The original documents are located in Box 14, folder "Environment (4)" of the James M. Cannon Files at the Gerald R. Ford Presidential Library.

THE WHITE HOUSE

WASHINGTON

ACTION

April 17, 1975

MEMORANDUM FOR THE PRESIDENT

FROM : JIM CANNON

SUBJECT : Domestic Council Study of U.S. Environmental Policy

I recommend that the Domestic Council undertake a study of domestic environmental programs and policies, to determine their effectiveness, consistency with other national objectives, direct and indirect costs, and impact on the creation of new jobs and on productivity.

SUBJECT OF STUDY

The study would review existing Federal programs on air and water pollution and land use, including their impact on the consumer and on the economy as a whole, their consequences for specific major industries, and their interplay with State and local priorities.

OBJECTIVE

The objectives of the study are:

-- To produce a thorough-going analysis of Federal, State and local environmental programs in operation;

-- to assess the efficiency of current environmental programs in meeting national objectives in air and water quality and sound land use, to see if they need improvement; and,

-- if warranted by the conclusions of the study, to formulate for your consideration a series of policy options for modifying existing programs and policies to better serve the national interest.

ORGANIZATION

The review group for this study should include appropriate representatives of the following Departments and Agencies:

Treasury	CEA
Interior	EPA
Agriculture	CEQ
Commerce	EPB
Labor	FEA
HUD	ERDA
Transportation	Nuclear Regulatory Commission
OMB	Office of Consumer Affairs, HEW
	Council on Wage and Price Stability

RECOMMENDATION

The Vice President, Secretary Morton, Phil Buchen, Max Friedersdorf, Alan Greenspan, Bob Hartmann, Jim Lynn, Jack Marsh, Russ Peterson, Bill Seidman, Russ Train, and Frank Zarb have reviewed this memorandum and recommend approval.

DECISION

___Approve ___Disapprove

STAFFED TO THE FOLLOWING:

CABINET	WHITE HOUSE STAFF
Honorable Rogers C.B. Morton	Phil Buchen
	Max Friedersdorf
	Alan Greenspan
Honorable Russell W. Peterson Chairman, Council on Environmental Quality	Bob Hartmann
	Jim Lynn
	Jack Marsh
	Bill Seidman
Honorable Russell E. Train Administrator, Environmental Protection Agency	
Honorable Frank G. Zarb Administrator, Federal Energy Administration	

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Commerce	CEQ
HUD	ERC
Transportation	EPB

The review group would be chaired by the Executive Director of the Domestic Council.

TIMETABLE

The study should be completed by October 1, 1975.

DECISION

Proceed: Yes _____

No _____

Other Action: _____

ENVIRONMENTAL REVIEW GROUP

Mrs Train 4/16/75

It of Govt. is studying papers which on own primary statutory responsibility — We cannot accept that —

I at least would like to play an active role —

Does Gen you a fresh non-agency viewpt. Want to discuss an input

The "cooperative enterprise

offer a draft prospectus

would like to remove ERP + ERA. as formal members

Area when real opportunity for Construction opportunity is Art and real preparation

give real emphasis on

selection of people & design of

study ~~to~~ ~~[illegible]~~ — real ~~[illegible]~~

strongly —

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Alan Greenspan

DATE: April 24, 1975

FROM : Allan Pulsipher

SUBJECT: Domestic Council Environmental Policy Evaluation

Attached are some items that it might be useful to make available to those designing the Domestic Council's environmental policy evaluation.

The first is a short paper in which I have tried to explain in nontechnical terms the basic environmental policy problem. The point of the paper is that "patching up" and "pushing back" requirements of the current policy is an exercise in self delusion. Current policy is premised on perverse incentives and unless those incentives are changed it is foolish to expect that it can be enforced given realistic budgetary and legal constraints. The general outline of a realistic and efficient environmental policy is relatively well developed and well accepted -- at least outside of the more paranoid circles of the "environmental-scientific complex." Hence, although the paper dwells on the futility of current policy, the message is that the real problem is not what ought to replace it but how to go about it without being politically vulnerable to charges of "selling-out."

The second item attached (Tab B) is a memorandum I wrote to Gary Seevers last Fall (and also circulated to others in the Executive Branch) when there was discussion of an effort similar to that again being discussed. The memo briefly outlines a logical way to organize such a study.

The third item (Tab C) is a critique done by Joe Kalt of the methodology used in EPA's "economic impact" studies. Joe and I have discussed these problems with EPA but our success has been limited.

If you agree that it would be useful to transmit this material I will prepare an appropriate cover memorandum.

Attachments

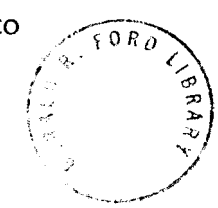
Allan Pulsipher - CEA
Draft 4/24/75

ENVIRONMENTAL POLICY

Environmental policies now being implemented result in programs that are inherently inefficient, create perverse incentives that retard the development of non-polluting technologies, and, have a high risk of ultimately being unenforceable. These problems are created by the logic of the basic structure of current policy. They are not merely the consequence of current policies being implemented "too quickly" or the environmental legislation having set targets that were "too high." Although it may be necessary to delay implementation schedules and lower targets in order to reduce the costs of these programs to politically tolerable levels, such changes will not solve the fundamental problems created by current environmental policy.

Recognition of the nature of the flaws of current policy is surprisingly widespread. So is agreement on the general outline that an efficient and effective policy should follow. The policy problem that needs to be resolved is how to make the implied transition. How to replace the current policy -- with one that is enforceable, efficient and encourages the development of non-polluting technologies -- without being vulnerable to charges of, either in appearance or in fact, retreating from or abandoning the widely shared national goal of providing a healthier and more pleasant physical environment.

There is no effort underway within the Administration to ascertain the feasibility or desirability of making this transition. Environmental policy-makers within EPA and CEQ apparently either do not accept this diagnosis or view their responsibility as limited to attempting to



implement existing policy as efficiently as possible regardless of any inherent weaknesses it may have. Policy makers in the executive branch outside the environmental agencies have thus far focused their efforts on trying to obtain Congressional relief from the more apparent aberrations and inefficiencies of existing legislation -- particularly those dramatized by the "energy crisis." Organized Administration efforts to explore alternative approaches to environmental policy ceased when the sulfur tax was dropped in 1972. Making a transition to an enforceable environmental policy becomes increasingly difficult and increasingly important as the first of the many legislated deadlines become imminent.

I. BACKGROUND

EPA has primary responsibility for the formulation, implementation and enforcement of environmental policy. Some aspects of the formulation and administration of this policy have been delegated to the States but they remain largely subject to EPA's oversight and approval. EPA implements its policy in two ways -- regulation and subsidy. It designs and administers a program of detailed, largely technologically based rules and regulations intended to assure that the environmental standards stipulated in legislation will be met on schedule. EPA's program of subsidies to municipalities to construct sewage systems is the largest federal non-transportation public works program currently operating and it will continue to grow in the future.

EPA derives its authority largely from the 1970 amendments to the Clean Air Act and the 1972 amendments to the Federal Water Pollution

Control Act. The 1970 amendments to the Clean Air Act prescribe procedures for establishing a system of nationally uniform primary and secondary ambient air quality standards. Primary standards are designed to protect human health. Secondary standards are based upon additional measurable repercussions of air quality upon the "public welfare." EPA is directed by law to ensure that the primary standards will not be violated after mid-1975. No deadline is stipulated for the secondary standards, but they must be met within a "reasonable" period of time.

The 1970 amendments also order that automobile manufacturers reduce emissions of the principal automotive emissions, to a level approximately 90% less than 1970 levels. Originally this was to be accomplished by 1976 but the schedule for attainment has been delayed.

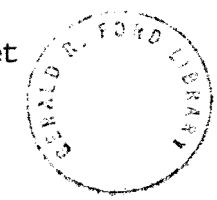
The 1972 amendments to the Federal Water Pollution Control Act comprise the second principal piece of legislation that EPA is responsible for implementing. These amendments set goals that the discharging of pollutants into navigable waters be halted completely by 1985 and, wherever attainable, water standards clean enough to support marine life and permit swimming be achieved by 1983.

The 1985 "zero discharge" goal is widely regarded as unachievable and the National Commission on Water Quality has been established in order to ascertain whether the 1983 goal is, in fact, achievable and what the costs of attempting to reach it would be. The first comprehensive report from the Commission is due in October of 1975. The nature of the charge of the

Commission and the fact that a majority of its membership is composed of members of the Congress that designed the 1972 amendments imply that it is doubtful that a change of the basic principles upon which environment policy is premised will be evaluated or recommended.

The control policy that the Congress has directed EPA to use to attain the environmental goals depends upon a complex system of pollution control technology assessment. Both the air and water laws direct EPA, in effect, to make an assessment of "available control technology" and to use this assessment as the basis for setting effluent and emission standards for each major source and type of pollution. A conceptual and legal lexicon is evolving from litigation and administrative compromises that is intended to guide EPA is making such assessments (for different time schedules, pollutants, and categories of sources) but there is as yet little agreement even on such basic issues as whether the standards should be uniform nation-wide for sources within the same industry or whether they may vary depending upon regional differences in technology or economic and social circumstances. The procedure of setting and administering this set of technical standards is so complex that it may be necessary to establish a special Environmental Court (analogous to the Tax Court) to keep up with the volume of litigation that has been generated.

The central principle of "technology assessment" based policy itself is deceptively simple. EPA is to make a judgment about the extent to which it is possible to reduce pollution with technology that exists, or could be developed, and then it is required to ensure that all sources meet



those standards (but usually not required to use the technology upon which the standards are based). Regardless of the standard of "achievability" by which such assessments are to be guided, to be meaningful, each standard has to be fairly unique to the characteristics of the productive technology which it is intended to control. The complexity inherent in the technological diversity and uniqueness of a modern industrial economy, however, makes such assessments a very complicated and contentious process.

Current environmental policy has several related weaknesses. These weaknesses, however, are each symptoms of a fundamental problem that is inherent in the premises of the approach that is being used.

II. THE FUNDAMENTAL PROBLEM OF ENVIRONMENTAL POLICY

Environmental problems are, for the most part, the direct result of the way that the economic system works. They are neither aberrations nor anomalies. Indeed, an understanding of the structure of individual incentives in a market directed economy leads directly to the prediction that such problems will appear. Hence, in this sense, environmental problems are created because the individual incentives in a market economy work "too well." This fundamental fact tends to be obscured because economists have frequently described environmental problems as instances of "market failure."

Rivers and lakes will become polluted sinks for industrial wastes if no charge is levied against those that use them for this purpose and other methods of waste disposed are costly. If it is desired to preserve some rivers and lakes for recreation or other purposes there are two general

ways of doing so. The first is simply to limit or prohibit discharges of waste into the water, i.e., direct regulation. The second is to make the cost of discharging higher than the cost of alternative methods of disposal, i.e. changing individual incentives so that the market produces the socially desired result. If the ultimate goal is complete cessation of all discharges and, the two methods could be enforced at the same cost, then either method could produce the desired result.

The costs of complete elimination of discharges into all media (water, air, and land) are so high, however, that such a policy would be politically, if not simply physically, unenforceable. If only "part" of the discharge is to be eliminated the rational goal thus becomes obtaining a balance between the use of rivers and lakes, for example, for waste disposal and for recreation or other uses, such that any level of reduction in discharge, even if arbitrarily selected, would be met at the least cost. Ideally, of course, the goal ought to be to reduce pollution until the greatest net benefit to society is obtained. With either goal, however, the approach of using market incentives by increasing the cost of discharging offers many advantages over the direct prohibition or regulation approach.

Pollution from discharges can be reduced by a variety of methods. By treating the waste "at the end of the pipe," by modifying the production process to produce less waste, or by changing the production mix so that products that generate less waste are substituted for those that generate more waste. If the cost of generating and disposing of

waste is increased, an incentive is automatically created to pursue all three of these methods simultaneously and to do this as efficiently as possible.

If the alternative approach of direct regulation were to be used, when the goal is something less than complete zero discharge, a judgement would have to be made about how much of a reduction, given its costs, is "reasonable" or desirable. To make such a judgement in a way that would approach the efficiency of the market incentive method of pollution control one would have to make a complex assessment of the production technology used by the discharger, available alternatives to it, the structure of the markets for the discharger's products; all in combination with the capability and costs of relevant pollution control technology. The ability to make such assessments for all potential dischargers would clearly exceed the capability of even the most able, dedicated and generously funded regulatory agency. As a consequence, in fact, EPA sets standards largely on the basis of an assessment of available "end-of-the-pipe" technology, alone, and on a regionally-uniform, industry-wide basis.*

Given the existing law, EPA has no choice but to use the direct regulation approach to environmental management. It is important to

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*EPA does attempt to ascertain the "economic impact" of the regulations that it sets in this way. This exercise, however, makes no pretense of ascertaining whether the standards it proposes are in any meaningful sense efficient or even "least cost" ones -- and, in fact, does not even provide a conceptually adequate estimate of the economic cost of the standards that it does promulgate. (A critique of the methodology EPA uses to make these estimates is attached at Tab A.)

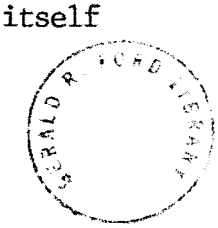
realize, however, that to dispatch its charge as efficiently as it could by employing the pollution charge approach, EPA would have to make an assessment of the technology, markets, and control alternatives of each polluter on a source-by-source basis. In order to do this with the same efficiency as is built into the pollution charge approach the agency would have to duplicate the expertise and experience of the would be polluters on virtually the same source by source basis.

Reduced to this absurd extreme, both the conceptual magnitude and ultimate futility of EPA's current strategy is evident. In the long-run effective and efficient environmental policy will have to be structured so when individuals respond to the incentives the economic system creates for them they do not cause unacceptable levels of environmental damage. Adequate environmental protection will only be insured when it is a consequence of how the economic system works -- not, as is presently the case, in effect, in spite of it.

III. SPECIFIC TYPES OF PROBLEMS

The failure of current environmental policy to change the economic incentives that have resulted in unacceptable environmental damage in the past is beginning to manifest itself in several symptomatic ways. Although it may not accurately indicate the degree of interrelatedness between these problems, they can be categorized as follows.

1. Built-in obsolescence -- Environmental standards set on the basis of the "best" technology "available" or "practicable" will become progressively obsolete as time passes. Changes both in technology itself and in those largely economic factors that initially led to the



determination it was "best" inevitably produce this result. The rapid increase in oil and gas prices provide an extreme and instructive example of this problem.

At the time when "best" technology air quality standards were set, non-polluting fuels such as oil and natural gas were relatively cheap and supplies apparently abundant. In this context the "best control technology" for most major coal burning facilities clearly was to switch to oil or gas for fuel. At prevailing prices such fuel switching resulted in much less pollution per unit of energy consumed, at only a moderate increase in direct operating costs. Fuel switching was aggressively promoted by EPA and much of the improvement in air quality observed in the early 1970s is directly attributable to it.

As fuel switching became pervasive it became apparent that supplies of "clean fuels" were not adequate to meet the demand that EPA had created. Moreover it also became clear that available clean fuels were not being allocated geographically so that their contribution to human health or the "public welfare," were in any sense optimized. Clean fuels were being used to make marginal improvements in relatively cleaner air, for fewer numbers of people, than their relative scarcity to society indicated would be desirable.

The jolting increase in the prices of imported clean fuels that followed the coalescence of the Arab oil producing countries and the subsequent foreign policy decision to reduce U.S. vulnerability to oil import disruptions, however, accelerated the obsolescence of the existing air pollution abatement plans by new order of magnitude. However it was

only after the embargo was over and extended bureaucratic and Congressional belaboring that the Energy Supply and Environmental Coordination Act of 1974 was passed. This Act is of almost unrivaled complexity and its meaning and impact will be clear only after an extended period of litigation. In the interim we are "stuck" with a system of air quality regulations that conflict with national energy and foreign policy and have become obsolete in the literal sense of the word.

Under a charge system, where the total payment varies directly with the volume of pollutants emitted (as well as, under most proposals, the quality of the ambient air) the desire of the polluter to reduce costs will lead the more prolific polluters in the dirtiest air sheds to bid clean fuels away from those in areas where clean fuels offer a smaller opportunity for cost reductions. Although the ability of such a system to enhance the efficiency with which environmental resources are used has been widely recognized for some time, the corollary attribute of automatically maintaining temporal efficiency as circumstances change is at least as important. Although the original emission limitations (formulated upon the assumption of the availability of clean fuels at a competitive price) never approached optimality, the rapid price rise and subsequent decision to consciously reduce dependence upon (imported) oil and increase the use of domestic coal, quickly would have made such standards obsolete in any case.

2. Perverse incentives for developing non-polluting technologies -- When emission standards are based upon some concept of the "best control technology," however the phrase is defined, it is in the interest of

those that are required to meet the standard that "best" be defined modestly and changed infrequently. This implies that under such standards the research and development efforts of the would-be polluters will be directed toward demonstrating that "available control technology" is unreliable, too costly, or that it does not meet some other criteria implicit in the particular version of "best technology" that is applicable.

Once a technologically based standard has been achieved those subject to it have no incentive to develop or install technology to reduce pollutants any further. Indeed, under such systems their incentive is to conceal the existence or dispute the effectiveness of improved technology because they are likely to be required to install it if it is developed.

Environmental management systems based upon standards developed by using the "best technology" approach do create incentives for pollution control industries to develop that are independent of the industry to which the controls apply. However it is very unlikely that technological progress will evolve as rapidly or as efficiently in these industries as it would under an emission charge system. Independent pollution control equipment firms are likely to concentrate on "end-of-the-pipe" technology. They will tend to do this for two basic reasons. First, to limit the degree of specialized technical expertise about production techniques specific to particular industries that they need, and, secondly, such technology is likely to have broader marketing possibilities than more specialized equipment.

End of the pipe technology, however, is only one method of reducing pollutants. Encouraging the development of non-polluting technologies also includes changes in production processes and in product mixes. In many industries changes in production processes or modification of product mixes are likely to be equally, if not more, efficient means of reducing emissions.

Firms in industries subject to standards set, implicitly, on the capability of end-of-the-pipe technology have no incentive to devote resources to the development of the alternative forms non-polluting technologies. If they did so this might simply lead to stricter standards because they themselves would, in effect, have changed the definition of "best technology."

3. Implementation though confrontation leads to progressive distrust and confusion -- The conflicting incentives created by the regulatory approach to environmental policy have turned the task of implementing it into a prolonged and expensive adversary process. The implementation process has moved forward largely by means of a series of "public relation" campaigns and bureaucratic confrontations that routinely are resolved only after litigation. As a consequence the costs of administering environmental policy are much higher than they need to be for both EPA and those it regulates, resources are diverted from solving to obscuring environmental problems, and the adversaries themselves develop a unhealthy sense of mutual distrust.

Adversaries neither expect nor provide accurate and complete information. This fact greatly increases the cost of implementing and

enforcing environmental standards and regulations. At the limit, to be as well prepared as its "adversaries," EPA would have to replicate a very substantial part of the technical and scientific expertise they possess.

However even such a redundant investment in information and expertise by EPA would not insure that environmental policy necessarily would rest on a more secure factual and analytical foundation because substantive disputes are usually "settled" by the courts. Hence unless the courts were to make yet a third replication of the original body of technical expertise, complex scientific problems would continue to be sidestepped and disputes resolved largely by recourse to the courts' determination of "legislative intent" or other legal concepts.

Without the expectation of an ultimate and reliable "test" of the veracity of the information and analysis advanced during an adversary proceeding, competing claims inevitably tend to be formulated more for their strategic effect than informative content. Routinely providing biased information, in turn, leads to progressive, reciprocal distrust and, eventually, to a discounting of the contribution that scientific analysis, itself, can make to the environmental policy formulation process.

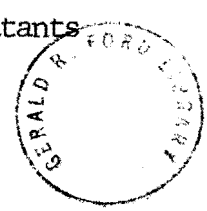
Since so much of the existing environmental legislation was designed with a factual and analytic foundation that was at best rudimentary, this inherent weakness in the incentives of current policy is particularly a perverse one. Moreover it is doubtful that it can be remedied within the framework of existing policy. The scale and complexity of the system of environmental and economic interactions that are intended to be regulated

simply exceed the capability of existing methods of recording, collating, and analyzing information. To the extent that this is so, the problem can not be ameliorated by even extraordinary budgetary largesse.

Under a fee or tax system informational requirements for implementation and enforcement as largely reduced to problems of effective monitoring and measurement of pollutants. These measurements, themselves, generate the information needed to redirect policy as required to reach the particular environmental goals selected. Under such a system disputes of "fact" are limited to real phenomena that can be observed and measured rather than, as under the current approach, disputes about what could be or might have been.

4. Inherent inefficiency -- The cost of reducing or eliminating pollutants vary widely between different regions, different industries and sectors, and different sources within the same industry or sector. In order to achieve any given level of environmental quality at the least sacrifice to society of those resources that it could use for other purposes, pollution should be reduced proportionately more by those sources that find it cheaper than by those sources that find it more costly to do so. Under a fee system such balancing is automatic. The incentives created by the system are such that pollutants will be reduced as long as the revenue saved (taxes or charges not paid) is greater than the cost of making the reductions.

Given complete and accurate information about the costs of reducing pollution on a source-by-source basis it is conceptually possible that an equally efficient distribution of the desired reduction in pollutants



could be achieved by direct regulation. However it has been argued previously that the costs of acquiring such complete and accurate information are so high that this "possibility" is not a realistic one. Even if this were not the case, and higher standards were required of sources that could reduce pollution most cheaply and lower standards of higher cost sources it is likely that traditional legal criteria such as "equal treatment under the law" would be violated.

5. Excessive cost -- In an absolute sense the total costs of achieving current goals will be substantial. A recent study gives a "conservative estimate" of $500 billion as the total cost of reaching, by the early 1980's, the standards set in the 1970 Air and 1972 Water Act amendments.*

Estimates of the benefits of these expenditures are subject to a wide range of dispute. Some, in fact, argue that comprehensive empirical estimates of benefits are impossible. Because of this it has been argued that whether the total environmental costs are "too high" or "too low" are essentially subjective value judgements.

CEQ and EPA have made attempts to place environmental costs in a more meaningful context by incorporating the cost estimates into a macroeconomic model of the American economy developed by Chase

*Allan J. Kneese and Charles L. Schultze, Pollution, Prices, and Public Policy (Washington: The Brookings Institution, 1975), p. 76. This estimate does not include the costs of achieving the complete zero discharge goal that is included in the 1972 water law but widely regarded as unrealistic. If these costs were included the total would be doubled or even tripled.

Econometrics Inc. The objective of this exercise is to estimate the "impact" of environmental costs on the principal economic indicators of prices, output, investment, and foreign trade. This exercise gave a useful translation of the costs into additional dimensions -- i.e., predicted changes in price indexes, growth rates, and utilization rates. These added dimensions, however, are no more capable of objectively answering the question of whether the costs are "too high" in an absolute sense than are the absolute aggregates themselves.

There are several factors, however, that strongly suggest that costs of existing environmental programs are "too high" in an unambiguous sense. They are "too high" because they are higher than they need to be in order to achieve the environmental goals that are set by the principal environmental laws -- in other words, not absolutely "too high" but relatively "too high."

In the first place, a number of careful scholars have made systematic deductive comparisons of current policy with a fee or tax system similar to that which was previously presented in this paper. They uniformly have concluded that costs could be lowered without reducing benefits.*

*See Allan V. Kneese and Charles L. Schultze, Pollution, Prices and Public Policy (Washington: The Brookings Institution, 1975), A Myrick Freeman III, Robert H. Haveman, and Allan V. Kneese, The Economics of Environmental Policy (New York: Wiley, 1973), and Joseph J. Seneca and Michael K. Taussig, Environmental Economics (Englewood Cliffs, N.J.: Prentice Hall, 1974).

A second sort of evidence is furnished as a by-product macroeconomic impact studies done by Chase Econometrics under contract for EPA and CEQ. In addition to a basic scenario, which attempted to replicate the requirements of the law as now written, Chase also analyzed two other relevant scenarios. In one they reduced projected investment costs of pollution control expenditures by 10% and increased operation and maintenance expenditures by about 15%. These are changes in the same direction as those that would be predicted to occur if a fee or tax system were to be instituted and, consequently, less dependence was placed upon capital intensive "end-of-the-pipe" technology and greater efforts made to reduce pollutants by production process changes. The simulated "economic impact" of the same level of pollution control costs, in the aggregate, was substantially lessened by this alternative scenario. The projected impact upon prices was reduced by about one-fourth and the maximum projected decrease in GNP by more than one-third. A second alternative scenario evened and extended the timing of pollution control expenditures. The effect on prices was similar to the previous case while the decrease in GNP was only about one-half that predicted in base case for policy as it is now framed.

A third kind of evidence is furnished by the recent National Academy of Science study of The Costs and Benefits of Automobile Emission Controls.* Although not a comprehensive survey of environmental policy

*Air Quality and Automobile Emission Control: Volume IV Costs and Benefits of Automobile Emissions, 93-24 (Washington: U.S.G. Printing Office, 1974).

this study did suggest two feasible alternatives to current automotive emissions policy that would increase the benefit/cost ratio of the auto emissions control program from less than unity to, at least, above two. In other words the two alternative policies identified were predicted to be more than twice as effective as current policy.

IV. CONCLUSION

Each of the problems enumerated above are symptoms of the fundamental failure of current environmental policy to create incentives that are reinforced by, rather than conflict with, those of the economic system. In the aggregate these problems pose the real danger that, given the current policy approach, realistic environmental goals will be gradually ignored as utopian and "too expensive." Thus, in addition to the high cost incurred by a largely futile attempt to implement current policy in the short-run, in the long-run its inherent inefficiency may lead even to abandonment of the environmental of the goals themselves.

The task for those concerned with environmental protection is thus to formulate a strategy for transforming current policy into one that is efficient and promotes rather than discourages the development of non-polluting technologies, and is thus enforceable. The major obstacle that must be overcome to accomplish this task is the charge that the effort is a subterfuge to mask an abandonment of the principal environmental goals. Unless such charges can be effectively refuted there is little chance that the transformation that is required can be made.

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Gary Seevers **DATE:** September 17, 1974

FROM : Allan Pulsipher

SUBJECT: Are Existing Research Programs Answering Adequately the Economic and Social Questions Posed by Environmental Protection Activities?

The discussion within the executive branch of the economic consequences of environmental controls does not appear to be identifying the important issues with very much efficiency or success. One reason for this is that five distinct sorts of questions tend to be confused in the discussion. As a result neither research nor policy analysis needs, thus far, have been articulated clearly.

One way of stating the important questions that need to be answered is as follows:

1. What are the economic and social consequences of the rules and regulations that EPA and the States are issuing to implement their interpretation of the principles and objectives of the existing environmental legislation?

2. Are there legally defensible alternative interpretations of the principles and objectives in the legislation that would decrease costs or increase benefits if they were used to implement the environmental legislation?

3. Could the existing legislation be amended to add, eliminate or redefine principles and objectives so as to accomplish the existing Congressionally mandated goals at a lower cost?

4. Are the Congressional mandates in the existing legislation consistent with an efficient and timely realization of other important economic and social goals of the Nation?

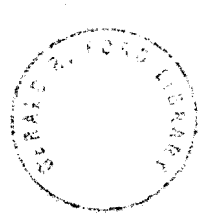
5. If not, how should environmental goals be set in order to insure consistency with other national objectives?

The preponderance of both EPA's and CEQ's research program has consisted of attempts to answer the first sort of question. In the past, most of EPA's economic studies have attempted to estimate the direct and immediate consequences of specific proposed regulations on specific industries. Currently EPA is initiating an effort to ascertain the combined effect of both air and water requirements on six industries that face large pollution control requirements. This is the first time that EPA has tried to estimate systematically the total impact of their regulations on a particular industry group. EPA also contracts annually with Chase Econometrics for a run of the Chase macro model with and without pollution control costs. The output is predicted changes in the common aggregate indicators attributable to current estimates of control costs. The cost estimates have shown a tendency to change from year to year and therefore the reliability of these projections is questionable. CEQ's economic studies have also emphasized measuring and projecting aggregate pollution control expenditures.

EPA maintains that their economic impact studies have influenced policy with respect to their specification of particular industry regulations in terms of both scope and stringency. Thus economic analysis and economic considerations have influenced environmental policy at this "grass roots," operational level. I do not believe, however, economic analysis has contributed in a meaningful and systematic way to the formulation of environmental policy at the levels that correspond to questions two through five.

Research relevant to these questions has been done by both EPA and CEQ as well as such private organizations as Resources for the Future and the Brookings Institution. However, this work has not been systematically nor comprehensively designed to answer the questions relevant to consistent policy formulation and no one has yet synthesized it nor identified the relevant gaps and inconsistencies. Perhaps, as a result, at least in part, there is little evidence that this research and analysis has influenced the formulation and implementation of environmental policy. Another important explanatory factor is undoubtedly the very short and demanding time tables that EPA is mandated to meet by the environmental legislation.

Regardless of the cause, however, the failure to test, continually and systematically, the consistency of our implicit intermediate and long term environmental policy against the guidelines furnished by



economic analysis is a serious and risky shortcoming. When the existing environmental legislation was designed and enacted we were experiencing a relatively stable period of prices and economic growth, low energy prices and interest rates, and almost soporiferously optimistic expectations of steady increases in economic well being. Conditions have changed. Realization of the magnitude of the investments required for protecting the quality of the environment is becoming more widespread. Hence the risk of an inefficient environmental policy leading to a loss of public support for environmental improvement and protection is increasing.

Moreover, although confusion still characterizes the discussion, it is also becoming more broadly perceived that data generated internally by EPA to answer questions of the "type one" sort are logically incapable of answering questions of the two through five sort. A comparison of the magnitude of pollution control costs with base figures drawn from the national income accounts or elsewhere is an essentially subjective and personal judgement in the absence of answers and data of the sort suggested by questions two through five. Hence I believe that the effort to assess the adequacy of the research on the economic and social consequences of environmental policy is an important one and timely one.

This conclusion raises the question of how the task of broadening and lengthening the focus of research on economic and social aspects of environmental policy should be organized. Questions two through five inherently involve an element of judgment and critique of the performance of EPA in answering implicitly these questions in the past. Therefore I do not believe that one could reasonably depend upon the agency to internally carry out a research program that would meet these needs, regardless of the guidance given it. Hence I suggest that we raise these concerns with other Executive Office agencies in order to explore alternative ways of accomplishing this task.

cc: AG, WF, JD

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Report on the Methodology of the Environmental Protection Agency's Economic Impact Studies

by

Joe Kalt

This report is concerned with the methodology of the Environmental Protection Agency economic impact studies as described by Mr. Swep T. Davis, Chief of the Water Economics Branch of the Economic Analysis Division of the EPA, in "Methodology for Assessing the Economic Impact of Water Pollution Controls on Industrial Dischargers." The EPA is correct in its general attempt to analyze all of the costs of its pollution control requirements - internal (to the firm) operating costs as well as external effects on employment, suppliers, and affected communities. Considering the magnitude of the investment programs necessitated by the abatement requirements and the potential costliness of error in the impact evaluations, however, the actual mechanics of assessing real costs used by the EPA are inadequate.

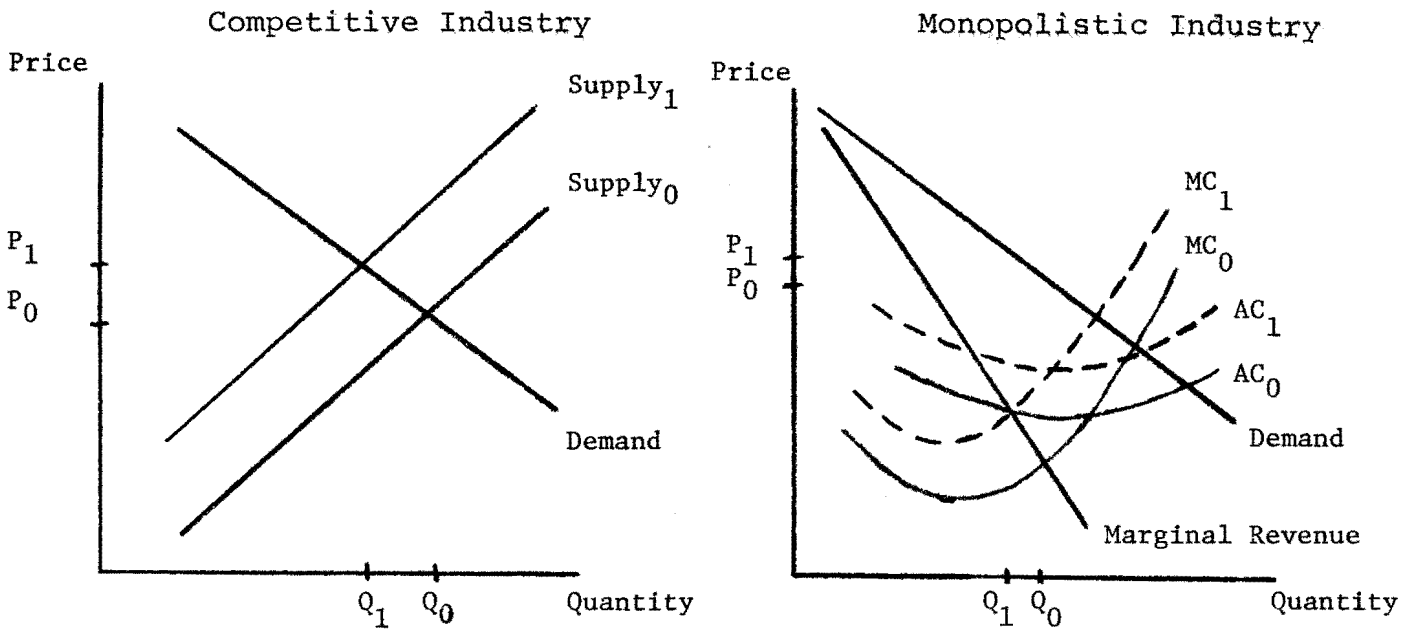
As Mr. Davis reports, the first concern of the EPA's economic impact studies is the price effects of increased pollution control costs borne by firms. The impact studies then analyze the effects of post-requirement prices on industry growth and plant closures. As regards to growth, the impact studies address the issues of capital availability and long-run profitability. Estimates of employment and regional

impact effects are in turn taken directly from the projections of plant closures. Essentially, the EPA's method is to assess the effect of internal costs on growth and plant closures and the effect of projected growth and plant closures on external costs.

Price and Production Effects

The imposition of pollution control requirements for an industry results in an increase in costs to the producing firms. The precise effect of this increase on prices depends upon the demand and supply elasticities faced by firms. The greater the elasticity of demand (other things equal), the less price will rise as new costs are imposed. The greater the elasticity of supply (other things equal), the more price will rise. With negatively sloped demand curves, an increased price corresponds to fewer units purchased. The effect of increased costs is shown below for a competitive and a monopolistic industry. The "o" subscript denotes pre-abatement requirement variables and the "1" subscript denotes post-requirement variables.

The higher price results from the shift in the supply curve. At the initial price, fewer units are produced. As customers bid for these units, their price is bid up. The higher price is the result of decreased output. Resources previously used

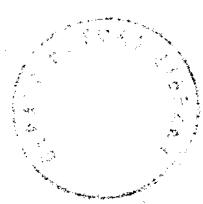


now produce less return. Their values fall. Profits are necessarily reduced since, if a post-abatement requirement technology were more profitable, we would expect profit maximizing firms to have chosen that technology voluntarily, i.e., prior to legal requirement. This result is independent of elasticities. Even in a dynamic world where demand is shifting out, the value of the firms' resources to their owners are decreased as the abatement costs increase, since the present value of the resources reflects their discounted expected future return and the increase in pollution control costs reduces this expected return. The effect of an increase in pollution control costs, then, shows up partly in the

increased price and reduced output faced by customers and partly in the decreased value of the affected firms to their owners. Both of these effects are real costs of the abatement requirements.

In its analysis of the price effects of pollution control requirements, the EPA is primarily concerned with whether firms in an affected industry will be able to "pass on" the cost increases associated with compliance. The general conclusion of the EPA methodology is that if costs can be "passed on," there will be no plant closures and no external costs. As the above analysis suggests, however, a cost increase of this type is never completely "passed on." Although with certain elasticities, price may rise by as much as the cost increase, the shifting supply function results in less profitable output.

While the report by Mr. Davis mentions the issue of demand and supply elasticities, the impact studies seldom concern themselves with the problem. This is partly due to a lack of data and reliable numerical estimates. Estimates of elasticities are characteristically made (if at all) on the basis of casual observation of available substitutes.[1] Regarding dynamic changes in demand, no numerical predictions are made other than by extrapolation of current trends. As an example, in the impact study of the paper products industry, the working



assumption is that demand changes for paper products are the same as projected changes in GNP.[2] This approach of extrapolating trends is inadequate in so far as it overlooks the effects of increased prices and consequent substitution. This problem is discussed in more detail below in connection with long-run profitability estimation. The simple extrapolation of trends is also subject to error from unforeseen changes and imperfect correlation.

Beyond the lack of numerical data on supplies and demands, the EPA impact studies generally reveal less understanding of pricing in open markets than Mr. Davis' report implies. His methodology report sites the EPA's concern for supply and demand relationships and market structure. The approach to pricing and output actually used, however, lacks a unifying model of constrained profit maximization and incorporates the "passing on" fallacy discussed above. In those cases where EPA demand trends indicate a bright future, it is generally assumed that firms have unilateral control over the prices, outputs, and profits they will face. In the EPA study on the steel industry, for example, it was assumed that "increased costs can be directly added to prices, thereby holding earnings constant and raising prices to cover increased costs,"[3] with no output effects. A model of Price = Pre-Control Price + Average Cost Addition is common in the EPA studies. This model is in

contradiction to the notions of negatively sloped demand curves and constrained profit maximization.

In those cases where estimated demand trends or estimates of high elasticity are such that the future does not look bright (e.g., the Plastics Study), the studies conclude that increased costs cannot be "passed on," i.e., prices can not be raised. Not only does this require the unlikely existence of perfectly elastic industry demand (no slope), but as the above analysis indicated, part of a cost addition is always "passed on" to customers in the form of fewer units of output available. In some cases where the impact studies conclude that costs can not be "passed on" through higher prices, it is also concluded that there are no foreseeable output effects.[4] This is in opposition to the notion of supply curves (shifted left by cost additions). While there are variations in the degree to which the EPA studies exhibit understanding of the relation between costs, outputs, and prices, there is not a unanimous comprehension or use of a micro-theoretical approach to pricing. In so far as pricing effects are so central to the impact analysis, improvements in this methodological area are imperative.

Plant Closures

The EPA is primarily concerned with the effect of increased costs and price dynamics on the rate of plant closures - under

its heading of "output effects." As is obvious from the above graphical analysis, other things equal, increased costs result in output reductions. (Or a decreased rate of expansion in a situation of growing demand.) These, however, need not take the form of plant closings in every instance. Individual plants faced with higher costs can reduce the rate of output, the hours of operation, and so on. Thus, it is possible and probable that increased costs would affect employment as plants continue to operate, but reduce production, decrease overtime, reduce hiring rates, etc. In the same manner, it does not take plant closings to reduce the demand for non-labor inputs - what the EPA calls "supplier effects." Yet, as Mr. Davis reports, the EPA bases its estimates of external effects directly on its projections of plant closures. This exclusive focus on plant closings leads to a downward bias in the estimates of employment, community, and supplier effects - assuming, for the moment, that the projections of plant closings are accurate. Further, to the extent that the value of plants to their owners declines as a result of reduced, but still positive, output, the profitability, access to capital, and growth estimates are biased upward by a methodology exclusively concerned with plant closures. In short, the output effects of increased pollution abatement costs are not all in the form of plant closures. The other forms of output reduction are overlooked

by the economic methodology of the EPA impact studies.

Further, regarding plant closures, there is no apparent recognition by either Mr. Davis or the economic impact studies of the potential benefits in terms of social efficiency of some closures. Indeed, if the internalization of pollution externalities results in some curtailment of operations, such closures would represent a market judgement that the affected resources have higher valued uses elsewhere - disregarding problems of the second best. These benefits are distinct from the environmental benefits of pollution abatement.

The methodology of estimating potential plant closures (aside from the inadequacy of focusing just on closures) is also subject to several criticisms. In his report, Mr. Davis outlines three fairly sound methods of analyzing the firms' shut-down decision. The first is a standard "Price versus Average Variable Cost" comparison model by which the firm stops operations when average variable cost exceeds price. The second model is a rate of return analysis in which the firm closes a plant when its operations do not yield a rate of return above some minimum target (presumably set by rates of return from alternative uses.) The third model prescribes the closing of a plant when the discounted present value of the cash flow from the plants operation does not exceed the present

value of closing the plant. Each of these methods can theoretically provide a guideline for plant closure projections. In so far as each of these models critically depends upon prevailing prices, however, their correct use is severely hampered by the problems in the EPA's method of analyzing price effects - as discussed above. Moreover, primarily because of a lack of data, these models can seldom be applied to the analysis of existing plants.

With the universal absence of individual plant data, the EPA methodology calls for the conceptual construction of what Mr. Davis describes as a representative, "model plant." These "model plants" are constructed from industry-wide data (primarily from industry sources), interviews with industry personnel concerning the viability of their plants, and "judgemental assessments"[5] of industry health. Besides the obvious incentive for industry sources to provide biased information, the "model plant" and its use cannot help but reflect the previously discussed inadequacy of the attendant estimates concerning price effects, demand projections, and so forth. While the "model plant" may be a least cost adaptation to the scarcity of data, its worth as a decision-making tool for the EPA is questionable in so far as the margins for error and massive size of expenditures make the probability and potential costs

of mistaken judgement quite large. More attention to existing plants is needed.

Apart from the problems associated with the "Model plant," the projections of plant closures may be biased in several other ways. First, because of lack of data and their "marginal" stature, firms with small percentages of industry capacity are often excluded from the EPA projections.[6] Given less than perfect capital markets and the large initial capital investment required in some industries to meet abatement requirements, these firms may experience higher than average closing rates. Secondly, plant closures prior to the imposition of control requirements are excluded from the EPA estimates of the effect of its requirements on plant closings. Since the current value of a firm or plant includes the discounted present value of future returns, it is possible for the very prospect of future abatement cost increases to reduce the present value of an operation and cause its closing. This effect implies a downward bias in the EPA projections of plant closings and accompanying bias in estimates of external effects.

The estimates produced by the EPA of the actual costs of the pollution abatement equipment and operation (which the impact studies assume has to be "passed on" or "absorbed")

are generally taken as given. As a few of the studies have emphasized and as Mr. Davis points out, the technical and cost projections of the EPA must be subjected to frequent reappraisal. A particular problem which should be addressed by the EPA concerns substitution possibilities and managerial efficiency. The EPA efforts to revise their cost estimates are directly tied to technologies which in many cases have not been tested in the market, although they are efficient from an engineering viewpoint. Given the proclivity of profit maximizers for technological and managerial innovation, EPA engineering cost estimates may prove inadequate. The knowledge needed for correct cost estimation and identification of the best (i.e., most economical as opposed to most technically efficient) technology is too complicated by individual circumstance to be conveyed other than through market variables. The EPA should thus pay attention not only to technological advances but to the relative values of various technologies as they are determined in the market place since the cost projections critically influence the estimates of output effects.[7]

Several other aspects of the cost issue should be considered if the EPA is to accomplish a general cost-benefit analysis in its impact studies. As Mr. Davis is aware, the EPA impact studies usually do not take into account levels

of pollution control already in place at existing plants. This leads to overstatement of the impact effects. Further, because of overlapping data and/or joint production, the problem of multi-product plants poses particular problems for cost estimation and analyzing price effects. As a method of getting around this problem, the EPA uses its highest cost estimates. Attention should be directed toward eliminating this source of error. The EPA cost estimates of industry impact also overlook the real costs involved in the obsolescense or premature retirement of capital equipment as a result of the abatement requirements. Although this issue is occasionally recognized,[8] no systematic effort is made to assess and quantify these costs or their impact on capital demands, profitability, and output.

Profitability and Growth

The primary determinants of the scale of operations and closures are capital availability and profitability. These depend, in turn, on prices and quantities. According to Mr. Davis, analysis of capital availability and profitability gives the EPA an idea of the output effects (i.e., plant closures) of its regulations. These profitability projections can be expected to reflect the errors in price analysis and cost estimation discussed above.

The first working premise of the EPA impact studies is that profitability can be maintained if abatement costs can be "passed on" through price increases. The problems and fallacies of this approach have been sufficiently discussed already. Suffering from inadequate data on future demands and supplies, the EPA impact studies are forced to make qualitative estimates and ad hoc assumptions. In the impact analysis of the steel industry, for example, it is assumed as a working premise "that the industry's average profitability would continue to be equal to the average for the 1967-72 period."[9] This assumption is one of the major issues ultimately at the heart of the question of pollution control, i.e., how much are the abatement requirements going to harm the affected industries? To assume what is at issue is to obviate the need for the impact study. Further, the impact estimates or assumptions of profitability are based on extrapolations of aggregate trend estimates of "required" quantities and "available" supplies. This approach overlooks substitution and output responses to price changes. Specifically, to estimate capital requirements, profit potential, and growth on statements such as: "by 1980, the world will need one billion tons of raw steel"[10] and to equate this quantity with "demand" is senseless insofar as it makes no reference to the price of steel and negatively sloped demand functions. The concepts of absolute, "necessary" quantities is foreign to economic analysis, although prominent

in the EPA methodology.

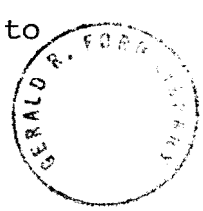
Another problem with the EPA analysis of profitability concerns the difference between profits (or at least accounting profits) under the pollution control requirements and what they would have been in the absence of those requirements. The difference represents a real cost to the owners of affected firms. Similarly, in its analysis of the effects of pollution abatement costs on growth in affected industries, the EPA makes no estimates of the costs associated with potential differentials between growth rates under the abatement requirements and what those rates would have otherwise been. Insofar as profitability affects the availability of capital for growth and replacement and pollution control requirements affect profitability, the two growth rates would be expected to differ. Whether this difference is significant(in terms of foregone output and employment) should be addressed by the EPA.

Employment and Community Effects

Employment and community impact effects are estimated by the EPA studies based upon projections of plant closures. As discussed above, this approach is wholly inadequate given the other possible output responses to increased pollution control costs. Further, the impact studies limit themselves to qualitative judgements on whether or not unemployment will result in a particular industry - dependent upon the

ability of firms to "pass on" cost increases. The numerical estimates that are occasionally made are subject to error due to errors in the plant closure projections. Little attempt is made to quantitatively analyze the costs of increased unemployment. While the projected unemployment is transitory (as Mr. Davis points out), it would certainly aid a cost-benefit analysis of the pollution control program to have some idea of cost magnitudes.

Mr. Davis' report also explains that the EPA impact studies do not concern themselves with the positive employment effects in the pollution abatement industry. Nevertheless, the projected magnitudes of capital spending on pollution control equipment make it likely that employment and output in this industry will be considerable as firms are increasingly forced to internalize formerly external costs. In the steel industry alone, for example, it is estimated that between six billion and nine billion dollars will be spent on pollution control by 1983.[11] While the EPA certainly works under constraints of time and resources, some attention should be directed to this area.



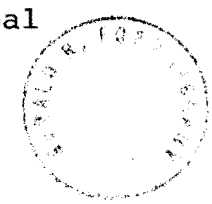
Market Structure Effects

The EPA methodology as set forth by Mr. Davis concerns itself with market structure in its analysis of price adjustments

to increased pollution control costs. But the EPA studies do not address the issue of the possible effects of the pollution control requirements on market structure, although there is some evidence that the abatement requirements will have negative effects on competition. In the steel and paper products industries, for example, EPA cost estimates indicate large initial investments and decreasing costs to pollution control over relevant ranges. With less than perfect capital markets, these conditions may result in competitive advantages to large firms over small firms and existing firms over potential entrants. It would be fruitful for the EPA impact studies to analyze the effects of abatement requirements on competitive efficiency.

Conclusion

The problems of the EPA economic impact studies fall into two main areas: the microeconomic analysis of the effects of cost increases on prices and outputs and the quantitative estimation of the affected variables. Errors made in theoretical analysis can be expected to run through both the qualitative and quantitative conclusions of the impact studies. Theoretical problems can, in turn, be expected to be compounded by the problems of data availability. Of course, asking for the necessary data may be asking for the impossible if the goal



of the impact studies is a general cost-benefit analysis of pollution abatement requirements. Such an analysis requires increased attention by the EPA to quantitative analysis of not only costs in affected industries, but also the environmental and economic efficiency benefits of pollution abatement and the costs of the EPA itself. The current EPA methodology, moreover, pays little attention to an integration of its industry impact studies. Yet it seems likely that the effects of abatement requirements on the ferroalloys industry will be felt in the steel industry and the effects in the steel industry will be felt in ...

In attempting to amass the data for a general, quantitative analysis, the EPA faces the perennial problem of the economic planner trying to assign values to non-marketed goods and services. Given the magnitude of the potential costs and benefits, however, the value of a predominantly qualitative analysis is questionable. Perhaps some attention should be given to the possibilities for marketable pollution rights or injunctions to overcome the problem of planning.

FOOTNOTES

[1] See for example, the EPA economic impact study of the Pulp, Paper, and Paperboard Industry, p. D-39.

[2] See the Pulp, Paper and Paperboard Industry study, pp. D-34-39.

[3] The EPA economic impact study of The Integrated Iron and Steel Industry, pg. 7.

[4] See the EPA economic impact study of The Plastics and Synthetics Industry. P. 17 is an example.

[5] The EPA economic impact study of The Ferroalloys Industry is a typical case. See,for example, p. 5.

[6] In the EPA economic impact study of the cement industry, for example, over 25 percent of the plants in the industry were not included. See Cement Industry, p. 9.

[7] In the EPA economic impact study of the steel industry, for example, industry estimates of pollution control costs were 9.5 times larger than the estimates made by the study contracted by the EPA. See The Integrated Iron and Steel Industry, p. V-5,6.

[8] The Integrated Iron and Steel Industry, p. VI-24.

[9] The Integrated Iron and Steel Industry, p. 11.

[10] The Integrated Iron and Steel Industry, p. VI-10.

[11] The Integrated Iron and Steel Industry, p. V-7.