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Table of Contents

Papers presented, Tuesday, October 30, 1973

MORNING SESSION

Walter Zabban, *Session Chairman,* The Chester Engineers, Coraopolis, Pa.

AFTERNOON SESSION

R. N. Baum, Jr., *Session Chairman,* Calgon Corporation, Pittsburgh, Pa.

Papers presented, Wednesday, October 31, 1973

MORNING SESSION

Joint Session, ASME Research Committee on Boiler Feedwater Studies

D. E. Noll, *Session Chairman*, Calgon Corporation, Pittsburgh, Pa.

Paul Goldstein, *Co-Chairman*, NUS Corporation, Pittsburgh, Pa.

AFTERNOON SESSION

Paul Cohen, *Session Chairman*, Westinghouse Electric Corporation, Madison, Pa.

Papers presented, Thursday, November 1, 1973

MORNING SESSION

R. Gordon Knight, *Session Chairman*, Duquesne Light Company, Pittsburgh, Pa.

AFTERNOON SESSION

PROGRESS REPORTS

C. A. Bishop, *Session Chairman*, U. S. Steel Corporation, Monroeville, Pa.

An Economist Looks At Pollution

by J. N. OCHS, Department of Economics, University of Pittsburgh, Pittsburgh, Pa.

One hundred and seventy-five years ago Thomas Malthus wrote his "Essay on the Principles of Population as it Affects the Future Improvement of Society." In this essay Malthus argued that continued growth of the population in a world of finite resources would inevitably push humanity to the limit of bare survival. It was his vision of the future which first earned economics the title of the Dismal Science. It is ironic that Malthus wrote his essay at the threshold of an era of unprecedented growth in not only population but also in the material standards of human existence.

Today there is a new generation which has rediscovered the Law of Diminishing Marginal Productivity and has once again warned us that the price of survival is the stoppage of growth. The ecologists warn us that to continue to grow is to eventually perish. I have no doubt that the ecologists are correct. Continued growth must inevitably lead us to a period in which further growth will be immisseration. I do not believe, however, that we have as yet reached such a point nor do I wish to speculate as to how soon the inevitable will be immisserating. I do not believe, however, myself today to a set of problems in social engineering which have arisen as a consequence of the technical progress which has so far kept us out of the Malthusian Trap.

The transformation of the social and physical environment which has occurred over the past centuries is basically the unintended cumulative consequence of a multitude of decisions made by individuals whose actions were taken with the very limited objective of securing personal advantages for themselves. Yet these decisions were made within a nexus of legal and economic institutions which so conditioned the individuals's calculus of gains and losses that actions which were designed to secure personal gain also appear, on balance, to have promoted the general welfare. In recent years, however, there has developed an increasing sense of conviction that the social mechanisms which have channeled private choices of technology are no longer adequate to assure that as former Secretary of Defense, Charles Wilson put it, "What's good for General Motors is good for the country."

This conflict between private and public interest appears sharpest with respect to the use of environmental resources. We have achieved our current standard of living by the adoption of techniques which both concentrate processing activities spatially, and draw increasing volumes of virgin materials into production. In the course of processing, residuals are created which must either be retained in the production sector through recycling or discharged back into the environmet. Either method of handling the residuals involves a cost. It is often more costly for a firm to recycle residuals which are close at hand than to bring in virgin materials from great distances. On the other hand, the volume of residuals discharged into many of our air and water sheds has exceeded their capacity to assimilate, transform and disperse these waste products without harm to life and property and to the amenities produced by the environment. These discharges generate social costs borne by all users of the environment. From a social point of view, additional residuals should be recycled whenever the costs of recycling are less than the cost of the additional pollution damage which would occur if the residuals are discharged into the environment. However, in spite of the fact that the assimilative capacity of many of our air and watersheds have taken on the character of scarce resources, our social institutions have historically encouraged individual decision-makers to view the use of these resources as costless. As a consequence, we have encouraged the adoption of living patterns, production processes and residual handling techniques which tend to generate more, and recycle less, residuals than is consistent with efficient use of our environmental resources. Given the fact that continued growth in output will both generate a greater demand for a cleaner environment and a larger volume of residuals with which to cope, the problem of managing the use of our environmental resources in an effective way is going to become increasingly urgent.

Alternatives Approaches to the Management of Environmental Resources

There are several possible approaches to the management of the use of environmental resources. In the following section we will briefly discuss their relative merits and deficiencies from an economist's point of view.

A. A Market in Pollution Rights

America's experience with the over-grazing and destruction of its commons and open range convinced it of the wisdom of utilizing the natural incentive of a person to conserve the value of his own land. Might this incentive to conserve private property also be harnessed in the case of other environmental resources? For example, a change in the legal status of environmental resources might be accomplished by vesting control over the use of these resources in a newly created corporation whose ownership shares were distributed in some equitable manner over the population. The function of such a corporation would be to auction off options to dischrage wastes into the environment. No one could make such discharges without first securing an option. And the corporation could not market any additional options until those which it marketed earlier were first exercised. In this way, any potential waste discharger would have to bid against groups who felt that they would be harmed by additional waste discharges into the environment. The presence of bids from potential receivers of pollution would force potential emitters to consider the costs which they will impose on others as an integral part of their own assessment of alternative production and residual handling strategies. In economists' jargon, the conversion of the environment to private property would facilitate the creation of a market which would, in turn, force firms to internalize the external costs of their decisions. Furthermore, since the options are sold sequentially, at each stage in the process the bids would represent incremental benefits that various parties attach to control over further discharges into the environment. Such a scheme would have much to recommend it—simplicity in operation, the absence of political maneuvering, no need to arbitrarily determine the total volume of waste discharges from all sources, the encouragement to waste dischargers to search over a wide range production and residuals handling strategies when seeking an economical way of dealing with their waste products—*if* the interests of receivers of pollution were reasonably represented in the bidding process. Unfortunately, this last condition is not likely to be satisfied. While an individual emitter may have a substantial interest in securing a right to discharge wastes into the environment the interest of an individual receiver may be quite small. Of course, a very large number of people may be receivers, so that it is their *collective* interest which ought to be represented in the bidding process. But each individual receiver would find it in his interest *not* to participate in the formation of a coalition to submit a collective bid: if a successful coalition is formed without him he can enjoy the benefit of a free-ride; moreover, the greater the potential benefits to all receivers of securing an option, the smaller the probability that his refusal to join the coalition of bidders will result in an unsuccessful bid being submitted; however, because every receiver views the coalition problem in the same way, the likelihood of getting a voluntary coalition of receivers together in order to submit an effective bid is quite small. We must conclude, therefore, that because of the essentially public nature of the benefits from reducing pollution, creation of private markets do not represent a reasonable approach to the management of environmental resources.

B. Residual Charges: A Quasi-Market Approach

While we are unlikely to discover the value which receivers place upon the avoidance of increments of pollution damage by developing a market in pollution rights, it may still be desirable to use a quasi-market mechanism to ration the use of the environment. Let us suppose that the community has established some environmental quality standards. If it knew the least costly way of meeting these standards it could establish a very detailed plan describing what actions each emitter must undertake. Of course, our understanding of methods of production is dynamic. Today's frontier of technology represents the obsolete methods of tomorrow. Therefore, the plan must be continually updated and the system must be capable of continually information to the central planning board. It is very unlikely, however, that the necessary information to effectively operate such a planning process could ever be gathered into one place. But, more importantly, it may not be necessary to engage in centralized planning of this kind in order to find the least costly method of achieving the desired environmental standard. By organizing an appropriate incentive system, we may direct the creative imaginations of many independent decision-makers toward searching from among the alternatives open to them those which result in the lowest cost of reducing pollution damage. To be most effective, the incentives should not prejudice the choices of individuals with respect to the abatement strategy which is followed.

One such system is to establish residual charges or a pollution tax per unit of residual emitted

into the environment. Such a tax would affect emitters in the same way as would the presence of bids from receivers in our previous market scheme. Residual charges force emitters to conceive of the environment as a valuable resource whose cost must be considered in deciding upon a production and residuals handling scheme. Unlike the bids of receivers in an effective market, however, there is no guarantee that the taxes represent the marginal social cost of environmental damage. The reason for this is that the standard toward which the tax is targeted must be chosen before anyone knows what tax rate (which measures the marginal cost of achieving the standard) will be required to get total emissions down to the required level. The initial choice of environmental standards are likely, therefore, to be made in a political climate in which indivduals' expression of preference are not appropriately constrained by considerations of cost. In a sense, the fundamental difficulty with the residuals charge approach being discussed here is the exact opposite of the market approach discussed earlier. In the market approach each receiver is given a free-ride incentive to *understate* his marginal valuation of pollution abatement. In the residuals charge approach, each receiver is encouraged to vote for an environmental standard upon the implicit premise that the cost he will bear for pollution abatement is not dependent upon his own vote. Under such circumstances we might expect individuals to push for more abatement than is, in fact, in their own interests to have achieved. This observation suggests that if environmental standards are to be determined by a political process, then the process ought to be constrained to consider a raising of standards by relatively small increments at a time so as to avoid locking society into a technology which is overly conservative in its use of environmental resources.[1]

C. Discharge Licenses

Both the market and residuals charge aproaches to the management of the use of environmental resources require the monitoring of actual emissions of pollutants. Another technique which requires such monitoring is the establishment of discharge licenses which specify maximum quantities of residuals which may be emitted by a licensee. A fundamental problem with a license system is that a rational allocation of licenses presupposes a knowledge by the license-granting agency of the cost each emitter will bear to treat his residuals and to avoid exceeding his allowable emissions. Without such knowledge it is unlikely that the marginal treatment cost will be equalized over all emitters. By contrast, a residuals charge scheme assures that this marginal condition for social cost minimization will be met. In addition, the residuals charge has a built-in, automatically enforced sanction to discourage emitters from exceeding the global standard toward which the residual charge is directed. The license scheme, however, requires a separate consideration of sanctions which are to be imposed only if the licensee exceeds his allowable discharge. Given the historical weakness of sanctions against discharge license violations it is, perhaps ,not surprising, that there has been strong opposition to the development of a residuals charge approach to environmental management.

D. Piecemeal Policy

It is not always feasible to engage in the monitoring necessary to operate a residuals charge or license system. The introduction of phosphates into water by households or automobile emissions into the atmosphere, for example, cannot be effectively monitored. In such cases a piecemeal approach to regulation which is directed at the control of specific processes is a reasonable alternative. In general, however, it is desirable to avoid control of specific processes. The basic argument against the establishment of legal requirements on the use of specific processes is that in establishing minimum allowable effluent rates for different processes, it is likely that the process standards cannot be chosen in a way which is fully reflective of the relative costs of effecting effluent control. From a social point of view it is desirable to put a higher standard of control on the process which is more easily controlled than on the process for which control costs are larger. A uniform emission tax scheme would induce effluent producers to adjust their processes in just this way but a central board is not likely to possess the information required to establish differential process rates which are fully reflective of differences in costs of abatement.

A second argument against process standards is that users of a specific process will attempt to exercise political leverage directed towards reducing the standard or delaying its application on grounds that the State set the standards on erroneous data with respect to technical capability of control or upon the cost of achieving it, or upon whatever other grounds it may think can delay the introduction of the standard. There is less possibility of such special pleading of particular interests when a uniform effluent fee is set.

Comprehensive Planning

While economists have a special affection for market and quasi-market management schemes which allow for a highly decentralized form of decision-making, there are *a priori* reasons for believing that more comprehensive planning which requires the creation of different institutions may be required to fully rationalize the management of our environmental resources. The first consideration suggestive of a comprehensive approach is the spatial aspect of pollution problems. Pollution damage in a particular water shed depends not only upon the quantities and variety of pollutants put into it but also upon the location and character of those activities which would suffer damage as a result of the presence of pollutants. This suggests that a lot of pollution confined to a few places may cause less damage than a little pollution which is present everywhere. Once we have determined the best spatial configuration of activities it may be possible to utilize a set of residual charges which will induce people to arrange their activities into that pattern; but searching over possible spatial configurations for the best one, is by its very nature a comprehensive planning task. There may be many configurations to consider, each of which could be achieved by a particular set of taxes and controls which would induce persons to mold their activities into the desired configuration. But one could not determine the nature of these controls until the most desired configuration had been chosen. Searching among alternative spatial arrangements is therefore a systems analysis problem for an institution whose perspective is broader than that of individual emitters or receivers of pollution. Within such a systems approach, it may be found that it is better to let some streams be industrial sewers while others have a pristine quality rather than attempting to reduce pollution levels everywhere. To the economist, who asks that benefits be weighed against cost, assertions such that "all water should be capable of supporting fishlife" or that "no stream should experience degradation" appear to border on the irrational.

A second consideration suggestive of the gains from comprehensive planning is that scale economies may be exploited by expanding the domain of conceivable alternatives open to a given emitter. If there are scale economies in treatment of residuals, then reducing the number of outfalls and the introduction of by-pass piping may be required to exploit them. This requires the introduction of facilities which are commonly shared and raises questions of methods of financing such joint facilities. In some cases a viable alternative to, or supplement for, treatment facilities is an increase in the assimilative capacity of a stream through stream flow augmentation or mechanical aeration. Once again, the pursuit of such alternatives requires institutions who pursue planning from a more comprehensive viewpoint than that of individual emitters.[2]

It is, of course, one thing to suggest that significant gains could be achieved through comprehensive planning,[3] it is another to develop the institutions to carry out such planning. A central difficulty is that watersheds do not respect political boundaries. Therefore, such institutions must generally be created out of coalitions.

A third consideration which calls for a comprehensive approach to environemtal management is the fundamental principle of the conservation of matter. If we concentrate our interest solely to the reduction of water pollution we may encourage disposal of wastes into airsheds or concentrations on the land which from a social point of view may be more costly than the damage which would have resulted by the flushing of materials into the watershed. The point I wish to make here is that we do not have a water pollution problem and an air pollution problem but rather we have a general problem of residuals management. This implies that some degree of coordination must be achieved in the management of all of our environmental resources.

Concluding Remarks

It has become fashionable in some circles to argue that the fruits of technology harvested by engineers have become so bitter and difficult to digest that we would be better off reducing our efforts to achieve technical progress. Although I agree that we have often got more than we bargained for, I do not believe that engineers are to be blamed for the unwanted side effects of progress. If our economic system has been wasteful of our environmental resources, if our industrial operations, our urban settlements and modes of transport are inefficiently designed it is not the fault of engineers. They have done what we have asked them to do. The basic reason for our environmental problems is that we have done a poor job of social engineering. To further improve the quality of our life, it is going to become increasingly important that we build social institutions to more effectively manage our environmental re-

sources. When we have accomplished this task, then our society will direct the efforts of engineers to design problems which more adequately reflect what we as a society desire to accomplish. I have no doubt that the engineering professions will be equal to the new tasks we will ask of them, as they have been in the past.

FOOTNOTES

1. The establishment of residual charges has the effect of vesting of property rights to the environment with the receivers of pollution. In imposing such charges on embitters the State is acting as an agent for the receivers who receive compensation for the use of their property in the form of reduced taxes. If is also possible to utilize a residuals charge scheme when property rights to the environment are vested with embitters. In this cases, the State would collect taxes from receivers in order to pay a subsidy per unit of pollution reduction achieved by embitters.

2. An example of such an institution is the *Genossenschaften*, or cooperatives, which have developed regional management systems of water disposal and supply in the Ruhr area. For a description of these water cooperatives see, Kneese, *The Economics of Regional Water Quality Management*, Johns Hopkins Press, 1964.

3. The magnitude of such gains have been documented by such studies on the Delaware Estuary Study conducted by the Federal Water Quality Administration.

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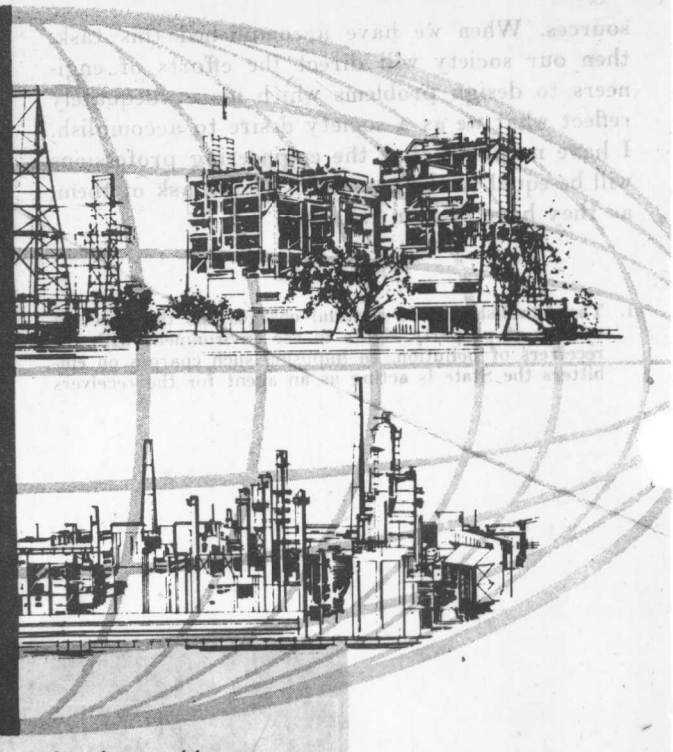

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- Albion
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- Amory
- Jackson
- Laurel
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- Cut Bank
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- Kimball

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- Las Vegas

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- Artesia
- Eunice
- Farmington
- Hobbs
- Lovington

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- New York City

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- Wake Forest

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- Tioga

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- Centerville
- Genoa
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- Zanesville

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- Ardmore
- Bartlesville
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- Duncan
- Enid
- Fairfax
- Healdton
- *Oklahoma City
- Pauls Valley
- Seminole
- Tulsa
- Woodward

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- Bradford
- Indiana
- *Pittsburgh

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- Oneida

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- Abilene
- Albany
- Alice
- Amarillo
- Andrews
- Bay City
- Beaumont
- Big Spring
- Brownfield
- *Corpus Christi
- *Dallas
- Denver City
- Dumas
- El Campo
- Falfurrias
- Gainesville
- Hawkins
- *Houston
- Jacksboro
- Kilgore
- Liberty
- Luling
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- Mission
- Monahans
- Odessa
- Palestine
- Pampa
- Pecos
- Perryton

TEXAS (Continued)
- Pleasanton
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Changing Federal-State Relationships In Water Pollution Control Programs

by JOSEPH L. COHEN, Associate Research Professor of Health Law, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pa.

Prior to 1948, governmental regulation of water quality existed mainly on a state or local level. During this period the Federal Government took no active role in the control of water pollution.[1] Although the Federal Rivers and Harbors Act of 1899 was on the statute books, its use as a water pollution control measure came substantially later.[2] As Davies[3] has stated:

> "Until 1948, legal authority to control water pollution belonged almost exclusively to the states and localities. In almost all states jurisdiction had gradually passed from the local to the state level as it became apparent that the localities which suffered the effects of pollution were unable to control its upstream sources. By 1948, all the states had some agency responsible for pollution control, although the legal power of such agencies varied widely." [4]

With the enactment of the Federal Water Pollution Control Act of 1948, the Federal Government hesitatingly began to extend its regulatory power to the field of water pollution control.[5] Between 1956 and 1970 this act was amended five times.[6] During this time Congress was careful not to disturb the status quo too much. According to Davies:

> "For the twenty years between 1945 and 1965 controversy over water pollution legislation centered on two major areas—federal enforcement powers and financial assistance for the construction of waste treatment plants. These two subjects occupied the bulk of the debate on the 1948, 1956, and 1961 acts, just as they had been the major subjects of controversy during the New Deal period."

This attitude of deference to the states is a marked characteristic of our federal system. As Rosenthal has well stated.:

> "Much more significant than the limitations imposed by the Constitution in a legal, judicially enforced, sense are the practical political factors which have thus far restricted the federal role in the protection of the environment and may be expected to have a restraining influence in at least the near future. As pointed out by Professor Wechsler: 'National action has always been regarded as exceptional in our policy, an intrusion to be justified by some necessity, the special rather than the ordinary case. ... The tradition plainly serves the values of our federalism insofar as it maintains a burden of persuasion on those favoring national intervention.'" [7]

So sensitive has Congress been to state prerogatives in the field of water quality control that it has included in the Federal Water Pollution Control Act Amendments of 1972 the following provision:

> "It is the policy of Congress to recognize, preserve, and protect the primary responsibilites and rights of states to prevent, reduce, and eliminate pollution, to plan the development and use (including the restoration, preservation, and enhancement) of land and water resources, and to consult with the Administrator in the exercise of his authority under this Act. ..." [8]

Within the context of the 1972 Act, however, the inclusion of such a provision represents mere lip service to a rapidly vanishing tradition concerning the respective roles of the federal and state governments. The Act in its entirety effectively expands the powers of the Federal Government in the field of water pollution control at the expense of state governmental authority.

It is the purpose of this paper to show why and how the legal system of the Federal Government responded to demands for a more effective water pollution control system and, in the process, how the powers of the Federal Government in this area have been vastly augmented and those of the states substantially diminished. In so doing, an attempt will be made to describe the situation now existing as a result of the 1972 Amendments to the Federal Water Pollution Control Act and to trace some of its implications for the states.

The authority of states to regulate the quality of water within their territorial limits stems from the "police power," that fundamental attribute of state governments which enables them to legislate in the public interest.[9] Although the legal basis exists for effective state action in the field of water pollution control, law alone is not sufficient to accomplish the task. Legal rules operate within a context of social, economic and political reality. The fact that sufficient legal authority existed in the states prior to 1972 effectively to attack the water pollution problem was insufficient to overcome the various economic, political and administrative problems which militated against effective compliance on a state level.

The police power of the state does not extend beyond its geographic boundaries. Therefore, a state may not enforce its pollution control legis-

lation against a source of pollution located outside the state. In an effort to rectify this situation, some states with a common interest in a given body of water have entered into interstate compacts for the control of pollution on interstate waters.[10] As an enforcement tool, however, compacts have not been promising.[11]

While states have never been able to enforce their own pollution control legislation on out-of-state sources, they could until recently invoke the original jurisdiction of the United States Supreme Court, as provided under the Federal Constitution,[12] to restrain air or water pollution originating from activity in another state and affecting its own interests or those of its citizens.[13] More recently it has been firmly established that a state may commence an action in Federal District Court to restrain a polluter from contaminating the waters of a state from a point outside its boundaries.[14] What has been found to be the "federal common law of water pollution" has been the doctrinal basis for asserting this jurisdiction on the part of the lower federal courts.[15] This development both relieved the United States Supreme Court from the necessity of hearing cases of this sort, and provided a much better forum in which to try this essentially "nuisance-type" litigation.

Although in the exercise of the police power states may take appropriate action to control water pollution, this power is subject to a significant limitation by virtue of the doctrine of federal preemption.[16] The doctrine of preemption is based on the supremacy clause of the Federal Constitution[17] and may render null and void otherwise valid state laws in areas in which Congress has acted. A clear example of the operation of the doctrine of preemption is found in *Northern States Power Co. v. State of Minnesota.*[18] In that case the United States Supreme Court affirmed the holdings of two lower Federal Courts to the effect that the state of Minnesota could not require nuclear power plants, which require licenses and permits from the Federal Atomic Energy Commission, to abide by state water quality and air quality standards relating to radioactive discharges and emissions more restrictive than those of the United States Atomic Energy Commission.

The Federal Government, as well as the states, possesses legal authority to control and abate water pollution. The power of the Federal Government to do so is based on the constitutional power of Congress to regulate interstate and foreign commerce.[19] Under this constitutional grant, Congress regulate navigable waters.[20] The Federal Water Pollution Control Act of 1972 is based upon congressional authority to regulate navigable waters.[21]

Under its authority to regulate navigable waaters of the United States, Congress enacted the Rivers and Harbors Act of 1899,[22] a codification of prior existing Federal navigation legislation. Section 13[23] of that law makes it unlawful to discharge refuse into any navigable river or tributary thereof without first obtaining a permit from the Secretary of the Army so to discharge refuse. This authority long lay dormant as a regulatory measure in the pollution control field. In the 1960's the use of the Federal Rivers and Harbors Act of 1899 as a pollution abatement statute was sanctioned by the Supreme Court of the United States. *In U. S. vs. Republic Steel Corp.*,[24] the court upheld, in 1960, an injunction against Republic Steel for the discharge of industrial solids into navigable waters without first obtaining a permit from the Army Corps of Enginners. In 1966, the court in *U. S. v. Standard Oil Co.*,[25] held that the discharge of commercially valuable gasoline into navigable waters is a discharge of refuse within the meaning of Section 13[26] of the Federal Rivers and Harbors Act of 1899 and hence unlawful unless sanctioned by permit.

With the sanction of the Supreme Court behind it, the Federal Government had a highly effective enforcement measure at its disposal in the pollution abatement field. Utilizing the Rivers and Harbors Act of 1899 in this manner has several advantages. The evidentiary problem under the Refuse Act is relatively simple: It is only necessary to prove a discharge of refuse into navigable waters without a permit from the Army Corps of Engineers. It was not necessary to relate the discharge to pollution potential, nor was it necessary to relate it to the quality of the water. Secondly, the definition of refuse was such as to include practically any discharge other than sewage, regardless of whether the substance discharged was commercially valuable.[27] Thirdly, an unpermitted discharge of refuse into navigable water was unlawful regardless of the fact that such discharge was an impediment or not to navigation.[28] Finally, the provision of the "Refuse Act" permitted citizens to share in fines assessed against violators of the Act if they were instrumental in gathering the evidence which led to the conviction.[29] This led to substantial citizen participation in Refuse Act violations, particularly

when it was decided that the courts did not have the discretion to deny the sharing of the fines assessed.[30]

The major drawback of the Refuse Act as a water pollution control statute was that the perceived purpose of the Act as interpreted by its administrators, the Army Corps of Engineers, was to remove obstructions to navigability, not as a pollution control statute. Thus, the regulations of the Army Corps of Engineers, relative to the discharge of refuse into navigable waters did not require a permit unless the discharge was likely to impede navigation.[31] This continued to be the interpretation of the Army Corps of Engineers even subsequent to *U. S. v. Standard Oil Co.*[32]

The failure of the Army Corps of Engineers to require a permit for all discharges except sewage, led to certain inconsistencies in programs to abate water pollution. Especially was this so after the *Standard Oil* case with regard to discharges into navigable waters that were permissible under state law. This meant that persons discharging in navigable waters without a permit from the Army Corps of Engineers were liable to criminal sanctions under the Refuse Act, regardless of their good faith in meeting water quality standards and effluent limitations prescribed under the law of the state under which they were operating. There was an effort to rectify this problem in 1971 with the institution of a permit system related to water quality consideration.[33] However, this effort was stymied by *Kalur v Resor*,[34] in which the Federal District Court held, inter alia, that permits to discharge refuse in navigable waters could not be granted by the Army Corps of Engineers without an Environmental Impact Statement being performed on each permit application.[35]

This state of affairs led to substantial confusion as is indicated in *United States v. Pennsylvania Industrial Chemical Co.*,[36] in which the Supreme Court of the United States decided that one who allegedly violated the Refuse Act could assert as a defense to a prosecution under the Act, that he detrimentally relied on the policy of the Army Corps of Engineers in not requiring a permit for certain types of discharge. The reliance, to constitute a valid defense against a prosecution, must have been made in good faith. Thus, the use of the Refuse Act as a water pollution control statute, although relatively simple to enforce, created administrative and legal problems that substantially reduced its effectiveness.

Out of the complexities inherent in the existing state of affairs and a desire for more effective water pollution control regulation, Congress passed the Federal Water Pollution Control Act Amendments of 1972, which conferred upon the Federal Government a major role in the fight for cleaner water. While the 1972 Act is extremely complex and touches upon federal-state relationships in myriads of ways, probably the most salient feature of the law is how state action in the permit issuing and enforcement areas are circumscribed by federal requirements. Under prior federal legislation, state water pollution control laws were left intact. States had their own permit systems and standard-setting mechanisms. Except with regard to establishing water quality standards for interstate waters within their boundaries, [37] states were free to administer and enforce their own water pollution control programs except in one limited instance.[38]

Under the 1972 legislation, however, all this is changed with regard to state water pollution control enforcement programs. Section 402 of the Federal Water Pollution Control Act Amendments of 1972[39] establishes a national pollutant discharge elimination system (NPDES). This section of the law places authority in the Environmental Protection Agency to administer a permit system and to delegate to states under very rigorous standards the administration of such system designed to implement the NPDES. Subsection (b) [40] of Section 402 of the Act sets forth the requirements under which a state may, if it wishes, administer the permit system authorized under Section 402.

The threshhold requirement for states under this section is to submit to the Environment Protection Agency Administrator a full and complete description of the program it proposes to establish and administer under state law.[41] The state submission must also contain a statement by its Attorney General to the effect that the laws of the state provide adequate authority to carry out the program described in its submission to the Administrator. The Administrator of the Environmental Protection Agency is to approve each program submitted unless he determines that adequate authority does not exist in the following areas:

1. To issue permits which apply and insure compliance with any applicable requirements of Sections 301, 302, 306, 307, and 403 of the act, and which are for fixed terms not exceeding five years, and can be terminated or modified for cause.

2. To issue permits which apply and insure compliance with all applicable requirements of Section 306 of the act, or to inspect, monitor, enter, and require reports at least to the same extent as required by that section.

3. To assure that the public and any other states the waters of which may be effected receive notice of such application for a permit and to provide an opportunity for public hearing before a ruling on each application.

4. To insure that the Administrator receive notice of each application, including a copy thereof, for a permit.

5. To insure that any state other than the permitting state whose waters may be affected by the issuance of a permit may submit written recommendations to the permitting state and the Administrator with respect to any permit application. If any part of such written recommendations are not accepted by the permitting state, it will notify the affected state and the administrator in writing of the failure to accept such recommendations and its reasons for so doing.

6. To insure that no permit will be issued if, in the judgment of the Secretary of the Army acting for the Chief of Engineers, after consultation with the Secretary of the Department in which the Coast Guard is operating, anchorage and navigation of any of the navigable waters would be substantially impaired thereby.

7. To abate violations of the permit or the permit program, including civil and criminal penalties and other methods of enforcement.

8. To insure that any permit for a discharge from a publicly owned treatment works includes condition to require adequate notice to the permitting agency of:

   (a) no introductions into such works of pollutants from any source which would be a new source as defined in Sections 306 if such source were discharging pollutants,

   (b) no introductions of pollutants into such works from a source which would be subject to Section 301 if it were discharging such pollutants, or

   (c) a substantial change in volume or character of pollutants being introduced into such works by a source introducing pollutants into such works at the time of issuance of the permit. Such notice shall include information to such treatment works and any anticipated impact of such change in the quantity or quality of effluence to be discharged from such publicly owned treatment works.

9. To insure that any industrial user of any publicly owned treatment works complies with Section 204(b), 307 and 308 of the Act. [42]

Section 402 of the Act further provides that within ninety days after the date on which the state has submitted a program or a revision thereof, the Administrator shall suspend the issuance of permits in that state as to those navigable waters subject to the program, unless he determines that:

1. the state permit program does not meet the requirements of Subsection 402(b) of the Act, [43] or

2. does not conform to the guidelines issued under Section 304 (h) (2) of the Act.[44]

The Act provides that the Administrator shall notify a state of any revisions or modifications necessary to conform to the above mentioned requirements or guidelines.[45] The Act also provides for the conditions under which approval, once given, may be withdrawn.[46]

Each state participating in the NPDES program is required to submit to the Administrator a copy of each permit application received by the state and provide notice to the Administrator of every action related to the consideration of such application, including each permit proposed to be issued by the state.[47] Moreover, no permit may be issued until the expiration of ninety days of notification to the Administrator of his objections to the issuance of the permit,[48] or if the Administrator, within ninety days of the date of transmittal of the proposed permit, objects to the issuance as being outside the guidelines and requirements of the Act.[49] The Act also provides for the power in the administrator to waive the requirements of 90-day period with reference to any permit application.[50]

In addition to the requirements of Section 402 of the Act, the state program must meet the requirements of regulations promulgated pursuant to Section 304(h) (2) of the Act. These regulations, in effect, require detailed compliance by state programs. Although these are technically "guidelines," they are obligatory on states which wish to have a permit program under the Act. Illustrative of the detail required by the guideline is Section 124.24 of 40 C. F. R. which reads as follows:

> "Any State or interstate program participating in the NPDES shall require that any NPDES form submitted to the Director be signed as follows:
>
> (a) In the case of corporations, by a principal executive officer of at least the level of vice-president, or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the NPDES form originates.
>
> (b) In the case of a partnership, by a general partner.
>
> (c) In the case of a sole proprietorship, by the proprietor.
>
> (d) In the case of a municipal, State, or other public facility, by either a principal executive officer, ranking elected official or other duly authorized employee." [51]

The permit system under Section 402[52] and the prohibition against pollutional discharges in Section 301[53] are all predicated upon discharges into navigable waters. The term "navigable waters" is defined in Section 502 of the Act as follows:

> "The term 'navigable waters' means the waters of the United States, including the territorial seas." [54]

In providing for a system of regulation based on discharges into navigable waters, Congress, as it did under the Federal Rivers and Harbors Act of 1899, acted under its constitutional authority over navigable waters of the United States.

Although the Rivers and Harbors Act of 1899[55] and the Federal Water Pollution Control Act Amendments of 1972[56] are both predicated upon the constitutional power of Congress to regulate the navigable waters of the United States, the commerce clause of the Constitution allows Congress to exercise a substantially greater authority in the field of water pollution control than regulating navigable waters alone. As Edelman[57] has written:

> "... the regulation of water and air pollution which endangers the health or welfare of persons in a state other than that in which the pollution originated is clearly within the reach of the commerce power of Congress." [58]

Under the rationale of *United States v. Darby*,[59] Congress could have also extended the provisions of the Act to regulate the discharge into non-navigable waters made by persons engaged in or affecting interstate or foreign commerce. But Congress did not go that far.

What Congress did not provide, the Administrator of the Environmental Protection Agency, by regulation, did in effect supply.[60] In the regulations of the Environmental Protection Agency on policies and procedures for the National Pollutant Discharge Elimination System, the term "navigable waters" is defined to include the following:

1. All navigable waters of the United States;
2. Tributaries of navigable waters of the United States;
3. Interstate waters;
4. Intrastate lakes, rivers and streams from which fish or shellfish are taken and sold in interstate commerce; and
5. Intrastate lakes, rivers and streams which are utilized for industrial purposes by industries in interstate commerce.[61]

There are two major objections to such an administrative determination. First, there is no authority granted the Administrator by the Act to define navigable waters to include those waters which are not navigable waters of the United States. Secondly, such an interpretation can only give rise to litigation as to the proper scope of the permit system under Section 402. This would be true whether the permit system is administered by the Administrator or administered by the states under the authority of Section 402(b).

Furthermore, the above administrative definition of navigable waters was not included in those regulations of the Environmental Protection Agency regarding the necessary state program elements for participation in the National Pollutant Discharge Elimination System issued pursuant to Section 304(b) of the Act.[62] In these latter regulations, the term "navigable waters" is not defined, but is among the terms the definition of which is referred back to Section 502[63] of the Act. Aside from the fact that this would seem to be inconsistent with Section 402(a)(3) of the Act which provides for compatibility between Administrator-administered programs and state administered programs, this can only lead to definitional ambiguity and uncertainty as to the intended coverage of the permit system. Such a state of affairs can only lead to confusion and administrative and legal problems.

Questions of enforcement will ultimately be decided by the courts, but confusion as to the scope of the Act. especially with regard to the permit system and the provisions of Sections 301,[64] 302,[65] 307,[66] or 308[67] of the Act could become exceedingly complicated depending upon whether the Administrator was administering the program or whether a state had that responsibility. Thus unless some semblance of agreement as to the definition of navigable waters under the Act is reached, or unless the two regulations of the Administrator are made compatible on this point, much needless litigation could be produced. The extent of such litigation would be a measure of administrative ineptitude or oversight in implementing the permit program.

Because state water quality regulation over the course of time failed, for a variety of reasons, to meet the growing needs for a more rational system of water quality control, the Federal Government entered the field of water quality regulation in an effort to correct what were perceived to be shortcomings in the state system. The federal effort consisted of a mixture of Congressional legislation and innovative court procedures. However, until 1972, the federal response was less than comprehensive. Because of a perceived need for a complete revision of the existing system of water quality control, Congress enacted the Federal Water Pollution Control Act Amendments of 1972

over the veto of President Nixon. It completely reverses the respective roles of the state and Federal Government in the field of water pollution control and abatement. While legal and constitutional doctrine have not been barriers to this development, traditional political assumptions about the nature of the federal systems have. In the field of environmental protection, the need for more effective regulation has led to a reversal of traditional roles. The extent of federal-state cooperation in this field of regulation will be a measure of the success of the new understanding.

The complete reversal of traditional roles of the Federal and state governments in the field of water pollution control has resulted in a diminution of state authority and, correspondingly, an increase in Federal power in this area. Although the Water Pollution Control Act Amendments of 1972 professed to recognize that the states have a primary interest in the control of water quality, the tenor of its provisions and the rules and regulations of the Administrator adopted pursuant thereto, leave little doubt that this is not so. States administering a permit program under the Act have very limited discretion. The Federal Government closely supervises and defines the permit procedures to be utilized by the states.[68] Under the Act, states which participate in the National Pollutant Discharge Elimination Assistance are required to send a copy of each application for a permit they receive, and a copy of permit proposed to be issued to the Administrator, who then has a 90-day period in which to object to its issuance.[69]

Basically, the system of regulation envisioned by the Federal Water Pollution Control Act Amendments of 1972 is for the Federal Government to set the standards for water quality and for the state government to supply the manpower to carry out the details of administering and enforcing the permit system. Whether this division of responsibility will result in better water quality regulation is in large part dependent on the attitude of both state and federal officials toward their respective responsibility under this system. If the governmental officials involved are primarily interested in the control of water pollution, the new allocation of powers can provide the basis for a more effective and rational water quality control program. On the other hand, if the states regard the system as an infringement on their prerogatives, the objectives of the legislation will suffer, and the cause of water pollution control and abatement will suffer substantially.

The Federal Water Pollution Control Act Amendments of 1972, like the Clean Air Act Amendments of 1970, is a recognition of a predominant national interest in environmental quality. This national interest and concern has developed out of the recognition that the previous system of regulation in which state interests and authority predominated was not sufficient to the task. Technological progress and economic development presented problems in the latter part of the twentieth century that were predominantly national in scope. These have been and continue to be factors which tend to make state regulation relatively ineffective. Thus the need for the assertion of a national interest if the objective of enhancing the quality of our national water resources is to be met.

FOOTNOTES

1. GRAD, RATHJENS and ROSENTHAL, ENVIRONMENTAL CONTROL: PRIORITIES POLICIES AND THE LAW (New York, 1971), (hereinafter referred to as "Grad, Rathjens and Rosenthal") 58-59; DAVIES, THE POLITICS OF POLLUTION (New York, 1970) (hereinafter referred to as "Davies") 38-40.
2. GRAD, RATHJENS and ROSENTHAL, 57-58.
3. THE POLITICS OF POLLUTION, *supra.*
4. *ibid,* 38.
5. GRAD, RATHJENS and ROSENTHAL, 58-62.
6. DAVIES, 40.
7. GRAD, RATHJENS and ROSENTHAL, 231-232.
8. 33 U.S.C. §1251(b) (1972).
9. "... A state, in the exercise of its police power, may, within constitutional limitations, not only suppress what is offensive, disorderly or unsanitary, but enact regulations to promote the public health, morals or safety and the general well-being of the community." *Commonwealth of Pennsylvania v. Harmar Coal Co.,* 452 Pa. 77, 92 (1973).
10. See GRAD, RATHJENS and ROSENTHAL, 135-138.
11. "The states suffer from the same problem of rivalry and lack of cooperation as the localities. State governments do not like to surrender power. The reluctance to impose stringent pollution controls for fear of injuring economic development is as much a factor in straight thinking as in local calculations. The difficulty of the states getting together has resulted in limited, and on the whole, disappointing experience with interstate cooperation for pollution control." DAVIES, 134-135.
12. U. S. Const. Art. III, §2.
13. *Georgia v. Tennessee Copper Co.,* 206 U.S. 230 (1907). *Missouri v. Illinois,* 180 U.S. 208 (1901).
14. *Illinois v. City of Milwaukee,* 406 U.S. 91 (1972).
15. *ibid,* 99-100. Citing with approval the language of Judge Johnsen in *Texas v. Pankey,* 441 F. 2d 2 6, 240 (1971), as follows: "As the field of federal common law has been given necessary expansion into matters of federal concern and relationship (where no applicable federal statute exists, as there does not here), the ecological rights of a State in the improper impairment of them from sources outside the States' own territory, now would and should, we think, be held to be a matter having basis and standard in federal common law and so

directly constituting a question arising under the laws of the United States."

16. See: Note, *Environmental Control: Higher State Standards and The Question of Pre-emption,* 55 CORNELL LAW REVIEW 846 (1970).

17. U. S. Const., Art. VI, paragraph 2, states: "The Constitution, and the laws of the United States which shall be made in pursuance thereof; and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land; and the judges in every state shall be bound thereby, anything in the Constitution or laws of any state to the contrary notwithstanding."

18. 405 U. S. 1035 (1972), affirming 447 F. 2d 1143 (1971).

19. U. S. Const., Art. I, §8, clause 3.

20. *Gibbons v. Ogden,* 9 Wheat. 1 (1824); *United State v. Appalachian Electric Power Co.,* 311 U. S. 377 (1940).

21. 33 U. S. C. §1311 (1972) provides, with certain exceptions, that the discharge of pollutants is unlawful. The term "discharge of a pollutant" is defined in 33 U. S. C. §1312 (1972) as, *inter alia,* any addition of any pollutant to navigable water from any point source.

22. 30 Stat. 1121 (1899).

23. U. S. C. §407 (1972).

24. 362 U. S. 482 (1960).

25. 384 U. S. 224 (1966).

26. 33 U. S. C. §407 (1972).

27. *U. S. v. Standard Oil Co.,* 384 U. S. 224 (1966).

28. *ibid,* 228-229.

29. 33 U. S. C. §411 (1972).

30. *U. S. v. St. Regis Paper Co.,* 328 F. Supp. 660 (W. D. Wis. 1971).

31. 33 C. F. R. §209.200(e) (2) (1969).

32. See *U. S. v. Pennsylvania Industrial Chemical Co.,* 411 U. S. 655 (1973).

33. 33 C. F. R. §209.131 (1971); 36 Fed. Reg. 6564 (1971).

34. 335 F. Supp. 1 (1971).

35. *ibid.*

36. 411 U. S. 655 (1973).

37. Pub. L. No. 89-234, §1-8, 79 Stat. 903 (1965).

38. See *Northern States Power Co. v. Minnesota, supra,* in which it was decided that state water pollution control laws cannot be enforced with regard to radioactive discharges from nuclear power plants licensed by the Atomic Energy Commission.

39. 33 U. S. C. §1342 (1972).

40. 33 U. S. C. §1342(b) (1972).

41. *ibid.*

42. 33 U. S. C. §1342(b) (1) - (9) (1972).

43. 33 U. S. C. §1342(b) (1972).

44. 33 U. S. C. §1314(h) (2) (1972).

45. 33 U. S. C. §1342(c) (3) (1972).

46. *ibid.*

47. 33 U. S. C. §1342(d) (1) (1972).

48. 33 U. S. C. §1342(d) (2) (1972).

49. *ibid.*

50. 33 U. S. C. §1342(e) (1972).

51. 40 C. F. R. §124.24.

52. 33 U. S. C. §1342 (1972).

53. 33 U. S. C. §1311 (1972).

54. 33 U. S. C. §1362(7) (1972).

55. 30 Stat. 1121 (1899).

56. 33 U. S. C. §1251-1376 (1972).

57. Edelman, *Federal Air and Water Control: The Application of The Commerce Power To Abate Interstate and Intrastate Pollution,* 33 GEO. WASHINGTON L. REV. 1067 (1965).

58. *ibid,* 1078.

59. 312 U. S. 100 (1941). In *Darby,* the United States Supreme Court upheld the requirements of the Fair Labor Standards Act against the contention that the motive of the regulation was to regulate wages and hours of manufacturing employees rather than to regulate commerce. To this contention the Court answered: "... The motive and purpose of a regulation of interstate commerce are matters for the legislative judgment upon the exercise of which the Constitution places no restriction and over which the courts are given no control. ..." 312 U. S. at 115.

60. 40 C. F. R. 125.1(o).

61. *ibid.*

62. See 40 C. F. R. 124.1(n).

63. 33 U. S. C. §1362 (1972). The term "navigable" is defined in clause (7) of that section as "waters of the United States."

64. 33 U. S. C. §1311 (1972).

65. *ibid.* §1312.

66. *ibid.* §1317.

67. *ibid.* §1318.

68. *ibid.* §1342(b); 40 C. F. R. Part 124.

69. 33 U. S. C. §1342(d) (2) (1972).