permit condition are subject to fines of between \$2,500 and \$25,000 per day of violation and/or one year imprisonment. These penalties double if a discharger persists, or repeats the violation after a first criminal conviction.

### **Emergency Powers—Oil and Hazardous Substances**

The law grants EPA broad authority to seek immediate relief where any pollutant or combination of pollutants is "presenting an imminent or substantial endangerment" to public health or any person's livelihood, such as the marketing of shellfish. Although it is not clearly stated in the law, these emergency powers are intended to implement action under a separate program entitled "Oil and Hazardous Substances Liability."

The oil and hazardous substances section is essentially an expansion of the oil spill control program of the 1970 Water Quality Improvement Act except that it also includes dis-

charges or spills or other hazardous substances. Unlike the permit program with its emphasis on preventive control, this program seeks to control discharges of oil and hazardous substances through the negative mechanism of heavy fines. For example, the owner or operator of a vessel may be fined as much as \$14,000,000 for negligence or misconduct leading to a spill as well as an additional fine to cover the entire cost of the clean-up.

States may impose their own restrictions on and penalties for discharges of hazardous substances. In addition, the Coast Guard may deny entry to any vessel that fails to meet all requirements.

The House Report states that "the list of hazardous substances must be easy to understand and must receive widespread publicity." However, no provision has been included for citizen involvement in this process. Furthermore, the law does not clarify the difference between a toxic and a hazardous substance. Citizens should request that EPA clearly explain these differences, the means by which each might be recognized and how a citizen should go about reporting the presence in the water of either type of substance.

## **Review of the State Program**

If a State clearly fails to properly administer its NPDES permit program, EPA has the power to revoke the State's permit authority and administer the program itself. If, after a public hearing, EPA determines that a State is not administering its approved program in accordance with the Act, it must notify the State. If after 90 days the State has failed to take corrective action, the Administrator must withdraw his approval of the State's program. Responsibility for administering the permit program will then revert to EPA.

If a State with an otherwise well run program fails to enforce its permits, EPA will assume responsibility for enforcement without revoking the entire State program. Before assuming full enforcement powers, EPA must: receive information of widespread permit violations; notify the State; allow the State 30 days to correct the failure; and give public notice of "Federally assumed enforcement" if the failures continue. EPA must

then enforce all permit conditions by issuing compliance orders until the State convinces the Administrator that it will enforce its permits.

In the initial implementation of the permit program, States will undoubtedly encounter numerous problems. However, citizens will have to judge whether, over the long run, the cause of clean water will be better served by working with the State to improve the State program or by having authority transferred back to the Federal government.

### **Retained Enforcement Measures**

The law specifically provides that any order to come out of a Federal enforcement conference, or any suit brought under the Refuse Act or previous water pollution control legislation will continue in full force unless it conflicts with the Act's major objectives. However, this does not include enforcement conferences, summaries, or recommendations for remedial action to be taken by State water pollution control agencies that were adopted at enforcement conferences under the old Act.

## **STATE ENFORCEMENT OF THE ACT**

Since the original Water Pollution Control Act of 1948, States have always had primary responsibility for enforcement, backed-up by Federal powers if State enforcement was insufficient. Widespread dissatisfaction over State handling of enforcement has produced a gradual increase in Federal authority, culminating in the new Act. Yet, despite broad Federal regulatory powers granted under the 1972 Law, Congress has asserted that it "fully intends that the greater portion of enforcement action will be brought by States."

While States are expected to develop their own procedures for permit program enforcement, EPA regulations require that they have procedures and authority to:

- Sue in court to impose civil and criminal penalties
- Insure that fines are comparable to Federal penalties and that they represent an effective economic deterrent to violations

- Immediately halt any substantial endangerments to public health by:
  - issuing an order or bringing suit
  - immediately notifying the Regional Administrator
- Initiate follow-up action when any discharger is not meeting his compliance schedule
- Modify, suspend or revoke permits after an opportunity for a public hearing

Except in the special case of direct jeopardy to health and welfare, the Federal guidelines do not reveal how and under what conditions these enforcement activities will be initiated. The guidelines require States to adopt new regulations to carry out enforcement by January 1, 1974. Citizens should use this opportunity to work with States in developing specific enforcement procedures before they are submitted as part of their permit program to EPA. In pressing for stronger procedures and regulations, citizens should urge their State to clarify:

- What it must do if, in sampling a discharger's effluent, a violation is discovered
- Whether a single violation warrants a compliance order, a fine, or merely transmission of the information to EPA
- The maximum time limitations for compliance with a State enforcement order
- The State's definition of "follow-up action"

The public may hear that: highly specific enforcement procedures will restrict flexibility, that enforcement must be tailored to the individual discharger; or that negotiation is more effective and less expensive than legal proceedings. Citizens may, however, point to the experience under the Water Pollution Control Act of 1965, where, in the absence of firm and quick enforcement procedures, the Federal government spent millions of dollars in negotiations with comparatively few results. Moreover, it may be argued that enforcement measures are equitable only if they fall uniformly on all polluters.

Substantial fines may help States defray their legal expenses. EPA has suggested three options that States may incorporate

into their enforcement program to encourage compliance and to generate additional funds:

- (a) Assessing the violator for costs of investigating or monitoring the violation
- (b) Charging the violator for removal of pollutants or for reducing the impact of his pollution
- (c) Requiring compensation to the State for damages to the public (including loss of fish and wildlife) or payment to affected residents in the State

### CITIZEN SUITS

Citizen response to the legal remedies available under the Refuse Act was overwhelmingly favorable. To provide citizens with some similar means of legal recourse, without also encouraging them "to engage in frivolous and harassing legal action," the Act provides that any citizen who is, or may be, affected by a violator may bring suit if enforcement agencies are unable or unwilling to act.\*

The citizen may bring suit against any party (corporation, association, State, municipality, or instrumentality of the United States) who is alleged to be in violation of:

- *Any effluent standard or limitation promulgated under the Act*—includes permit certification procedures and any permit or term and condition of a permit, including compliance schedules.
- *Any order or permit issued by the Administrator or State*

In bringing suit, the citizen must give 60 days notice to both the State and to the violator, to allow voluntary compliance or the initiation of enforcement action by the State. In the interim, citizens may wish to seek a temporary restraining order to halt serious pollution. In seeking immediate relief,

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\*The Act's provision reflects the Supreme Court decision reached in *Sierra Club v. Morton*. In the case, the Court ruled that legal standing to sue against development of a public resource depends upon a showing of direct interest by an individual user. However, direct injury can include loss of recreational, aesthetic and other conservational values as well as financial loss.

citizens should expect to have to post substantial bonds as proof of interest and of the urgency of the situation. The 60 day waiting period may be waived for violations of “new source” or toxic standards or in the case of danger to public health and welfare or where EPA fails to enforce a standard in another State. Citizens filing suit under either of the first two conditions are still required to inform EPA of their actions by formal notice.

### **Restrictions on Citizen Suits**

The law specifies the following restrictions on citizen sponsored suits:

(a) Citizens may only bring suit to the extent allowed under the 11th Amendment of the Constitution. This Amendment prohibits citizens in one State from bringing action against another State. Citizens wishing to sue an upstream State for failure to enforce a standard must urge their Governor to sue EPA. However, the burden of proof is on the plaintiff to show the relationship between the violated standard and its interstate effect on water quality or on public health and welfare.

(b) Citizens may not sue to require compliance if the Administrator or the State is actively pursuing enforcement action against the violator. If an enforcement agency is initiating suit, citizens have the right to intervene in the case, without having to prove “substantial or direct interest.”

(c) The Act allows courts to assign the costs of litigation to any party in the suit. While this might sometimes free citizens from the expense of litigation, it is also intended to deter them from suing without good cause.

(d) EPA may not be sued unless it has failed to perform mandatory action or duties. The law must specify that EPA “shall” perform a specific duty, and not simply “authorize” EPA to take action.

### **Judicial Review of EPA’s Action**

The citizen suit provision—in and of itself—does not allow individuals to sue EPA for setting standards that prove to be insufficient to carry out the objectives of the Act. However,

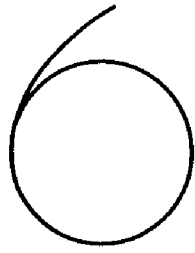
citizens may go to court to seek judicial review of EPA's actions regarding:

- Approval or denial of individual permits
- Establishment of standards and limitations
- Approval or denial of State permit programs

However, the Administrator's actions may not be reviewed in any civil or criminal proceeding for enforcement. Nor does the judicial review process require the Administrator to modify his actions on the basis of supplementary information. While this latter provision may help preserve the standards from industries seeking to avoid stringent permit requirements, it may also work against the citizen in seeking to upgrade the standards.\*

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\*However, the Administrative Procedures Act allows such review if citizens can prove that the Administrator's decision was made "arbitrarily or capriciously." Further details on the APA are in *Environmental Law*, Chapter 5. (See Bibliography.)



# Economic Considerations

The decisions on how clean our waters should be cannot be divorced from the question of how much the clean-up will cost. Although the 1972 Act appears to be an unusually strong document, it would be a mistake for the reader to think that the Act commits us to cleaning up our waters, whatever the cost.

Scattered liberally throughout the 1972 Act are provisions requiring a consideration of the costs and benefits of pollution control in, for example:

- The establishment of standards for “best practicable” and “best available treatment,” and standards for new sources
- The setting of water quality-related effluent limitations
- Biennial reports to Congress by EPA

## **INTERNATIONAL CONSIDERATIONS**

The public may hear that required levels of control will cause the prices of our goods to rise relative to prices of foreign products, resulting in our products being less competitive in the world market. Therefore the Act calls for a thorough study of the effects of pollution control on our world trading position. The Secretary of Commerce is to report to Congress each year on:

- The effects of control measures on production costs and market prices of manufactured goods



- Levels of control expected in other countries (as water pollution problems become more severe abroad)
- Possible shifts in competitive advantage
- Means of off-setting foreign competitive advantage, e.g., tariffs
- Effect of such tariffs as incentives to foreign pollution control

## **NATIONAL STANDARDS AND GOALS**

At the national level, controversy focuses on the possible costs of meeting the long-run goals of the Act: best available treatment and body contact water quality by 1983, and zero discharge of pollutants by 1985. Foes of stringent pollution limitations argue that the costs of control will be ruinous. There are several vital factors that this argument overlooks.

First, pollution control will produce benefits as well as costs. To be meaningful, estimates of the costs of pollution control must be balanced against the benefits derived from clean water. The Council on Environmental Quality (CEQ) in its Annual Reports contends that such costs will often be outweighed by the benefits.

Second, predictions of economic disaster tend to ignore the fact that the zero discharge goal for 1985 is exactly that—a goal—and not a legal requirement. If it becomes clear that elimination of all discharges will be prohibitively expensive or that it will produce no corresponding gains in water quality, the goal can and will be changed.

Third, cost estimates for zero discharge are often based on the application of existing add-on treatment techniques. However, the no discharge goal is predicated on the use of more economical methods, including process changes, recycling, and in-plant controls. The development of more advanced treatment techniques is expected to produce even further economies. Finally, the Act specifically calls for benefit/cost analyses so that the Nation can decide, on the basis of full information, how clean is clean enough.

## **LOCAL ECONOMIC IMPACTS**

At the local level, controversy may focus on particular plants or a locally-dominant industry. Advocates of clean water will be confronted with arguments that stringent pollution control standards will force plants to close, cause wholesale unemployment, and undermine the economic base of the entire community.

In many cases, plans for closing a plant may already exist, and the company may simply use pollution control requirements as an excuse to shut down an antiquated plant which has long been losing money. In other instances, an economically healthy plant may threaten closure or layoffs in an attempt to delay the application of stringent control requirements.

Changes in production methods may offer an economical alternative to prohibitively expensive add-on treatment. The use of such in-process controls will often produce gains in productivity or profits from recovered wastes. The company's accounting of control expenses should clearly balance these economic benefits against the costs. Finally, tax credits and accelerated depreciation deductions may permit the company (particularly a highly-profitable one) to recover part of its investment by reducing normal after-profit taxes.

In some towns, particularly in economically-depressed regions, a marginal plant may be the major employer. If the plant is closed and no new jobs are available for the workers, the community may well choose to suffer the pollution rather than massive unemployment. However, low-interest Federal loans for construction of pollution control facilities may offer a solution in such cases. The Act authorizes loans to small businesses that would otherwise "suffer substantial economic injury" from meeting the control requirements.

Citizens will need accurate information to evaluate a shut-down threat, including: information on the company's economic health; the actual costs of pollution control; and offsetting gains in productivity; the number and type of jobs affected; and the chances for alternative employment. In the next section, we consider some of the ways plant employees

and citizens concerned with water pollution can work together to obtain this information.

## **EMPLOYEE PROTECTION**

Organized labor has become a new proponent of better environmental policies. Labor leaders together with environmentalists have sought legislative protection from:

- Company threats to move to another State or country having less stringent standards
- Instances where corporations, anxious to get rid of inefficient and obsolete facilities, falsely blamed shutdowns on environmental regulations
- Intimidation of workers who report in-plant violations of pollution control laws

In addition, they have sought a means by which to subpoena records to investigate company profits versus actual costs in acquiring pollution control equipment.

The new Water Pollution Control law is the first Act under which injured employees may seek recourse against polluting employers. The law offers protection to employees who have testified or brought suit under the Act, and to those who believe they have been discriminated against. The Secretary of Labor is required to hold hearings and subpoena company records, if necessary, in order to determine any possible violations committed by the employer. Employers found to be violating any standards or regulations must pay all the employee's legal costs and may be required to fully compensate or rehire him.

The law also requires the EPA Administrator to investigate, upon request of an affected employee, threatened plant closures or lay-offs when employees attribute them to any requirement of the Act. Once such a public hearing is granted, the Administrator is required to make findings of fact and to issue non-binding recommendations.

Also, the Department of Labor and EPA have established an "early warning system," under which EPA notifies Labor when reports indicate that a plant may have to shut down because of environmental considerations. Labor, at that time

begins work to minimize the adverse effects on employees in the affected community.

By removing the threat of economic intimidation, these provisions free employees to become ever stronger advocates of water pollution control. Citizen activists should cooperate closely with labor's efforts to clean up the waters; they may contact the United Auto Workers, which has worked closely with many other unions in water pollution issues.\*

## **SEPARATING ECONOMICS FROM GOALS**

Money spent to control water pollution is an investment in the quality of life. We are free to divorce the whole question of the cost of pollution control from the realm of economic justifications and to treat clean water as an overriding national goal, as we did with the space program.

National goals are inherently political questions; the answers will be forged in the give and take of our political process. If citizens feel strongly that clean water is such a goal, they must demonstrate that they are willing to pay the costs in higher prices, reduced consumption, and generous support for pollution control programs.

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\*United Auto Workers Union, Conservation Department, 8000 E. Jefferson, Detroit, Michigan 48214.

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# Appendices

## REPORTS

Effective citizen participation depends upon timely and adequate information. The various reports that EPA must submit to Congress may be a most useful source of information including data on progress and problems in pollution control programs at both State and Federal levels of government. Citizens should watch for these reports during the early months of each session of Congress and obtain copies from their Congressman or from EPA.

The Act requires EPA to make a large number of reports on a wide variety of topics including training grants, waste treatment programs for particular local regions and other special programs. Some of these reports may be less than vital from the citizen's point of view. However, there are two reports which the citizen should not miss. These reports—one annual, the other biennial—should provide an irreplaceable summary and overview of pollution control efforts, complimenting the citizens' information on specific local issues.

### Annual Report

Within the first three months of each session, EPA must submit a report on:

- 1) The progress and problems of all the different levels of plans required by the Act.
- 2) Actions and results of Federal pollution control research.
- 3) The progress and problems in developing effluent limitations.
- 4) The status of State programs, including a comparison of actual and planned progress.
- 5) Enforcement actions undertaken during the year.

- 6) The status of State and local pollution control programs.
- 7) Results of the annual survey of the efficiency of public waste treatment plants.
- 8) EPA actions, including those on training grants and scholarships.
- 9) The reports and recommendations of the Water Pollution Control Advisory Board.

### **Biennial Report**

By February 10 of every odd-numbered year, EPA must submit:

- 1) A detailed estimate of the cost of carrying out the Act.
- 2) A revised estimate of the cost of constructing all needed public waste treatment works.
- 3) A study of the economic impact of construction of treatment facilities on all levels of government.
- 4) An analysis of the requirements for and cost of meeting the Act's objectives nationwide.
- 5) Copies of cost estimates received from the States.

### **National Policies and Goals Study**

The Act requires the President to study all national policies and goals established by law and to determine the optimum relationships among them, in terms of the resources of the Nation. By October 1974, he must inform the Congress of the results of the study and of his recommendations.

### **Report on New Court System**

The Federal Water Pollution Control Act may radically change the current system of legal jurisdiction over matters of water pollution, and perhaps over all environmental issues. The Act requires that within one year after passage of the Act, the Attorney General of the United States report to Congress on the feasibility of establishing a separate judicial structure.

The Justice Department is currently considering three alternatives: a single court to hear *all* environmental cases; a panel of judges to review environmentally-related orders of all Federal agencies; or a court which would review all orders issued by specific agencies, such as the Environmental Protection Agency, the Department of Interior, Atomic Energy Commission, etc. Citizens should contact the Land and Natural Resources Division, Department of Justice, Washington, D.C. 20530 for up-dated information on this issue.

## TREATMENT TECHNOLOGY\*

The most common form of water pollution control in the United States is a system consisting of sewers and a waste treatment plant. The sewers collect the waste water from homes, businesses, and industries, and deliver it to the plant for treatment to make it fit for discharge into streams—or for reuse.

### Collection Systems

Each building has a sewer that connects to the common or lateral sewer beneath the street. The laterals connect with the larger trunk or main sewers which, in turn, discharge into an interceptor sewer.

**Separated sewer systems** consist of sanitary sewers, which carry only sewage, and separate storm sewers, which take care of the runoff from rain and snow. However, the water released from the storm sewers is often seriously contaminated with oil, dirt, organic matter and chemicals.

**Combined sewers** carry away both water polluted by human use and storm run-off from streets and buildings. In a combined sewer system, the interceptors are designed to permit a portion of the sewage to pass directly into the receiving waters when storms cause high runoff. If part of the increased load of water were not diverted, the treatment plant would be overloaded and the purifying process would not function properly.

### Waste Treatment

The basic function of waste treatment is to speed up the natural processes by which water purifies itself. This process relies on bacteria that digest the organic matter in the sewage, consuming oxygen in the water in order to do their job. If the sewage load is excessive, the bacteria may consume too much of the dissolved oxygen (DO) available in the water, leaving too little to sustain fish and plant life. Low levels of DO also reduce the stream's ability to assimilate and purify wastes. This demand for dissolved oxygen—called the biochemical oxygen demand or BOD—is used to measure the organic waste load of sewage. It is thus an indication of how well a treatment plant is working; if the plant is overloaded or performing poorly, its effluent will have a high content of organic wastes and therefore a high BOD.

### Primary Treatment

This mechanical process chiefly removes solids from the water. First, sewage is screened to remove floating objects. Next, the sewage passes into a chamber where sand and grit settle. Suspended solids are then settled out in a sedimentation tank, collecting on the bottom as raw sludge. Finally, the waste water is chlorinated to kill disease-causing bacteria and to reduce odor.

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\*This section is largely adapted from EPA publications, including: *A Primer on Waste Water Treatment*; *Clean Water: It's Up to You*; and several brochures on technology transfer.

About 30 percent of our municipalities give only primary treatment to their sewage. At best, primary treatment removes only about 35 percent of BOD, too little to protect water quality.

### **Secondary Treatment**

The next series of steps in waste water treatment is usually a biological process; it improves on natural purification methods by using bacteria under controlled conditions to rapidly decompose organic wastes.

The principal types of secondary treatment are the trickling filter and the activated sludge process. A *trickling filter* is a bed of stones or synthetic material through which the sewage passes after primary treatment. Bacteria on the stones consume most of the organic matter in the sewage as it trickles through the bed. In the *activated sludge* process, sewage that has undergone primary treatment is mixed with air and bacteria-laden sludge and held for several hours. Sedimentation and chlorination complete the process. The activated sludge process is becoming the more popular type because of smaller size, lower cost, more precise control, and greater efficiency.

While a plant combining primary and secondary treatment may be able to remove up to 80 or 90 percent BOD, secondary treatment is effective only for organic wastes. Complex industrial wastes are often not susceptible to biological treatment and damaging to the bacteria in the treatment plant.

### **Physical-Chemical Treatment**

More advanced methods of treatment have been developed to cope with a waste load that is growing worse in both quantity and quality. *Physical-chemical treatment* methods include a number of versatile techniques that do not rely on biological processes; they offer extreme flexibility in waste treatment. In an exclusively physical-chemical system, these techniques can be used in series to provide any desired level of waste treatment—including removal of phosphates, mineral salts, and suspended solids. One or more of these techniques can also be used in combination with biological treatment to remove a particular troublesome pollutant or to increase the capacity of the facility. Such combinations of biological, physical, and chemical treatment methods offer an economical means of adapting to specific changes in water quality requirements and qualitative shifts in waste load. The three major physical-chemical methods include:

- (a) **Coagulation—sedimentation** (also known as clarification). This process removes essentially all suspended solids and reduces concentration of phosphates by over 90 percent. Chemicals called flocculants are used to bunch the particles together into larger masses which can then be removed. Clarifying chemicals can be simply and economically added to a conventional biological system at any of several points in the existing treatment process.
- (b) **Carbon—adsorption**. The effluent is passed through activated charcoal, which will remove over 98 percent of the organic matter that resists normal biological treatment.



- (c) **Electrodialysis.** This process may be used if a reduction in dissolved salts is required. Ionized mineral salts in the water are attracted through a membrane to an electrically charged pole. Rarely employed unless the water will be reused for municipal or industrial supplies, electrodialysis is capable of reducing the load of salts by over 50 percent. (The process is not currently considered to be cost-effective.)

### **New Approaches**

Scientists and engineers are still looking for the ultimate system, one that will clean up our water, simply, completely, and at reasonable cost. Two promising processes are:

- (a) **Reverse osmosis.** This is an experimental technique in which molecules of pure water are forced through a semi-permeable membrane, thus reversing the usual treatment process by removing the water from the waste. Small scale tests show the method to be effective in separating the water from all pollutants.
- (b) **Land Disposal.** Also known as the living filter, this biological process relies on the waste disposal capability of the soil. Sewage is first held in shallow lagoons and aerated to accelerate the action of the bacteria. The sludge settles out and is applied to the land as fertilizer while the liquid waste (containing suspended and dissolved nutrients) is chlorinated and sprayed on the land. Final purification is accomplished by natural biological, chemical and physical reactions in the soil.

Land disposal or "soil systems" is one of the oldest means of treatment and has been used for hundreds of years. There are over 500 soils systems in the U.S. However, this system is currently undergoing a revival and only recently has a full-scale research effort been undertaken to adapt the system for possible use on a municipal scale. The first large scale application is now being developed in Muskegon County, Michigan.

## GLOSSARY

The following terms appear frequently in the text and in other materials on water pollution control. These terms are presented in simplified, rather than highly technical, definition. (Definitions from the Act are designated by an asterisk in the margin.)

**activated-sludge process**—use of biologically active sewage sludge to hasten the breakdown of organic matter in raw sewage during secondary treatment.

**adsorption**—the adhesion of a substance to the surface of a solid or liquid. Adsorption is often used to extract pollutants by causing them to be attached to adsorbents such as activated carbon or silica gel. Some adsorbents are used to extract oil from waterways in oil spills.

**aquifer**—a bed of porous rock or sand that carries or holds water.

**advanced treatment**—various processes used in addition to secondary treatment, including coagulation-sedimentation or electrodialysis, and adsorption.

**benefit-cost analysis**—economic analysis of a project or program, which yields a ratio between anticipated benefits and costs, thus revealing the relative economic efficiency of the project.

**biochemical oxygen demand (BOD)**—a measure of the amount of oxygen consumed in biological processes that break down organic matter in water; a measure of the organic pollutant load.

**chlorination**—the application of chlorine to water for purposes of disinfection (ineffective against many viruses).

**coagulation**—the clumping of particles to settle out impurities; often induced by chemicals such as lime or alum.

\* **discharge of a pollutant**—any addition of any pollutant to navigable waters from any point source; any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel.

**disposal well**—a deep well used for the disposal of liquid wastes.

**DO**—dissolved oxygen; the oxygen freely available in water and necessary for aquatic life and the oxidation of organic materials.

**effluent**—a substance that flows out; the treated or untreated liquid that flows out of a waste treatment plant, a sewer, or an industrial out-fall.

\* **effluent limitation**—any restriction (including schedules of compliance) established by a State or EPA on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean.

**electrodialysis**—a treatment process that uses electrical current and an arrangement of permeable membranes to separate soluble minerals from water. Often used to desalinate salt or brackish water.

**estuary**—aquatic area where fresh and salt water mix.

**eutrophication**—an aging process in lakes, during which the water becomes overly rich in dissolved nutrients, resulting in excessive development of algae and other microscopic plants causing a decline in levels of dissolved oxygen (DO).

**flocculation**—the process of separating suspended solids by chemical creation of clumps or flocs.

**ground water**—water in the porous rocks and soils of the earth's crust; a large proportion of the total supply of fresh water.

**industrial user**—any industry that introduces pollutants into public sewer systems and whose wastes are treated by a publicly-owned treatment facility.

**land disposal method**—advanced waste treatment that uses soil, air, plants and bacteria to remove pollutants from waste water. It includes four basic processes: pretreatment to screen out large solids; chlorination and vegetation in the soil; spraying over cropland where vegetation and microorganisms in the soil remove additional pollutants; and reclamation by wells or drain tiles.

- \* **navigable waters**—the waters of the United States, including the territorial seas, and intrastate waters.

**new source**—any point source which is constructed after the issuance of National Standards of Performance regulations (May 1974).

**non-point source**—any non-confined area from which pollutants are discharged into a body of water, i.e., agricultural run-off, urban run-off, and sedimentation from construction sites.

**nutrient**—a chemical substance (e.g., nitrogen or phosphorus) absorbed by green plants and used for growth.

- \* **ocean**—any portion of the high seas beyond the contiguous zone.

**permit**—a legally-binding document issued by a State or Federal permit agency to the owner or manager of a point source discharge. The permit document contains a schedule of compliance requiring the permit holder to achieve a specified standard or limitation (by constructing treatment facilities or modifying plant processes) by a specified date. Permit documents also specify monitoring and reporting requirements to be conducted by the applicant. All permits issued are valid for a maximum of five years.

- \* **point source**—any discernible, confined and discrete conveyance, including . . . any pipe, ditch, channel, tunnel, conduit, well, discrete operations, or vessel, or other floating craft, from which pollutants are or may be discharged.

**pollution**—the man-made or man-induced alteration of the chemical, physical, biological and radiological integrity of water making it less desirable for the propagation of balanced indigenous populations of fish, for recreation, industry or wildlife uses.

- \* **pollutant**—waste discharged into water including: dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions,

chemical wastes, biological materials, radioactive materials, heat wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal and agricultural waste; but not including, sewage discharged from vessels nor material injected into wells in connection with the production of oil and gas.

**pretreatment**—any process used to reduce the pollutant load before the waste is introduced into a sewer system or delivered to a treatment plant.

**primary treatment**—the first stage in waste water treatment in which floating or settleable solids are mechanically removed by screening and sedimentation.

**receiving waters**—bodies of water into which waste water effluents are discharged.

**reverse osmosis**—an advanced method of waste treatment that relies on a semi-permeable membrane to separate waters from pollutants.

**river basin**—one of 267 major and minor basin areas drained by a river and its tributaries.

**schedule of compliance**—description of remedial actions to be accomplished by the permit holder (type of facility to be installed or alternative control measures to be established) and a sequence of actions leading to compliance with applicable standards.

**secondary treatment**—the second step in most waste treatment systems in which bacteria consume the organic parts of the wastes. It is accomplished by bringing the sewage and bacteria together in trickling filters or in the activated sludge process.

**sewer**—any pipe or conduit used to carry sewage or storm water to treatment plants or receiving waters.

**sewer, combined**—sewer that carries both waste water and storm water.

**sewer, interceptor**—a sewer which collects the sewage from the main and trunk sewers and carries them to points of treatment or discharge.

**sewer, lateral**—a street sewer that serves a limited number of properties and discharges into a trunk sewer.

**sewer, sanitary**—in a system of separated sewers, the pipes that carry waste water but exclude storm water.

**sewer, trunk**—a sewer that transports waste water from collecting (lateral) sewers to the treatment plants.

**sludge**—the solids removed from waste water by sedimentation and precipitation; often presents a problem of ultimate disposal.

**suspended solids**—(SS) small particles of solid pollutants that resist separation by conventional means. SS (along with BOD) is used as a measurement of water quality and an indicator of treatment plant efficiency.

**territorial seas**—the portion of the sea that is within the three mile limit.

**thermal pollution**—the impairment of water quality through temperature increase, usually from discharges of industrial cooling water.

\* **toxic pollutants**—a pollutant or combination of pollutants including disease causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism either directly or indirectly cause death, disease, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), and physical deformations in such organisms and their offspring.

**trickling filter**—a bed of rocks that supports bacterial growth used to treat waste water; a secondary treatment process where sewage is trickled over a bed of rocks so that bacteria can break down organic wastes.

**water quality standard**—a plan for water quality management specifying: the use (recreation, fish and wildlife propagation, drinking water, industrial or agricultural) to be made of the water; criteria to measure and protect these uses; implementation and enforcement plans; and an anti-degradation statement to protect existing water quality.

**water quality criteria**—the levels of pollutants that affect the suitability of water for a given use.

## BIBLIOGRAPHY

The following is a list of some of the more important writings about water pollution control. Sources and prices are given wherever possible.

For convenience, each source has been placed under a general heading. The classification is often arbitrary. For example, the *Economics of Water Supply and Quality* has been listed under the "Technical Information" Section. It could also be placed in the "Economics" section, since the approach to the study is clearly an economic one.

Publications available from the Government Printing Office (GPO) can be ordered from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Publications available from the National Technical Information Service can be ordered from NTIS, 5282 Port Royal Road, Springfield, VA, 22151. Publication numbers must be cited when ordering by mail.

EPA also distributes informational materials. Copies of EPA standards and other regulations are generally available free of charge. Check with your regional public affairs office or write to EPA, Office of Public Affairs, 401 M Street, S.W., Washington, D.C. 20460.

## GENERAL INFORMATION

THE CHALLENGE OF THE ENVIRONMENT, A Primer on EPA's statutory authority, December, 1972, EPA. Provides a brief description of EPA's legal authority in water, air, solid waste and other environmental programs. (Free from EPA)

ENVIRONMENTAL QUALITY, C.E.Q. Annual Reports, 1970-1972; to obtain, write to the Council on Environmental Quality, 722 Jackson Place, N.W., Washington, D.C. 20006. This book is an excellent summary of the year's events in all environmental law.

THE TOWN THAT LAUNDERS ITS WATER, Stevens, Leonard A., New York, Coward, McCann, Geoghegan, Inc., 1971. How a California town managed to reclaim and reuse its water. The New Conservation Series describes the experiment of Santee, California in water reuse covering such aspects as funding construction of purification plant and gaining public acceptance. Price: \$4.49.

A PRIMER ON WASTE WATER TREATMENT, EPA, Water Quality Office, March, 1971. Discusses many aspects of treating pollution; explains methods of treatment used today and new processes being developed for treatment of wastes in the future. 55¢

## LAW PUBLIC POLICY AND ADMINISTRATION

THE POLITICS OF POLLUTION, Davies, J. Clarence, New York, Pegasus Co., 1970. This book deals with all types of pollution; it is strong on historical background including that of water pollution control and contains a chapter on citizen lobbies.

**WATER WASTELAND**, Zwick, David and Benstock, Marcy, Grossman Publishers, 1971. A comprehensive, incisive and candid book on water pollution: covers all types of water pollution issues and discusses the political realm under which pollution abatement programs operate.

**NATIONAL ENVIRONMENTAL POLICY ACT**, Public Law 91-190. Defines the Federal policy for protection of the environment; requires Federal agencies to evaluate and report on all major proposed actions that affect the environment. GPO 10¢

**ENVIRONMENTAL LAW**, Reitze, Arnold W. Jr., North American International, 1972. This excellent textbook covers the waterfront on environmental laws. It also provides useful scientific information and gives an incisive rundown on Congressional and Federal agency procedures dealing with environmental matters.

**FREEDOM OF INFORMATION ACT**, Public Law 90-23. Establishes the right of public access to Federal information; defines the kinds of information to be considered public and agency responsibilities in responding to requests. GPO 5¢

**FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972**, Public Law 92-500, 92nd Congress. This law sets the national policy for water pollution control; defines complex Federal-State-regional-local responsibilities. (Available free from EPA or may be purchased from GPO for 50¢)

**SENATE REPORT**, S. 2770 on the Federal Water Pollution Control Act Amendments of 1971, Report No. 92-414, by the Senate Public Works Committee, Oct. 28, 1971; 55¢. This document describes the Senate Public Works Committee's intent in drafting the new Federal Water Pollution Control Act Amendments.

**HOUSE REPORT**, H.R. 11895 & 11896, on the Federal Water Pollution Control Act Amendments of 1972, Report No. 92-911. Describes the House Public Works Committee's intent in issuing their version of the new water law. Contains section by section analysis of the House version by EPA.

**MANAGING THE ENVIRONMENT, 9 STATES LOOK FOR NEW ANSWERS**, Haskell, Elizabeth H., Woodrow Wilson International Center for Scholars, April 1971. Describes and evaluates trends in environmental management by State governments. (Available from Woodrow Wilson International Center for Scholars, Smithsonian Institution, Washington, D.C. 20024 for \$3.75.

**ENVIRONMENTAL CONTROL: PRIORITIES, POLICIES AND THE LAW**, Grad, Frank P., Rathjens, George W., and Rosenthal, Albert J., A study prepared by the Legislative Drafting Research Fund of Columbia University, Columbia University Press, N.Y., New York, 1971. Discusses mechanisms for environmental control; the setting of standards; comments on Federal environmental control programs and discusses private litigation in water pollution control. Includes excellent bibliographic references. \$9.00.

## ECONOMICS

THE ECONOMICS OF CLEAN WATER, EPA, 4 Volumes and Summary; the summary gives a good overall economic picture on water pollution control; volumes I and II are very technical; volume III is a good intermediate level description of what it will cost industry to meet the objectives of water pollution control program. 1970, \$6.50.

ECONOMIC GROWTH AND ENVIRONMENTAL DECAY, Barkley, Paul W. and Seckler, David W., Harcourt Brace Jovanovich, Inc., N.Y., 1972. An excellent book on the interrelationships between our Nation's growth and environmental decay. Gives a comprehensive history of growth and an economist's skepticism regarding it.

ECONOMIC IMPACT OF POLLUTION, CEQ, Commerce and EPA, 1972. A summary of recent studies prepared for CEQ by Department of Commerce and EPA. A good intermediate level analysis of the economic effects of pollution control. (Available from EPA.)

## CITIZEN ACTION

GROUPS THAT CAN HELP, EPA, 1972. Lists major environmental organizations; ways they can assist the average interested citizens in the environment.

DON'T LEAVE IT ALL TO THE EXPERTS, The Citizen's Role in Environmental Decision Making, EPA, November 1972. GPO Number 0-478-748, 55¢. (Also available from EPA.)

HOW TO BE POLITICALLY EFFECTIVE, League of Women Voters, National Office, 1730 M Street, N.W., Washington, D.C. 20036, No. 168; \$3.00. A basic guide suitable for use by schools, groups or individuals on how to make yourself heard in local and State political issues.

## TECHNICAL INFORMATION

THE ECONOMICS OF WATER SUPPLY AND QUALITY, by Harvard Water Program, February 1971. Discusses municipal waste treatment; economics of water supply; relates political realm to both water resource and water pollution control programs. GPO 50¢. Publication No. 5501-0070.

ENVIRONMENTAL SCIENCE AND TECHNOLOGY, Pollution Control Directory, published monthly by the American Chemical Society, 1155 16th Street, N.W., Washington, D.C. 20036. Contains an excellent bibliography of research papers and engineering equipment for pollution control.

THE ENVIRONMENTAL INDEX, 1972. A guide to environmental and research books and papers as well as films published during the year. \$75.00—for town libraries. Contact the Council on Environmental Quality for information on where to order the complete set.

EXPRO '73, EPA, 1973. A listing of all environmental research projects eligible for funding from EPA.



	1973	1974	1975	1976	1977	1978	1979
<b>Treatment Plants</b>	(Nov. 28, '72) FY '73 & '74 Construction Grant Allotment made by EPA (Feb. 18, '73) Sewer System Regulations & studies promulgated by EPA (Mar. 2, '73) User Charge Grant requirements in effect (Apr. 18, '73) Guidelines for Treatment works (Jun. 30, '73) Must not approve any grant unless applicant shows compliance w/2/18/73 regulations (Oct. 18, '73) Must apply for reimbursement for treatment construction (Jun. 30, '74) Must not approve any grant without consideration of best practicable technology						
<b>Areawide Plan</b>		(Dec. 18, '73) Planning agency regulations pub. by EPA (Jan. 18, '73) EPA guidelines for identifying planning areas (Mar. 18, '73) Water Quality Problems identified by Governors (Jul. 18, '73) Boundaries and agencies selected by Governors (Jul. 18, '74) Planning agency develops planning apparatus (Jul. 18, '76) Plan approved by Governor, sent to EPA (Jul. 18, '77) Annual Revision of plan (Jul. 18, '78) 2nd revision . . . annually thereafter					
<b>Reports</b>	(Jan. 1, '73) EPA report to states on effects of pesticides in water (Jan. 31, '73) Water Resources Council progress report on completing Level B plans . . . annually thereafter (Apr. 18, '73) Sec. of Commerce report on effects of Act on market prices . . . annually thereafter (Jul. 18, '73) EPA report to states and public on ways to control thermal discharges (Oct. 18, '73) EPA report on effects of pollutants on recreation, wildlife, aesthetics, etc. (Oct. 18, '73) EPA report on factors necessary to restore integrity of nation's waters (Jan. 1, '74) EPA nationwide inventory of water quality (Oct. 18, '74) EPA report to Congress on alternative methods of financing pollution control after fiscal 1976 (Jan. 1, '75) EPA report on social, environmental & economic costs to meet Act's objectives. . . annually thereafter						

This booklet was prepared by the Izaak Walton League of America under contract with the Environmental Protection Agency. We hope this booklet expands the reader's appreciation and understanding of the Federal Water Pollution Control Act of 1972 and its many opportunities for public participation.

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