ADMINISTRATIVELY CONFIDENTIAL

REPORT OF THE TASK FORCE
ON
POLLUTION ABATEMENT

October 9, 1965

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INTRODUCTION

In his Message on Natural Beauty last February, the President directed the Chairman of the Council of Economic Advisers to work with the appropriate departments to study the use of economic incentives to stimulate pollution prevention and abatement, and to recommend actions or legislation, if needed.

Acting under this instruction, a committee was established including the Departments of Treasury, Interior, Agriculture, Commerce, and Health, Education, and Welfare, the Housing and Home Finance Agency, the Office of Science and Technology, and the Bureau of the Budget. Several subcommittees or working groups were formed, and work was well along when, on July 31, the committee was asked to serve as well as a "Task Force" to study the entire area of pollution abatement and to make recommendations for the President's 1966 legislative program. At this time, Justice and Defense (Corps of Engineers) were added to the previous committee.

The Committee has met frequently and at length. Subcommittees or working groups had many further sessions, and numerous papers were prepared for the subcommittees and for the full committee. It is impossible to review in reasonable compass all of the proposals which were studied. The attached Report therefore deals almost entirely with proposals which were accepted unanimously or had very substantial support.

A summary of the principal conclusions precedes the full Report. Some of the more significant staff papers are attached as appendices.

A large number of individuals have contributed very extensively to the work of the Task Force. Particular thanks are due, however, to Edwin Mills and Paul MacAvoy of the CEA, who have had central responsibilities for the entire study, and to John Buckley of OST, James Flannery of HEW, and William Ross of BoB, whose contributions have been particularly significant.

Members of the Task Force representing their agencies were

Gardner Ackley, Chairman, CEA, Chairman of Task Force

Andrew Brimmer, Assistant Secretary of Commerce

William Capron, Assistant Director, BoB

Henry P. Caulfield, Jr., Director, Resources Program Staff, Interior

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Morton Schussheim, Assistant Administrator, HHFA

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Secretary Udall met several times with the Task Force.

SUMMARY OF REPORT

General Considerations

The pollution of man's environment has become a problem of major proportions. It imposes immense economic costs on society, offends aesthetic sensibilities, and endangers human health.

We know far too little about either the economic or the human costs of pollution. We need to know much more. But we already know enough to be able to design improved programs for abatement of many of the more obvious forms of pollution. And we know that the problems will become increasingly serious as population multiplies and as production expands even faster. There is no reason to wait for fuller knowledge before we take far more decisive action than has been taken up to this time.

The basic problem of pollution is that the pollutor uses resources which to him are a "free good" -- running water, air, the drainage properties of the soil, other people's "view" -- all of which are scarce and have economic or aesthetic value to other members of society.

Since the market does not operate to assure that the benefit to the pollutor is restrained by payment of a price equal to the benefits foregone by the victims of pollution, social policy attempts to find substitute mechanisms. These mechanisms are of essentially three types:

1. Legal processes whereby the victims of pollution -- or, normally, a government acting on their behalf -- restrain or limit the activities of the pollutor;

2. Direct government expenditures to remove or treat the pollution to make it less costly or less offensive to society.

3. Economic incentives or disincentives which induce the pollutor to limit his pollution.

Most actions to date have followed the first two methods; the third, however, can add a significant new dimension to social policy. It is clear that all three approaches need to be expanded simultaneously.

The Federal Government as a Source of Pollution

Before we can legitimately intensify efforts to abate pollution from non-Federal sources, we must put our own house in order. An Executive Order reducing or eliminating pollution of water arising from Federal activities is about to be issued. Its implementation will require enlarged budgetary support.

The Federal Government can appropriately require that Federal facilities reduce or curtail air pollution. Also, the activities which the Government supports through grants, loans, or contracts should be conducted in ways which minimize pollution. This is to request that all agencies examine their loan, grant, and procurement programs in order to reduce to the minimum the resulting impairment of the environment. Substantial and continuing follow-up will be necessary to assure that the feasible and appropriate actions are taken. Particularly difficult issues will need to be resolved in connection with the possible use of procurement activities to compel suppliers to reduce or eliminate pollution.

Water Pollution

1. The Task Force recommends a considerable strengthening of Federal authority to enforce the abatement of water pollution by municipalities, industrial firms, and others.

2. It further recommends a substantial stepping-up of Federal grant programs to assist State and local governments to provide adequate sewage treatment facilities. These programs need to be administered in ways which induce or require

-- the adequate operation of these facilities once provided;

-- the putting of these facilities on a self-financing basis so as to reduce future Federal costs and to induce users to limit unnecessary burdens on these facilities;

-- the encouragement of industrial firms to connect to municipal facilities where feasible; and

-- that facilities both for collection and treatment conform to comprehensive metropolitan area development plans and to emerging river basin plans for water supply and use.

3. Some members of the Task Force recommend that a system of "effluent fees" be developed which would provide an economic incentive for pollutors either to eliminate, reduce, or to treat their liquid wastes.

4. The Task Force opposes tax credits or special rapid depreciation for industrial pollution-abatement facilities.

5. The Task Force has not examined in great detail the use of dams for augmentation of stream flow to dilute pollution in low-flow periods. However, it appears that, in most instances, other methods should have priority.

6. The Task Force makes no proposals regarding separation of sanitary and storm sewers, nor for further programs on acid-mine drainage. Both problems require further study, which is now underway.

Air Pollution

1. New legislation on automobile effluents represents the first step in attacking this problem. However, further research and exploration are needed regarding techniques for assuring that suppression of effluent remains effective throughout the life of automobiles manufactured in accordance with the new standards. Specific proposals at this time are premature.

2. Research on the effects of air pollution and on methods for its control needs to be stepped up.

Solid Wastes

1. The Task Force recommends a new program of matching grants aimed at eliminating open dumps in all major population centers, either through sanitary land-fill or incineration.

2. Further research and systems engineering studies are needed on new methods for handling the growing problems of solid waste disposal.

Junk Autos

1. Screening or removal of junkyards under the Highway Beautification Act is only a first step. The most serious problem is to find ways of moving the growing volume of obsolete automobiles into the scrap cycle, at a time when use of automobile scrap is becoming increasingly less attractive to steel mills.

2. The Task Force recommends a Federal grant program to provide 10 shredding plants in major cities (in addition to 10 privately profitable facilities). Such plants produce a variety of scrap which, when properly priced, can compete with alternative sources of iron. This program needs to be preceded by intensive research and development activities under the Secretary of the Interior.

3. Federal grants to State and local governments are needed to help finance the transportation of abandoned or unusable automobiles to scrap processing yards. A tax on last owners of unregistered automobiles could be an effective means of moving unusable cars from backyards and would help control abandonment on streets.

4. The programs described above, as well as other highway beautification and safety programs, should be financed by a 1 or 2% excise tax on new automobiles.

Agricultural Pollution

1. USDA should establish a new unit to assess continually the pollution of soils. The Department should also study new disposal methods and new markets for farm wastes.

2. FAA regulation of the aerial application of pesticides could avoid their inappropriate or excessive use.

Research, Monitoring, and Manpower

The Task Force makes several specific recommendations on each of these topics. However, an intensive study of these matters by a PSAC panel is about to be submitted. Consequently, the Task Force made no systematic evaluation.

Federal Organization

The Budget Bureau is studying the proposals of the Task Force, as well as existing Federal Government activities, and will recommend separately any organizational changes it deems appropriate.

REPORT OF THE TASK FORCE ON POLLUTION ABATEMENT

I. THE NATURE OF POLLUTION

A. Water Pollution

Pollution of water occurs upon the discharge of wastes into streams or other bodies of water. Discharge of wastes takes place from many sources in the urban-industrial economy and from all kinds of surface drainage in both urban and in rural areas. The most abundant wastes consist of decomposable organic materials; but synthetic-organic chemicals, other (inorganic) chemical substances, phosphates, nitrates and other mineral substances even including radioactive elements are becoming an increasing problem. The decomposition of organic wastes removes oxygen from the water, reducing or eliminating its capacity to support fish and other aquatic life. The inorganic substances alter the utility of water for process purposes and cause excessive hardness; the synthetic-organic substances are potentially toxic to humans, and all contaminants certainly deteriorate the quality of water for recreation. All of the contaminants impose treatment costs on industrial and municipal users of water downstream from the point of discharge. Even modest amounts of pollutants can alter the ecology of the stream, with potentially severe disturbance to entire regions.

Pollution prevails nationwide. The most extensive cases are matters of economic and aesthetic loss in communities and whole regions; for example, massive fish kills in the lower Mississippi River that followed from the dumping or drainage of the pesticide endrin in the early 1960's had substantial effects on the economy of South Louisiana before the source was detected and curtailed. Instances of waste run off that do not appear to be widespread can inflict large losses on production in a region; the costs of replacing water in the lower Red River-Arkansas River region because of natural salinity and oil field wastes are estimated to be at least $23 million annually. The costs of pollution in Lake Erie are more extensive, but detection and correction of the causes has barely begun; the first indications of loss are the closing of at least 6 of the 32 public recreation and swimming areas, the reduction in harvest of blue pike from 20 million pounds per annum in 1936 to 7,400 pounds in 1960, and serious reductions in catches of other types of commercial fish.

The total costs of water pollution to the Nation involve all of these market values plus losses of aesthetic or health values. Aesthetic values that are extinguished by the objectionable sights and smells associated with polluted water are not subject to exchange in any market. It may be reasonable to think, however, that people in general would not be opposed to an outlay of at least 10 cents a day to be rid of these offensive sights and smells. Certainly lower property values in the vicinity of existing nuisances would support a much higher estimate. If that assumption appears to be not unreasonable, one can justifiably say that aesthetic damages add up to not less than $7 billion per year. Such a figure would appear to be minimal for what the American people, offered a free choice, would be willing to pay to be rid of this irritation to their aesthetic sensibilities.

The market values are represented by actual uses of the waters, both instream and in withdrawal. Given the extent to which damages to commercial fishing and recreation are known to exist, it is reasonable to assume that 25 cents per person per day for approximately one-third the population might represent the unit value of good quality waters for these purposes (in accord with "Evaluation Standards for Primary Outdoor Recreation Benefits" of the Water Resources Council). The value of these uses as well as the value of industrial uses of higher quality water (as measured by the potential savings from reduced treatment costs for public and industrial water supplies) would be at least $6 billion dollars annually.

Based upon reasonable assumptions as to willingness-to-pay, the total value of clean water to the Nation may therefore be more than $13 billion annually.

B. Air Pollution

Even though the air resources of the Earth are vast, only a small part of the air supply is available for the variety of uses at any single location. Since the great majority of industrial, municipal, and domestic sources of air pollution are located in the limited land areas shared by large masses of the population, the environmental hazard posed by polluted air affects both the health and welfare of some 90 percent of the urban dwellers of the country, as well as many residents of rural areas.

Air pollutants can be grouped broadly into two categories: gaseous pollutants and matter including solid particles such as smoke, dust and

liquid droplets. Their full impact on the health and welfare of the people of this country is not known. A number of investigations indicate, however, that the Nation pays an exceedingly high price for contaminated air.

Pollutants in urban atmospheres are highly damaging to material structures of many kinds. Sulfurous pollution hastens the corrosion of metal and stone building materials, resulting in premature maintenance and replacement; gaseous and particulate pollutants cause excessive soiling of and damage to painted surfaces, fabrics, rubber products, and other materials.

Reduced visibility associated with air pollution is a direct contributor to impaired safety and to delays in both air and ground transportation, and compels the use of lighting at times when sunlight would otherwise provide adequate illumination.

A wide range of agricultural and forest crops is subject to the damaging effects of air pollution. Estimates of agricultural losses alone run as high as $500 million annually, and these do not include damage to commercial trees, municipal plantings, and ornamental flowers or shrubs. Vegetation damage caused by air pollution has been reported in at least 27 States and the District of Columbia, and available information would suggest that no State is free of this adverse effect of atmospheric contamination.

When present knowledge of the economic effects of air pollution in particular locations is extrapolated to the whole nation, the aggregate cost of air pollution, including losses of aesthetic values, appears to exceed $10 billion per year.

Economic costs do not include the impairment of human health. There is a growing body of scientific evidence which indicates that polluted air may be associated with a variety of diseases of the cardiorespiratory system, including asthma, bronchitis, emphysema, lung cancer, and even the common cold. This evidence has been derived from laboratory research on animals, through studies of patients afflicted with cardiorespiratory disease, and through epidemiological investigations of disease patterns in association with community air pollution levels.

C. Solid Wastes: Rubbish, Garbage, and Community Refuse

At the present time, local government outlays on rubbish and garbage removal are more than $1.5 billion annually; in addition, at least $1.3 billion are spent each year by householders and firms for private removal. These expenditures of $2.8 billion are not sufficient to achieve reasonable standards of general health and welfare, because in a number of instances they pay for little more than collection of wastes and do not provide for sanitary burning or covering of the dumped materials after they are collected.

Burning in open dumps is still one means of disposing of solid wastes. This method results in air pollution of the first order; there have been sustained discharges of sulfur and carbon oxides and of the aldehydes recorded in a number of instances. Open dumps are breeding grounds for disease-carrying rats and flies -- as many as 70,000 flies having been produced per cubic foot of garbage -- whether there is burning or not. Open dumps have been observed to contribute to water pollution from seepage of wastes into the surrounding water supply.

D. Junk Automobiles

The abandonment of automobiles on city streets and the stockpiling of auto bodies in graveyards have adverse effects on the natural beauty of the country and adverse economic effects as well. The approaches to many major cities are marred by acres of stripped auto bodies; marginal agricultural land turned into "junk farms" disrupts the appearance of rural areas in many regions. There are economic losses for the neighbors of such junk collectors: property values and living conditions deteriorate because of the ugliness and the burning or noise of dismantling.

The neighborhood effects have been increasing in severity and extent since the middle 1950's. There is some basis for expecting that they will become much more severe in the next five years.

There is some evidence that the number of automobiles carpeting the landscape has increased. Automobiles taken off the registration lists either enter auto-wrecker's yards to be stripped of saleable parts or directly enter the scrap-processor's yards to be turned into scrap materials useable in industry -- particularly in steelmaking. The number of automobiles leaving the registration roles exceeded the number processed into useable scrap by approximately

800,000 each year in the period from 1958 to 1962. Although this may have been reversed in part during the last two years, it appears that over the earlier five year period 4 million automobiles entered auto wrecker's yards and stayed there.

The threat of resumed accumulation in the next few years is real, both because of increased numbers of cars leaving the registration rolls each year and because of expected decreased demand for automobile scrap. More cars will be junked as those from the large production years 1955, 1957, 1960-1963 are removed from service by accident or wear. At the same time, new pellet processing of iron ore and new, more strict limits on scrap use in the oxygenated furnaces are expected to reduce demand for all types of scrap, and particularly for automobile scrap. The number of junk autos in farmers' fields and industrial areas by 1975 could reach three times the present number.

E. Agricultural Sources of Pollution

Wastes from agricultural production include a number of pollutants. As livestock farming moves from pasture production towards confinement of larger numbers of animals at central locations, wastes are becoming concentrated in larger quantities at fewer locations. These drain off to pollute the surrounding water and air. Newer crop production techniques rely on chemical pesticides and fertilizers, some of which persist over long periods of time so as to pollute the environment.

Wastes -- particularly animal manure -- have leached and run off to become a serious source of water pollution. The runoff water has contained salts, toxic or disease producing entities, and excess nitrates. It has created hazards to fish and wildlife and a deterrent to recreation.

Pesticidal chemicals have had polluting effects that are well-documented by private and Federal research. Findings indicate that typically chemicals disappear at the rate of 50% or somewhat more per year. Along with the amount carried off by streams, the amount that remains is possibly toxic to animals and sometimes results in unacceptable residues in our food.

The run-off of fertilizer residues into water supplies has resulted in potential health hazards, as well. Increasing nitrogen

application to fields has resulted in high recordings of nitrates in water and milk supplies. Phosphorous run-offs have contributed to weed and algae growth in lakes and streams. Salt run-offs from irrigation water, as well as from natural sources, have caused damages in the loss of water use for recreation and industrial purposes -- as mentioned above in the case of the Arkansas-Red River.

The extent of the economic impact of these sources and types of pollution is not known. Costs are imposed by the production process on neighboring users of water and land, as well as upon neighboring domestic or wild animal populations. Valuable information can be obtained from research programs estimating these costs; such programs should be undertaken.

II. GENERAL CONSIDERATIONS IN POLLUTION ABATEMENT

The essence of almost all problems of pollution is that pollutors are able to use valuable resources -- air, water, or the absorptive properties of the soil -- without payment for the deterioration of its quality which is thereby imposed on other members of society. The damage from dumping sewage or industrial wastes into a river or releasing gaseous materials into the air is not borne by the pollutor but by others. He is not restrained by the cost because it is not specifically paid by him (though he in turn may suffer from pollution by others). Nor is the person damaged by the pollution induced to accept the damage by a payment from the pollutor.

Most other uses of resources are arranged through a market transaction, involving a private contract which imposes a cost on the user of the resource and provides a payment to the supplier. Since the contract is voluntary on both sides, it can be assumed that the benefit to the user of the resource is at least as great as the cost imposed on, or the benefit foregone, by the supplier.

There is no similar mechanism for equating costs and benefits in the case of the use of air, water, or ground drainage in a way that imposes costs on others or reduces the benefits they enjoy.

In many cases, however, the law has recognized the damage to others and allows the government, acting on behalf of those damaged, to prohibit or limit the pollution. The procedures to be used in this intervention have increasingly been defined by local, State, or Federal statute.

One procedure is to require the pollutor to bear the costs of abating pollution by requiring that pollution-creating activities be curtailed or that treatment be provided. In a number of instances, such pollution abatement schemes are surprisingly inexpensive for the pollutor. Responding to enforcement actions or local pressures to abate waste discharges, industries have often been able to reduce discharges substantially at nominal cost. In some cases, new processes installed to reduce waste discharges have actually turned out to be cheaper than the processes they replaced. After years of pressure, the auto industry has learned that it can redesign engines at modest cost and substantially reduce noxious discharges to the air. Without excessive cost, industry could treat its liquid wastes to a much greater extent than it now does. Many municipalities which now treat wastes either inadequately or not at all could treat wastes adequately without undue financial strain; with some outside help on initial capital investments, and with the adoption of reasonable user charges, all communities could meet operating and capital replacement costs of adequate treatment. And the Federal Government could do more to reduce pollution caused by Federal activities!

We can and should do much more to reduce the noxious effects of pollution. We should devote more resources to improving the quality of streams, to improving the quality of the air we breathe in our large metropolitan areas, to removing unsightly accumulations of junk autos and return them to the cycle of production. And we should undertake programs to eliminate smoldering public dumps that mar the environs of many urban areas, including the Nation's Capital. The following sections propose specific new and improved programs to achieve these goals.

In some cases, the costs of pollution can be so high that almost any expenditure is justified. In many countries, for example, the pollution of public water supplies is a serious danger to public health. In this country, our excellent Federal, State, and local public health services have virtually eliminated this danger. There are, however, health damages from air pollution and possibly from dumps. More research needs to be carried out on these matters. Meanwhile, substantial improvements can be justified on aesthetic and other grounds.

Some forms of pollution abatement are, however, so expensive that their benefits cannot justify the necessary outlays. We could not justify the high cost of removing every junk auto from the countryside,

or of making the water in every river from source to mouth clean enough for swimming. We have tried to look at both the benefits and the costs in evaluating pollution abatement proposals.

Those projects justified by an excess of benefits over costs should be undertaken cooperatively with State and local authorities. The Federal Government must take the lead in a national attack on pollution. But State and local governments should also assume greater responsibilities and devote more resources to pollution abatement. These authorities can be induced to move toward abatement by persuasion, technical assistance, careful use of Federal grant and loan programs, and by enforcement actions. Industry also should assume more responsibility for pollution abatement. We should mobilize the inventiveness and resourcefulness of industry to design processes that produce much less waste, to treat their own wastes more effectively, and to design better ways of treating the wastes of the entire population. Persuasion, enforcement, research contracts, and technical and other assistance can be used to these ends. In addition, it would be desirable to provide market incentives for the accomplishment of these goals, just as market incentives are used so effectively to stimulate production of the entire range of desirable goods and services.

Data on pollution are seriously deficient. We lack comprehensive data on air, water, and soil quality; on the aesthetic, health, and other damages from all sources of pollution; on the magnitude of the solid waste disposal problem; and on the costs of alternative means and degrees of abatement. Much better data are now being collected, largely as a result of stepped-up Federal efforts. In addition, in what follows we recommend further improvements in research and data collection for future analysis and policy making. Meanwhile, we have proceeded in our deliberations on the basis that the present, incomplete data were sufficient to indicate the need for a number of wide-ranging programs of pollution abatement.

III. NATURE AND EXTENT OF PRESENT FEDERAL PROGRAMS

A. Pollution from Federal Activities

A forthcoming Executive Order will contain more stringent regulations for control of sewage from Federal installations. New installations will be required to meet the treatment standards that are met by a modern municipal treatment plant. Existing installations will be required to formulate a plan for adequate abatement of waste discharges.

Federal agencies will be required to explore the ways in which grant, loan and other aid programs can contribute to the same objective.

B. Water

Prior to 1948, Federal concern was mostly confined to control of pollution of coastal waters from oil by ships under a 1924 statute, to research and surveys, and to technical assistance to State and local governments chiefly in regard to water-borne diseases. In 1948, the first general Federal pollution control regulation was passed. The Water Pollution Control Act was made permanent legislation in 1956, and its provisions were strengthened and extended in 1961. It now provides for administration by HEW of technical assistance, financial assistance for communities to build waste treatment facilities, comprehensive planning, research, and basic data collection and analysis. The Secretary has the power to intervene in selected cases and through elaborately prescribed procedures to prohibit or limit private or municipal discharge of effluent into rivers and streams crossing state lines.

The Corps of Engineers, the Geological Survey and the Bureau of Mines all have some control authority over sources of particular pollutants or of effects from pollution on particular aspects of the environment.

Legislation already passed in this session of Congress establishes a new Water Pollution Control Administration in the Department of HEW, and provides for the establishment of Federal-State water quality standards on interstate streams. The latter provision will materially simplify the elaborate enforcement procedures of previous legislation which required specific proof in each instance of endangerment to health or welfare.

In addition to HEW programs, there have been other grant programs. Under the Public Works Planning Program established in 1954, the Housing and Home Finance Agency has made about 1,900 interest-free advances to finance the planning of sewage collection and sewage treatment works. Under the Public Facility Loan Program (generally limited to communities with populations under 50,000), established in 1955, HHFA has made about 400 loans to finance the construction of sewage collection (and occasionally treatment) facilities. Now the new Department of Housing and Urban Development, Commerce, and Agriculture have authority to make matching grants and/or loans all

or part of which may be used for water supply, sewage collection, and treatment facilities. Legislation passed or pending in this session of Congress would increase substantially the authorizations for grant programs. The HEW authorization for treatment facilities went from $100 million to $150 million per year. The HUD authorization for grants for water supply and waste collection facilities has been set at $200 million per year. The Economic Development Act contains $500 million of grant authorization in Commerce for all types of community facilities, including water and sewer works. New legislation authorizes Agriculture to make $50 million in grants for construction of rural water supply and waste treatment systems.

C. Air Pollution

The Clean Air Act of 1963 provides the basis for HEW local agency cooperation in dealing with air pollution. Grants are authorized for research and control activities, and cooperation in the abatement of interstate pollution is obtained in joint conference, hearings, and court proceedings to enforce requirements that air pollution be curtailed. The basis of control of air pollution, as in the Water Pollution Control Act, as Federal authority to enforce standards of air quality by recourse to the courts. To these general procedures the amendment of 1965 [S. 306 of the 89th Congress] adds specific Federal authority to set standards for direct control of pollution from motor vehicles. The manufacturer of motor vehicles is required to meet these standards on new automobiles sold in this country by the addition of exhaust abatement devices or by other means.

D. Solid Wastes: Rubbish, Garbage, and Community Refuse

Under the aforementioned Public Works Planning Program, HHFA has financed the planning for a number of municipal incinerators. Under Section 702 of the Housing and Urban Development Act of 1965, HHFA can make grants out of the $200 million

per year authorized for a number of purposes, so as to finance solid waste disposal facilities such as incinerators. There has been no specific directive to spend a large proportion of this amount on solid waste disposal facilities.

Title II, Solid Waste Disposal, of S. 306 of the 89th Congress provides the basis for an extensive new program of research and of demonstration of efficient and sanitary disposal facilities for solid wastes. The Secretary of HEW is to stimulate new research by collecting and disseminating research information and by making grants for research or for the demonstration of new devices or techniques. The Program is designed to encourage cooperation with local agencies, by sharing the costs of making surveys of local disposal practices and of developing new disposal plans. As such, the program may stimulate action programs at the State level that are now largely lacking. Expenditures authorized for HEW for both of the new air and solid waste disposal programs in S. 306 are $7 million the first year and $24 million the second year.

E. Solid Wastes: Junk Autos

The details of legislative action with regard to highway beautification are not yet complete. It is expected that final legislation will call for the mandatory removal of junk yards from all federally-assisted highways, or their effective screening from view. A substantial portion of the expenses for removal and screening is to be provided by the Federal Government. There is no attention being given to moving junk autos through the scrap producing process, but rather the concern is with covering up the existing junk whether or not it is in the scrap cycle. Also, highway beautification and screening do not get at the abandoned cars on streets and backyards outside the cycle.

IV. PROPOSALS FOR NEW AND EXPANDED PROGRAMS

A. Pollution from Federal Sources

1. Pollution from Federal installations

Noticeable and substantial sources of water, air and soil pollution include the agencies of the Federal Government. It would be bad public relations as well as inefficient pollution

abatement if the government were to pay insufficient attention to pollution from Federal installations while urging major new pollution programs on Congress and the public. Congress has indicated considerable and well-founded concern with water pollution from existing Federal installations.

An Executive Order has been prepared with instructions that apply stringent standards for water pollution abatement in new Federal installations, and that require individual agencies to formulate plans for pollution abatement from existing installations. It is important that these instructions be issued before new programs are submitted to Congress. We recommend that there be a similar Executive Order requiring all new Federal facilities to meet air pollution control standards and all old facilities to begin to curtail pollution.

f. Pollution from Federally-Financed Operations

The program of water pollution abatement includes the requirement that all agencies review the extent to which borrowers, grantees, or contractors could be required to adhere to the water pollution control standards for the Federal facilities. These agencies were "encouraged" to prescribe standards; they should be required to set standards for effluents in stream from Federal projects and for air pollution, which is not covered by the Order. We recommend that all agencies of the Federal Government which administer grant programs require that appropriate provisions be taken by the grantees to minimize water and air pollution emissions arising from the grant-assisted construction or other activities.

One precedent for this type of requirement exists in the provision in the Urban Mass Transportation Act, which required the Administrator of HHFA to give consideration in making such grants to criteria established by the Secretary of HEW for minimizing air pollutant emissions potentially arising from grant-assisted facilities or equipment. An example of a Federal grant program often subject to complaint with respect to significant pollutant emissions is the Federal highway program and urban renewal program. Both of these grant-assisted programs have frequently involved the disposal of large quantities of demolition or land clearing debris by open burning, and the deposit of soil sediment in rivers and streams. Although the HHFA, in connection with the urban renewal program, has noted that the costs for more acceptable disposal methods for demolition and land clearing debris, or for more

extensive sediment control, may be included as a part of project costs, there is no requirement that this be done, and the practice by urban renewal agencies has been highly variable in this regard. In proposing the Order without specifying agencies, it is expected that it will eventually be applied to all continuing federal installations and programs, including the procurement of goods and services.

Without extensive and continuing examination of the agencies' practices with respect to these matters, little will be accomplished. Periodic reviews of pollutant-creating activities, whether at the Federal prison or in road construction, should be held. There should be a readiness in the Executive to consider greatly increased expenditures on all operations to cover the costs of new processes or of treatments to remove pollution.

E. Water Pollution

1. Legislation to strengthen enforcement procedures

The enforcement procedures required by the Water Pollution Control Act are elaborate and somewhat cumbersome. The Secretary of HEW can initiate enforcement on his own only in cases of interstate pollution; if pollution is intrastate, Federal proceedings must be initiated by request of a governor. The Secretary is required to call a conference of interested parties and to recommend means of abatement to the appropriate state agency. If the Secretary believes that satisfactory actions are not being taken after six months, he must call a hearing to make further recommendations. After a further six-month delay, the Government may bring suit if the Secretary is not satisfied that sufficient progress is being made. In cases of intrastate pollution, suit can be brought only with the consent of the governor. Enforcement cases typically extend over several years, even if no suit is brought.

The 1965 Amendments, encouraging the States or allowing the Secretary of HEW to set reasonable standards for water quality, will simplify enforcement procedures by eliminating the need to prove damages. The fact that standards are not being met serves as the basis for action. However, the process of setting standards is a complex one, and it will be many years before all interstate streams will be covered by effective standards.

There are several ways in which procedures could be further simplified for expeditious and effective enforcement while still protecting the rights of all parties.

(a) We recommend elimination of the two compulsory six-month delays in the enforcement procedure. In the past, the Secretary has freely granted extra time, sometimes measured in years, and he should continue to do so when justifiable. He should not, however, be constrained by built-in delays when the cause of the pollution is clear and remedial action can be quickly taken.

(b) We recommend extension of the authority of the Secretary to pollution problems in all navigable waters. This eliminates the requirement for consent of the State governor to call a conference and bring suit in cases of intrastate pollution. The interstate requirement in existing legislation bears little relation to the need for pollution abatement. Furthermore, the Federal Government already has some responsibilities, including those for water quality, over navigable streams within one state.

(c) We recommend that the Secretary be empowered to avoid the procedures of the Water Pollution Control Act, and to seek an injunction through the good office of the Attorney General in cases where pollution presents a clear and present danger to public health, where it derives from an identifiable source, and where there is no other immediate means of protecting public health.

(d) We recommend that the Secretary be given subpoena power and the right to inspect installations suspected of causing pollution. At present, the Secretary has no power to require persons to appear at meetings called pursuant to an enforcement action. Nor can he enter premises to obtain evidence of pollution. Ample precedents exist for the right of inspection under the Pure Food and Drug Act. Secret processes and formulae should, of course, be protected.

(e) We recommend that the judicial review of broad findings be limited to the substantial evidence test. Under existing law, the court has the power to rehear all evidence produced before the board. This procedure is time consuming and unnecessary since the boards are expert and impartial. Courts should, however, be empowered to receive evidence of facts discussed subsequent to the board's hearing.

(f) We recommend that private citizens be permitted to sue in Federal Court when damaged by pollution. At present, citizens must normally bring action to enjoin nuisances in State courts. To permit suits regarding pollution damage to be brought in Federal Court would free them from local prejudices and influence. Legislation should provide that injunctive relief must be the object of such suits since the principal Federal objective is abatement of pollution for the benefit of the entire community.

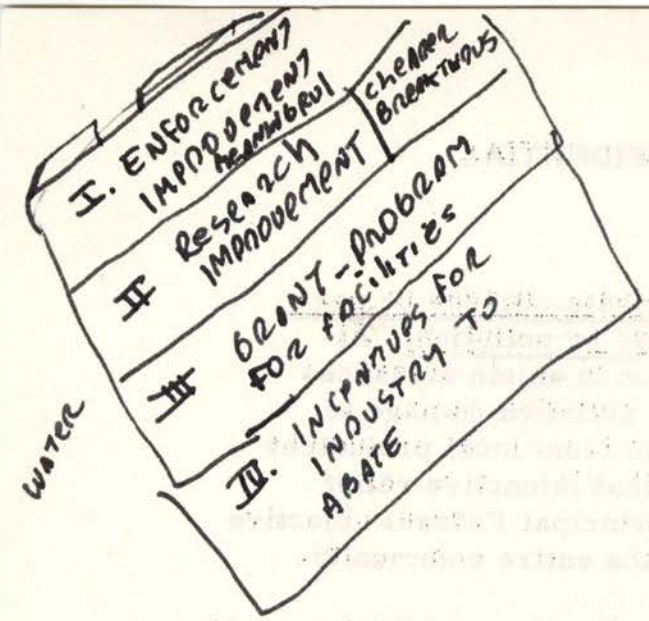
(g) We recommend that the findings and recommendations of boards and courts be permitted as evidence in private actions. The collection of relevant evidence would be extremely costly for a private party. There is no reason why evidence and findings of boards and courts in water pollution cases should not be usable in private actions.

(h) We recommend that class actions on behalf of others similarly situated be permitted. This would permit one plaintiff to take the burden of establishing the existence of pollution and then other affected individuals would merely have to prove damages.

(i) We recommend that the Federal Water Pollution Control Administration require registration of the nature, quantity, and point of discharge of all wastes from any outfall, and the amounts and sources of withdrawal for water supply purposes. The registration system would enhance not only the planning and program development process but would facilitate the establishment of water quality standards. The system should extend to public as well as private sources of pollution, and to wastes that undergo treatment as well as those that do not.

2. Grant and loan programs for waste collection and treatment facilities.

Approximately 125 million people (65% of the population) are now served by sewerage systems. About 16 million of these people are served by no treatment system at all, and another 35 million are served by treatment systems that are inadequate by modern standards. Our investigations indicate that it may be necessary to provide modern collection and treatment systems for between 75% and 80% of the population by 1975 to avoid serious deterioration of stream quality in and around urban areas.



Gardner:
-- more money to advance technology
-- by federal research programs.

demonstration projects
developmental projects
maybe at Federal
installation

We estimate that total national expenditure for construction of facilities for this purpose will have to be close to $20 billion over the next ten years. This will require annual construction expenditures to rise steadily from the current level of less than $1 billion to $3 billion by 1970.

In order to meet the 1975 goal of 75-80% coverage, increased expenditures will be necessary at the Federal, State and local levels. The Federal Government presently provides $100 million in 30% grants for treatment facilities and about $35 million in 50% grants for collection facilities. Present and pending Congressional actions will increase these amounts substantially. The Departments of HEW, HUD, Commerce, and Agriculture have substantial grant programs all or part of which can be used for collection and treatment facilities. The amounts available could come to about $400 million. This represents a rapid growth in the Federal effort, but even this amount will have to be increased in the coming year. The Task Force did not see how a system of State prepayment of Federal contributions could be devised, so that further commitments are necessary at an early date.

Our recommendations are as follows.

(a) We recommend that authorizations and appropriations be sought to permit the Government to pay a full share of the program necessary to achieve the 1975 goal. (An approximate schedule is in an attached working paper.) There is some evidence that communities are increasingly using the Federal grants merely as a substitute for their own outlays. Greater effort should be made to induce State and local governments to carry their share of the financial burden. This can be done by persuasion, technical assistance and more vigorous enforcement. Although total Federal outlays must rise substantially, it should not be necessary to increase Federal participation rates above those now in effect (provided all limitations on the dollar amount of loans are removed). We recommend that the Secretary of HEW be allowed more flexibility in allocating grant funds: limitations on the dollar amounts of individual grants should be removed, as should the population and income bases for distributing grants among the States.

(b) We recommend that greater efforts be made, through persuasion and technical assistance, to encourage communities to employ qualified supervisory and operating personnel on waste treatment facilities. At present, many facilities that the Government has helped to build are operated far below their peak efficiency because they are operated by unqualified personnel.

(c) We recommend that greater efforts be made to induce communities to place water supply and waste treatment systems on a self-financing basis. In the long run, the cost of these facilities should be borne by users rather than by the general taxpayer. Not only is it more equitable, but it would induce industrial and other users to utilize facilities less wastefully. One possibility is that communities be required to institute appropriate user charges as a condition of Federal grants. A less controversial but also less effective procedure would be to use persuasion and technical assistance for this purpose.

(d) We recommend that HEW, Commerce, and Agriculture grants -- like those at DHUD -- be conditional on certification by the Secretary of HUD that the facilities conform to an areawide sewerage system as part of a comprehensive plan for the development of the area. These measures would ensure that facilities would be consistent with planning standards now regularly required by the Government. (This recommendation is made by all members of the Task Force except HEW, the administering agency required to obtain the certification).

(e) We recommend that the Federal Water Resources Council examine standards for planning to assure that all aspects of water are adequately covered. Once this has been done, the unilateral surveys by any agency including those of the Water Pollution Control Administration conform to the standards established for comprehensive plans. Appropriate planning for water development and use requires information on both water quantity and quality. Without such information planning for necessary water for municipal, industrial, agricultural, recreational or any other use of water is not possible or at any rate not optimal. With the establishment of the Federal Water Resources Council, it should now be possible to standardize surveys so that all needs are met.

3. Approaches to industrial waste disposal.

Largely as a result of Federal and State enforcement measures, and of pressures resulting from growing public concern over pollution, substantial progress has been made in recent years in reducing the direct discharge of untreated industrial wastes into streams and lakes. Many firms now provide at least minimal treatment of their wastes, and many have installed modern processes that drastically reduce the output of waste.

But much more needs to be done. The abatement of industrial waste discharges must keep pace with the program of municipal abatement outlined above if deterioration of stream quality is to be avoided during the coming years. There are few alternatives at present to the treatment of municipal wastes by traditional methods. Industrial discharges, however, can be reduced in a large variety of ways. In many industries -- sugar beet refining is an example -- dramatic reductions in waste discharges have come about by the introduction of new industrial processes, sometimes especially designed to minimize the output of polluting wastes. It is thus important to bring to bear a wide range of know-how in dealing with industrial pollutants -- know-how which is specialized and may be peculiar to a particular plant or industry.

PSAC = EFFLUENT FEE APPROACH THIS IS POWERFUL INCENTIVE TO — — — DIFFICULT POLITICALLY

EXPERIMENTAL PROGRAM ON FEES IN SOME PARTS OF U.S.

Simplification and improvement of enforcement procedures will assist in abating industrial pollution. But the following recommendations should be of substantial further assistance.

(a) We recommend that granting agencies give more encouragement to industry to have their wastes treated by municipal treatment systems. Many industrial wastes are best treated by large, modern municipal treatment systems. Frequently, industries prefer no treatment at all since substantial investments are required in collection facilities, so that special inducements are required. Vigorous enforcement policies are one such inducement. When collection facilities are part of a municipal system, they are eligible for Federal grants, and this is a second inducement. Granting agencies can use technical assistance, leadership, and guidance as further inducements: for example, when an industry is located far from a municipal system, guidance can be provided in forming special local government districts to provide treatment not only for industrial plants in the area, but also for nearby populations.

(1)

COUNCIL OF STATE

REDUCE GOOTS MUNICIPAL TAXES: GIVE LOCAL TAX BREAK CONDITION GROWTH

INTRODUCE EFFLUENT FEE BILL AS A SWORD. TO MAKE REST EASIER.

(b) A number of members of the Task Force recommend the imposition of effluent fees on industrial discharges of wastes. Effluent fees -- charges on firms related to the kind and amount of waste discharged into a body of water -- have been used very successfully abroad.

(16) DRAFT APPROACH ON EFFLUENT FEES. (ACKERS COUNCIL/HEW)

The fees are set, under ideal conditions, so that the payment of each industrial firm is equal to the value lost of other firms and water users from deterioration of water quality. If one firm colors the water so as to make it unfit for recreation, then this firm is required to pay a higher fee than another firm not coloring the water but reducing the oxygen content by the same extent. The logic supporting such fees is that the pollutor is required to compensate -- by payment or by paying for water treatment -- those affected by the pollution in accord with the damage done. It represents, in effect, an effort to duplicate the market mechanism which applies to most other uses of resources.

Ideal conditions seldom, if ever, exist. The fees charged industry in the Ruhr Valley region of West Germany cover the costs of treatment, reduce the volume of polluting substances, and reserve certain streams exclusively for recreational use. Effluent fees in practice might also provide funds to guarantee secondary treatment so as to prevent any stream from polluting the air by becoming anaerobic. Analagous procedures have occasionally been used in the United States. The best example is the $1,000 per acre performance bond that strip-mine operators must post in the State of Pennsylvania as a requirement for obtaining a permit to operate. Such operators have the choice of restoring strip-mined lands to a condition acceptable to State inspection authorities -- acting under legally authorized guidelines -- or, by forfeiture of bond, providing the State with funds to do the restoration. We see no reason why other applications of this general nature could not be devised.

Effluent fees were recommended last year by the Task Force on Natural Resources. The advantages of a system of fees, when used in the context of enforcement of standards and of Federal grants for treatment systems, are:

(1) If set at levels roughly equivalent to the losses sustained by others, fees result in a broad and pervasive improvement in stream quality. Enforcement actions must proceed area by area, but one set of effluent fees can be and should be applied concurrently to all sources of particular pollutants in large areas or in the entire country.

Feasibility of a river-oriented development program with help from state – Rockefeller. Hudson for example.

WATER

- Research
- Fee bill (Cedlhow)
- River-oriented development demonstration (– state) (river basin)
- Reduction local taxes – (metro and autos so would ambulatal.)
- AIR Executive Order
  - Get this started.
- Govt must put its own house in order. Air & water

(2) Effluent fees provide firms with continuing incentives to search for new ways of abating waste discharges. In an enforcement case, a firm is directed to perform specific actions. Once it has performed these actions, it has no incentive to reduce waste discharges further. With an effluent fee scheme, the firm has incentive to search continuously for feasible means of further abatement as long as it discharges any wastes.

(3) The effluent fee places the burden for finding methods of abatement on the managers of industry, who are best placed to make adjustments that reduce costs of abatement to minimum levels for the firm while meeting the goals of public policy. Individual managers can make relevant detailed cost comparisons of a sort that are very difficult in a quasi-judicial proceeding.

(4) Effluent fees provide firms with an additional incentive to connect with municipal treatment plants when that is economical.

(5) Effluent fees place part of the cost of pollution abatement on the activities that are responsible for waste discharges, rather than relying entirely on larger and larger government outlays. There is some factual basis for expecting that fees can be set at levels that would induce substantial abatement of discharges without imposing undue financial burden on firms (as shown in the accompanying paper on case studies of effluent fees).

* TIE INTO MUNICIPAL SYSTEMS.

(6) Effluent fees provide revenues that can be used for constructing public works designed to abate pollution, such as dams for augmenting stream flow during periods of low water.

The objections to effluent fees are

(1) They would be controversial both inside and outside the government. There would be strong opposition from some segments of business, although some business leaders prefer this market-type incentive to enforcement procedures.

(2) Some conservationists would cry that the Federal Government was selling the right to pollute. It would

therefore be important to emphasize that effluent fees are intended to supplement rather than substitute for enforcement powers, and that effluent fees could achieve a pervasive improvement in stream quality that was difficult to achieve with enforcement.

(3) These are problems of practical administration of fees to be charged competing firms in separate parts of the country, on separate rivers, with differing effluents. These practical problems are being explored in a case study of the effect of effluent fees for companies on the Delaware River to be completed in October 1965. Also, simple systems of fees have been explored in some detail in two of the attached staff papers.

IA + INCENTIVES

(c) We do not recommend special tax concessions for pollution abatement. There has been support in Congress and elsewhere for fast write-offs on investment credits for waste treatment investments by industry. The following are the major objections to such proposals:

They are an inefficient incentive, since they merely make less costly an inherently unprofitable operation, and do not ensure the operation will be undertaken since it would still remain unprofitable. They thus require sanctions and/or grants to make them effective, and this in turn implies going to sanctions or grants directly without the intermediate intervention of a tax subsidy.

They direct attention exclusively to standard treatment methods, whereas process changes are often preferable.

They clutter the tax laws with devices so inefficient that incentives are created for adding further such devices later to "patch up" the inefficiencies; thus they add to the complexity and inequity of the tax system.

4. Special aspects: Acid Drainage from Strip Mines and Underground Mines

Control of acid mine drainage is essential in many places to assure adequate water quality for municipal and industrial water supplies and to maintain or restore fish and wildlife. This problem is of concern to the Bureau of Mines in the

Department of the Interior and to the Federal Water Pollution Control Administration in HEW; a joint program of the two Departments is under way to evaluate the effectiveness and costs of various measures to control acid drainage and to test new measures. During Fiscal Year 1966, the allocation for this joint program is $3.7 million -- to be increased to $5.2 million for Fiscal Year 1967.

Considerable knowledge already exists on the extent of pollution from this source. But knowledge on relative contributions of different sources of drainage, of the importance of different levels of acidity, and of economically feasible control methods, is far from adequate. The demonstration projects operated jointly by the Departments of HEW and Interior are designed to determine cost effectiveness or the relationship between increments of control obtained by various known control methods, the cost of each increment, and the economic and other benefits obtainable by each increment of control. The existing program also seeks to evaluate present State laws for control, the nature of private property rights -- both of the sub-surface mineral rights and the surface rights -- and laws that permit access by governmental officials for purposes of study and control. From this program, ways and means could be found to obtain more effective Federal-State collaboration with regard to enforcement, financing, and planning. Any further recommendations wait upon the successful completion of this program.

C. Air Pollution

1. Auto Effluents

Effluents from autos are the most important single source of air pollution. The recent legislation S. 306, an amendment to the Clean Air Act, requires the Secretary of HEW to set effluent standards on all new cars to be sold in the U. S. This is a major step forward in reducing this source of air pollution. But it is likely that further steps will be required in the coming years.

S. 306 applies only to new cars, and makes no provision for inspection or maintenance of anti-pollution devices installed on new cars. The best estimates available indicate that devices will be effective for between 10,000 and 20,000 miles without replacement or maintenance. Thus, even when

all cars on the road have been manufactured to meet Government standards, less than 25% of the driving will be done in cars with effective devices unless they are properly maintained. Measures will shortly be necessary to ensure appropriate maintenance.

At this time there is considerable uncertainty as to the devices or modifications that the auto manufacturers will employ to meet standards. Furthermore, major Government research is now underway to test the effectiveness and durability of devices under a wide range of conditions. We therefore think it would be premature to propose measures to deal with the problem raised by older cars. We recommend that the effectiveness of abatement devices and techniques be studied intensively during the next year with a view to the formulation of new proposals a year from now.

In the course of this study, the following points should be kept in mind.

The problem of automotive air pollution is most acute in large urban areas. It would be desirable to formulate a policy that is flexible enough to require the maintenance of high standards in cities where they are most important, but to permit lower standards in rural areas where they are less important.

It may be that, in setting standards for new cars, the Secretary of HEW can encourage the manufacturers to meet standards in ways that will be effective for long periods with little maintenance. There is reason to think that at least one of the companies expects to be able to meet a high standard that would last for the life of the car with only nominal maintenance.

As technology improves and the amount of driving increases, it will be necessary to impose gradually higher effluent standards on cars. New standards should be announced several years in advance to permit companies to undertake research and product development.

2. Pollutant Emissions from Stationary Sources

The Clean Air Act, as enacted and amended, has funds authorized through the fiscal year 1968. The present programs should be well on the way to achieving self-sustaining operation, and it is not recommended that further funds be

granted to continue these. There is an appreciable gain to be made, however, from further stimulus of research on means to reduce air pollution. We recommend that the Clean Air Act be amended to authorize the Secretary of HEW to make grants and contracts to public and private agencies, institutions, and organizations in an amount not to exceed 75% of the cost of any project which will demonstrate a new or improved method for the prevention or control of air pollution. The purpose of this amendment is to accelerate the process of securing the application of new knowledge concerning air pollution control technology resulting from research and development effort.

Examples of the type of situations to which this grant authority would apply include improved procedures for the control of pollutant emissions from municipal incinerators or for such industry applications as removal of sulfur compounds from combustion gases.

Additional enforcement authorities for control of air pollution are necessary; we recommend that the new procedures proposed for strengthening enforcement of water pollution controls be extended to air pollution as well. In particular, the Secretary of HEW should be authorized to eliminate, at his discretion, the initial step in the abatement procedure (i. e., the conference) and to proceed directly with a public hearing on the problem. The effect of this amendment would be to accelerate the abatement procedure and thus to promote a more rapid resolution of the problem. There should be some provision for the right of entry by Federal representatives to private premises on which are located significant sources of pollution subject to abatement action. In the absence of specific authorizations for entry public authorities, in many instances, have no means of measuring the pollutant discharges or of determining what control actions should be required.

Additional authorization can be made to extend cooperation between Federal and local authorities when air pollution problems encompass large geographical areas. We recommend the formation of joint Federal-State authorities on an "air shed" basis. This would authorize the Secretary of HEW, with one or more states, to form authorities with jurisdiction over areas deemed to share a common air supply and with authority to develop areawide air pollution programs.

III

B. Solid Wastes: Rubbish, Garbage, and Community Refuse

The present expenses for the disposal of solid wastes -- including the costs to society of the disease threat and air pollution of open dumps -- are exceedingly large, and policies for research and development (in S. 306 of the 89th Congress) to reduce these expenses should be of long term benefit. Before promising techniques of compacting, reclaiming, or destroying wastes are perfected, however, many years of unsanitary conditions will have passed. It is proposed to provide incentives for attaining minimum conditions of safety and health with present technology, through grants for transforming all present open and unsanitary dumps and inefficient burning operations into sanitary landfill, composting, or incinerator operations. As new methods are developed, these should also be applied. The facilities resulting should take advantage of all cost savings possible from consolidation and large-scale operation.

Most of the pollution problems can be avoided by transforming dumps into sanitary landfill operations, in which refuse is compacted in a trench and then covered daily with earth. Frequent and ample covering allows this type of disposal to meet the Public Health Service "A" standards for solid waste disposal which does not produce disease-bearing pests nor contribute to air and water pollution.

In urban areas with limited land for sanitary landfill, the installation of incinerators leads to significant reductions in pollution. The equipment renders wastes by high temperature burning, in most instances by mechanical stoking and continuous feed so as to process more than 100 tons per day per installation. All but the most stringent standards for smoke and fly ash emission can be attained by construction of appropriate refractories and stacks, and by installation of ash removal equipment. The ASME limitations on emission which are tolerant of smoke the shade of #2 on the Ringelmann chart, would be a reasonable but not necessary basis for operation of the great majority of such facilities.

The failure to use a sanitary disposal method is primarily a matter of economics. Neither local governmental agencies nor private operators have demonstrated any desire to pay more than $0.25-$1.00 per ton for open dumping, unless considerations of neighborhood protest or disease are overpowering. Reported cost ranges are $1.50-$3.50 per ton for sanitary landfilling and $3.50-$12.00 per ton for incineration. Legal requirements imposed by State or local governments, savings on hauling costs, and the

administrative practice of directly assessing all property owners of a county or other sufficiently large area to provide disposal services, assist in controlling open dumping. But a general and widespread program of Federal assistance is necessary to eliminate open dumping and provide acceptable, safe, and sanitary treatment and disposal systems.

The extent of grants necessary for such a program is exceedingly difficult to estimate: no census of installed facilities has ever been taken, so that there is no basis for assessing necessary additions to present incinerator facilities. One sample survey by a private company does indicate that 244 cities with populations greater than 50,000 in nine regions of the country provided installed burning capacity between 1.2 pounds and 6.1 pounds per resident per day on average. If a program of conversion to incineration were required to bring the "below average" city -- including the city with no incineration -- to the level of the average, then the estimated 72.4 thousand tons per day of present incinerator capacity has to be increased to 108.6 thousand tons per day at the outset. Additions to capacity, to meet requirements from expected growth of population, urban area growth, and growth in refuse production per capita in the next five years, would have to be an additional 20 thousand tons. For each city of more than 50,000 population to have "average or better" incinerator facilities, then, the construction of 56.2 thousand tons of capacity must take place. On the basis of construction expenses of $5,000 per ton of rated capacity, the total costs of this construction would be $281 million.

A more ambitious program would not only provide "average" sanitary facilities but would incinerate without air pollution all the rubbish and garbage produced in an urban region. It is estimated (from telephone conversations with city governments) that this would require 9.6 pounds of incinerating capacity per person per day in New England, between 4.5 and 6.7 pounds in other East Coast regions, and lesser amounts (3.2 to 4.0 pounds) in the South and Southwest. According to the standards of progressive city managers in the Great Lakes region, required operating capacity and excess capacity for growth come to 10.0 pounds per capita per day. Total new tonnage, to bring each city to "top regional levels" is 105 thousand tons. The total expenditure to construct this tonnage is $512 million.

It is proposed that the Departments of HEW and HUD immediately cooperate in carrying out a census of dumping practices, and grade these in accord with sanitary standards. Subsequently a broad program of grants to local governments for construction of sanitary treatment and disposal facilities should be developed, including the allocation of a portion of HHFA funds. These grants, if complemented with local funds, should construct more than $500 million of facilities with $150 million of Federal expenditures. Grants should be made only if the facilities meet the Public Health Service standards for pest control, and either the ASME standards for smoke emission, or local smoke ordnances, or standards of HEW which are more stringent. Grants should be made within the ultimate goals of local development of self-financing arrangements, and of compatibility with regional and area plans.

4. Junk Autos

The review of present programs indicates that much has been done or is going to be done in the immediate future to remove stockpiles of stripped autos from sight. The relocation or screening of the wrecker's yards hides the lack of disposal; the expected growth of this waste makes it necessary to turn to means for speeding up and increasing the movement of junk into the scrap cycle.

1. Construction of Processing Facilities

Programs of increased disposal, to be successful, have to provide high-quality scrap steel at prices competitive with other sources of metal. A limit on the number of junk autos entering the scrap cycle is set by the contamination of present auto scrap from nonferrous materials, plastic, and dirt inherent with present processing techniques. There are new processes which convert autos into a high quality scrap by fragmentizing the entire body into small pieces and utilizing electromagnets to remove the ferrous materials. This "shredding" process produces a high quality scrap which sells for a premium. The higher scrap prices increase the demand for junk autos -- and raise the prices received by the holders of scrappable cars so as to provide market incentives for cleaning out junkyards. In three cities where there have been shredding plants for some time, virtually all scrappable junk autos have moved into the scrap cycle from distances as great as 300 miles.

The production of shredded scrap is currently over 1 million tons per year as compared with about 5 million tons of the lower quality auto scrap. Substantial increases in shredding capacity can be realized

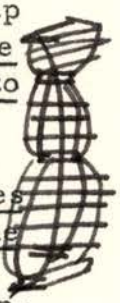
in very few years, if some Federal stimulus is provided, to the point where 20 or more plants provide 5 million tons of high-quality shredded scrap each year. This amount of tonnage, given continued or even declining output of the processors using conventional equipment, would conserve for use as scrap two to three million more automobiles in 1970 than in 1965. This would strip the junk yards and fields of the country of hulks not providing useable second hand auto equipment.

Both financial and technical assistance is required if this level of scrapping is to be attained.

Financial aid has to be forthcoming to support enterprises in cities with populations less than 1 million, and in a number of cities with larger populations. For profits to be forthcoming, a shredding operation has to be operated close to capacity of 300 thousand cars per year for a number of years; cities with an annual accumulation of 1/4 million junk autos cannot guarantee such a supply so that junk yards accumulate stripped cars. To provide these cities with shredders so as to clean out the junkyards -- but not to make profits -- Federal assistance can make certain that facilities are constructed and operated. We recommend that grants be provided for the construction of shredding facilities for processing junk automobiles; if necessary, bids be taken for the construction of such facilities at Federal expense, and for the leasing of the constructed plants. The contemplated expenditure for 10 plants -- the remaining 10 being provided by business firms as profitable operations -- is $30 million in a five year period.

Technical assistance might be necessary to establish more than one shredding plant in most of the larger cities. There are, at present, four operating plants of one corporation in four large cities that can guarantee steel scrap that is relatively free of contaminants which disrupt the steel making process. This company is in a near-monopoly position in these cities, because other potential producers have not been able to provide scrap of consistent quality and because those potential producing firms have been subject to suits for patent infringement brought by the established firm. (This firm, the Proler Corporation, has suits outstanding against the two other firms known to have established shredding facilities.) Attempts should be made to license the best process for more and newer plants, and to improve on this process. If these attempts are not successful, then, for maximum growth of facilities to remove junk autos, assistance must be provided for setting up competing plants with different processes but comparable quality of scrap output.

This assistance has to begin with research. To this date, no Government support has been applied to the improvement of processing techniques or equipment and, except for a modest in-house research program conducted by the Bureau of Mines, no support has been available for the development of promising non-traditional scrap consuming processes. Accordingly, we recommend that authority be extended to the Secretary of the Interior to enter into contracts and to make grants for the performance of research and development designed to 1) effect improvements and innovations in scrap-metal processing and preparation tehcniques, and 2) develop new processes and equipment based largely on the consumption or employment of the types of scrap that move slowly or not at all in traditional markets. The proposed authority should permit the Secretary to make such contracts and grants for the performance of research with such individuals, institutions, research establishments, and others who, in his judgment, present proposals promising a sufficient degree of technological and economic feasibility. This authority does not exist at present.



At the same time, research and demonstration plants could be set up in the large cities either directly or indirectly based upon the procedures of the one established company. This is likely to result in a complaint against Federal authority for patent infringement; it is expected (upon informal advice of the Justice Department) that such a complaint would be dismissed if the process used by the government were not identical to that of the established company. The risk of infringement would be present; the risk of not carrying out such a program is continued restricted rates of shredding of junk automobiles in the scrap cycle.

2. Junk Autos: Removal from Isolated Locations

Increasing the efficiency and quality of scrap making is believed to be the basic means for moving large numbers of junk autos out of urban locations. But uncovering acreages of land does not completely solve the junk auto problem. There are going to be unsightly stripped bodies in farm yards and auto repair shops far removed from processing plants, regardless of reduction in the national accumulation. These constitute as much of an eyesore as those close to the processing yards. The social cost of this ugliness, however, unlike that of water pollution, for example, is borne largely by the local community which must view the ugliness on a daily basis. Accordingly, it is appropriate to expect the local community to bear the largest part of the cost of removal. Federal

financing of any removal should be the minimum necessary to induce local action, and should also be guided by that element of the social costs which is borne by those who are residents of the community involved.

We recommend that Federal grants be made to any state or locality for the operation of a program for the disposal of junk automobiles, and that these grants be made conditional on the following:

(1) That 80% of the program costs are to be borne by the state and/or locality;

(2) That some portion of the non-Federal funds for the program comes from taxes on junk autos;

(3) That the program be accompanied by changes in state titling laws to permit hastened disposal of abandoned junk autos; and

(4) That disposals under the program through the scrap cycle constitute no more than 10% of the average non-program flow over the preceding five years.

The State and local agency -- most obviously, the registry of motor vehicles or the highway patrol -- should be prepared to identify the "eyesores" and to transport the offending autos to a scrap processor. In many instances the costs of transport to processors, 300 miles or farther removed, are reduced by "flattening" the autos in hydraulic presses; where this is economically justified, the assistance to local authorities should include grants and loans to purchase these presses. The means and location of junk disposal would be set before the Federal authorities agreed to provide reimbursement for any part of the expense.

The program would include an annual Federal or state license imposed on all automobiles except those currently registered for road use; auto wreckers would be explicitly exempt from such a license. Such a license would tend to move cars to the junk yards more rapidly, while the exemption for the auto wreckers would help to assure a market for cars no longer usable.

memo
① design
② (LEGISLATION IS IN WORKS)

The program has to be limited to a small percentage of all junk autos in any scrap processing market; otherwise, the activities of the public agency will disrupt the movement of the great majority of the auto bodies into the scrap cycle. For example, public removal to a scrap processor of large numbers of junk bodies reduces the price the processor pays for autos taken by private owners to his yard, so that public abandonment increases; the increase in abandonment necessitates a larger public program of collections until all junk autos come from the public agency. In this instance, then, the local agency provides a general subsidy for an entire industry, and such a service involves additional costs of public operation and surveillance.

Neither the movement of a large part of the volume of bodies into scrap production, nor the removal of particular unsightly junk, rids the country of the junkyards. Necessarily there will be junkyards as outlets for used automobile parts, and these necessarily will have solid waste disposal problems. Removal of entire junk yards to locations out of sight of highways is a solution in some instances, and screening of yards is a solution in others. But the general aim of new and further legislation ought to be to operate the junk auto industry as a processing industry with a high level of rapid production of scrap, rather than to destroy its function in a manner which adds to the number of abandoned hulks.

In the first years of the program, the source of funds should be from excise taxes on automobile sales: we recommend that, to finance programs associated with highway safety and beauty as well as with the disposition of aged or wrecked motor vehicles, there should be established in the Treasury an automotive user fund of the taxes imposed on the sales of new automobiles equal to from 1 to 2 percent of automobile sales prices. As the need for industrywide shredding capacity is met, capital expenditures should decrease. At this time, payments to local agencies, perhaps of $5-$10 million per annum, should constitute most of the disbursement; if efforts are made to move towards local programs which are self-sustaining, then the Automotive User Fund can be eliminated in favor of State taxes. There are a number of possible forms the State taxes can take, but the most promising is a "certificate" redeemable for face value at the auto wrecking yard. Such a program of taxes and removal should result in a permanent solution to the junk auto problem.

VI. Agricultural Sources of Pollution

So as to provide the basis for effective abatement in the future, proposals are made for immediate research into the extent and location of these sources of pollution. In addition, present levels of pollution can be curtailed by an immediate program of control at the critical sources.

1. A Research Program

The Federal Government has a role to play in informing the nation of the condition of its soils resources, and in collecting information on critical deterioration of soils resulting from pollution. We recommend that the Department of Agriculture establish an appropriate unit to assess continually the pollution status of our soils and to report their findings to the Congress.

2. Control of Sediment Pollution

Sediments in streams come from areas which are temporarily disturbed, as in land clearing and construction, and from agricultural surfaces in more or less continual disturbance. In order to minimize agricultural soil loss and permanently protect agricultural land, we recommend that new funding formulas be devised and applied by U. S. D. A., in the distribution of aid funds, to permit more weight to be given to the off-site benefits from control of critical source areas of pollution.

3. Control of solid waste disposal

Nitrogen, phosphorus and other elements from animal manures can be curtailed from moving into water supplies. We recommend that the authorities of the Federal Water Pollution Control Act and State Control Acts be vigorously applied to prevent further pollution and to abate existing pollution arising from farm animal and other farm wastes. New legislation is needed to authorize U. S. D. A. to cooperate with State authorities to improve necessary regulatory measures and to install and operate approved measures for the control of agricultural pollutants.

As an important part of this control program, concurrent research should be conducted on improved and more economic techniques of waste prevention and disposal. We recommend that the

U. S. Department of Agriculture and the State experiment stations place increasing emphasis on finding and using new and improved disposal methods and new markets for farm wastes, so as to lower the costs of disposal.

4. Control of Misuse of Pesticides

Pesticide use is regulated at the Federal level through the process of registration. For pesticides in interstate commerce, each formulation and each use must be approved by the Department of Agriculture on the basis of evidence supplied by the manufacturer as to effectiveness, and, in cooperation with the FDA, on the safety of the proposed use. The label bears suitable instructions for use and precautions as to safety.

Increasing amounts of pesticides are applied from the air, and Civil Air Regulations govern this sort of application. At present nearly 6,000 planes are involved in aerial applications, up 15 to 20% from 1962. Not all pesticide misuses occur with aerial application, but the substantial fraction that do could easily be brought under Federal regulation. We recommend that the Federal Aviation Agency require a license for airplane application of pesticides and other materials, that issuance be conditioned upon demonstrated familiarity by the licensee with the precautions necessary for avoiding all hazards, that such licenses require all use of pesticides to be in accordance with USDA registered labels, and that licenses be subject to suspension or revocation for pesticide uses or applications not authorized on these labels.

G. Research, Monitoring, and Manpower

The promising projects include studies of the effect of air pollution and of the best means of shredding junk autos. These, and a number of others, have been discussed in detail throughout this Report. More general discussions of series of projects has not been undertaken, given that a President's Science Advisory Committee panel is about to submit the results of intensive study of pollution research. It is hoped that the PSAC panel will provide suggestions for research programs, as well as projects complementary to those above.

H. Federal Organization

As important as the policy proposals are the organizational means for putting them into effect. The Budget Bureau is studying these proposals of the Task Force, as well as the organization of Federal Government activities related to pollution abatement, and will recommend any organizational changes it deems appropriate at an early date.

WORKING PAPERS

Title	Date
Final Report of the Task Group on Water Pollution	September 21, 1965
Report of the Working Group on Effluent Fees	July 31, 1965
Case Studies of Effluent Fees and Enforcement Policies	August 25, 1965
Effluent Fees in the Sugar Beet Industry	August 31, 1965
Effluent Fees of the Genossenschaften in the Ruhr Valley	August 9, 1965
Report of the Task Group on Air Pollution from Motor Vehicles	August 1, 1965
The Removal of Junk Autos: Introduction	October 7, 1965
The Removal of Junk Autos: Part I	August 18, 1965
The Removal of Junk Autos: Part II	August 20, 1965

FOR UNITED STATES GOVERNMENT USE ONLY

September 21, 1965

MEMORANDUM FOR THE MEMBERS OF THE COMMITTEE ON ECONOMIC INCENTIVES FOR POLLUTION ABATEMENT

FROM: Task Group on Water Pollution

Attached is the task group's final report. The report includes an extensive discussion of Federal grant and loan programs for waste collection and treatment facilities, but also discusses several other topics.

The Committee already has the task group's report on effluent, and we have not repeated or summarized that material in the present report. The Committee also has the brief description of the study it requested of sample effluent fee schedules in the Delaware estuary. That study is now underway.

The report is the combined effort of all participants in the task group. As before, participation has been in a technical capacity; agency views have not been sought and approval is not implied.

Attachment

FOR UNITED STATES GOVERNMENT USE ONLY

Report of the Task Group on Water Pollution

I. Grant and loan programs for municipal waste collection and treatment facilities.

A. Recent program and current situation

The following table shows contract awards for construction of waste collection and treatment facilities from 1950 to 1964.

Contract Awards For Collection and Treatment Facilities
(millions of dollars)

Year	Treatment	Collection	Total
1950	107	251	358
1951	115	230	345
1952	137	225	362
1953	187	286	473
1954	229	244	473
1955	201	301	502
1956	354	305	659
1957	351	247	598
1958	389	310	699
1959	349	336	685
1960	359	359	718
1961	448	380	829
1962	545	320	845
1963	679	405	1,084
1964	514	396	910

The following table shows the amounts of Federal support authorized since 1956.

Federal Support For Construction of Collection and Treatment Facilities
(millions of dollars)

Year	Collection	Treatment	Total	Amount of Loans Included in Total
1956	1	6	7	1
1957	3	55	59	3
1958	5	47	52	5
1959	4	47	51	4
1960	5	47	51	5
1961	17	55	72	17
1962	63	95	158	37
1963	130	173	303	31
1964	34	98	132	25

These data include grants and loans for HHFA - CFA, ARA, and PHS (including APW funds). Virtually all of the loans went for collection facilities. Loans for treatment facilities were: 1962, $0.2 million; 1963, $0.2 million; 1964, $0.9 million. Decreases in 1964 result from reductions in APW financing.

It is clear from these data that both total expenditures and Federal support have risen rapidly in recent years, although, owing to the APW program, they were larger in 1963 and 1964 than in 1965.

According to the 1960 Census, 76% of the population (135 million people) was served by central water supplies. 61% (109 million) was served by central sewage systems. A 1965 estimate indicates that 124 million are now served by sewerage systems, a gain of 15 million in five years. Of those now served by sewerage systems, 35 million are served by primary treatment only, and 16 million have no treatment.

B. Evaluation of future needs

In our preliminary report, we presented to the committee the following projections of needed expenditures on municipal waste collection and treatment facilities.

Needed Expenditures on Waste Facilities
(millions of dollars)

Year	Collection	Treatment	Total
1966	500	800	1,300
1967	600	1,000	1,600
1968	900	1,200	2,100
1969	1,300	1,300	2,600
1970	1,500	1,500	3,000
1971	1,650	1,650	3,300
1972	1,650	1,650	3,300
1973	1,650	1,650	3,300

This is a $20 billion program that has been drawn up by Government specialists. It is estimated that its execution

would provide sewerage and secondary treatment facilities for 80% of the 1975 population. It is estimated that 85% of the 1975 population will be served by central water supplies, so that the program would still leave 5% less of the population served by sewerage than by water supply systems. The $20 billion program would provide capital expenditures to extend and improve service and to replace worn out facilities, but not for operating costs.

The $20 billion program is based on estimates that the average per capita capital cost of collection facilities is $100, the per capita cost of adding secondary treatment facilities and needed appurtenances to existing primary facilities is $60, and the per capita capital cost of constructing a new facility with both primary and secondary treatment is $100. It is to be noted here that the cost of adding secondary treatment to a primary treatment plant that was designed with a view to the subsequent addition of secondary treatment is much less than the $60 cost quoted above.

The desirability of the proposed program can be evaluated in terms of the answers to two questions. Is secondary treatment -- about 85% BOD (biochemical oxygen demand) removal --

the right treatment level? Is 80% the right fraction of the population to reach by 1975?

1. Treatment level

The issue concerns the benefits and costs of various treatment levels. Benefits result from improved stream quality. Costs are capital and operating costs of facilities.

The absence of comprehensive measures of benefits from improved stream quality is the major stumbling block throughout the study of water quality. Here we are again forced to fall back on results from the PHS Delaware comprehensive study and the Bramhall-Mills study for Maryland. 1/

HEW has provided special calculations for the Delaware estuary. The first column of the following table shows the existing D. O. levels in the critical reaches of the Delaware estuary in and below the Philadelphia Metropolitan area. Columns 2 and 3 show the D. O. increments from secondary treatment of all municipal wastes and of all municipal and industrial wastes respectively. Columns 4 and 5 show the resulting D. O. levels.

1/ Future Water Supply and Demand, Maryland State Planning Department, 1965. See especially Chapter 10.

Dissolved Oxygen Levels in the Delaware Estuary
(parts per million)

Reach	1 Present D. O. level	2 Increment with secondary treatment of all municipal wastes	3 Increment with secondary treatment of all wastes	4 1 + 2	5 1 + 3
15	1.1	3.0	3.6	4.1	4.7
16	1.0	2.6	3.2	3.6	4.2
17	1.0	1.8	2.6	2.8	3.6
18	1.2	1.4	2.0	2.6	3.2
19	1.4	1.0	1.6	2.4	3.0
20	2.2	0.6	1.3	2.8	3.5

These data show that secondary treatment of all municipal wastes would be a great help in attaining the 3 PPM of D. O. that many regard as a minimum acceptable stream quality. The data also show, however, that the goal cannot be attained unless industrial wastes also receive secondary treatment. Another way of looking at these improvements in stream quality is as follows.

Under 1964 conditions, one or more reaches of the Delaware estuary will become anerobic about one week per summer on the average. With secondary treatment of all municipal wastes, this frequency would be reduced to about one day every other summer. With secondary treatment of all wastes, it would be reduced to one day every ten years. Thus, universal secondary

treatment would virtually eliminate the possibility of anaerobic states under contemporary conditions. Of course, these frequencies will rise through time as the total waste produced in the area grows.

A major conclusion of the Bramhall-Mills study is that low flow augmentation is a more expensive way than waste treatment to improve stream quality, at least until wastes are treated 90% or more. An additional conclusion is that, even with secondary treatment of all wastes (or equivalent abatement through product and process changes in industries in which such changes are more economical than waste treatment), a considerable amount of low flow augmentation will be necessary to maintain average summer D. O. levels of 3-4 PPM during the next decade or two These average D. O. levels are calculated to be necessary to avoid high probabilities of anaerobic streams during late summer months. There is reason to think that this conclusion applies elsewhere in the country as well as to Maryland.

It was pointed out above that, if a treatment plant is built to accomplish both primary and secondary treatment, or if it is built with the intention of adding secondary treatment at a

later date, the extra cost of secondary treatment is small. If secondary treatment is added to a plant designed only for primary treatment, it is much more expensive.

The conclusion is inescapable that widespread use of secondary treatment (or its equivalent in product and process changes) will be necessary in and around urban areas to avoid serious stream quality deterioration during the next decade or two. The conclusion applies equally to industrial and municipal wastes, and forms a major part of the basis for the task group's recommendations in its report on effluent fees. The only reason for applying the conclusion less stringently to municipal than to industrial wastes would be if the former were more expensive to treat than the latter. However, that is not the case. Almost all the wastes that enter municipal sewerage systems are biodegradable and are amendable to standard treatment methods. Such wastes are usually less expensive to treat than some of the more specialized wastes produced by many industrial processes.

It cannot be stated categorically that all new treatment facilities should include secondary treatment. It is, however, clear that secondary treatment will be appropriate in most metropolitan areas of substantial size in the near future, just

to avoid the obnoxious effects of anaerobic streams. Where conditions indicate the need for only primary treatment, new facilities should be constructed with a view to the addition of secondary treatment within a few years.

2. Population served by sewer and treatment systems

It is clear that the costs of collection and treatment facilities exceed the benefits for at least some areas of very low population density. It is therefore necessary to ask what percentage of the population it is justifiable to provide collection and treatment facilities for. In 1960, 31 million people (17% of the population) lived in counties with less than 50 people per square mile (about 50 acres per family). It is not technically and economically feasible to provide central collection and treatment facilities for many of these people. In many of these areas, other efficient methods -- such as septic tanks -- are available for waste disposal. Where feasible, their use should be required by state and local governments.

It is not true that the provision of collection and treatment facilities either does or should depend entirely on density. Some very low density areas may require facilities, and some relatively high density areas may not. Of the 16 million people whose sewerage systems provide no treatment at the

present time, 6. 3 million live in communities of over 100, 000; only 0. 3 million live in communities of less than 1, 000.

Nevertheless, it is clear that increasing urbanization has increased the percentage of the population that should be served with collection and treatment facilities during recent decades. Projections indicate that most U. S. population growth during the coming decades will continue to take place in urban areas, and that the share of the population living in urban areas will continue to rise substantially. This creates a presumption that the percentage of the population served by collection and treatment facilities should also rise.

It appears likely that most of the construction in the $20 billion program would take place in areas that are sufficiently dense that per capita costs of facilities can be assumed to be approximately constant as the percentage of the population served varies. Based on this assumption, the following table shows the estimated cost of the program for different percentages of the population served by 1975.

Cost of Alternative Programs

65% served	$13.1 billion
70% "	15.8 "
75% "	18.2 "
80% "	20.5 "
85% "	23.3 "

At percentages above 85, the costs would probably rise at a much faster rate.

It is not really necessary to decide now whether 75%, 80% or 85% of the population needs to be served in 1975. To meet even the lowest of those figures will require rapid acceleration of national expenditures on collection and treatment facilities. If it is agreed that the appropriate 1975 percentage served is probably not less than 75, then measures should be undertaken now to accelerate the rate of spending at something like the feasible rate of expansion of firms who specialize in this kind of construction. The most needed facilities should be built first, and the 1975 target can be modified gradually as later and better data become available.

The recommendation of the task group is that measures should be adopted to implement something like the $20 billion

program. Secondary treatment is a reasonable goal for municipal wastes in virtually all urban areas of moderate size and for some of quite small size. In those areas where local conditions indicate the need for only primary treatment, provision should be made at the time of construction for the addition of secondary treatment within a few years.

C. Federal Government policy

The $20 billion program described in section B would require a substantial increase in the proportion of the Nation's productive resources devoted to the construction of collection and treatment facilities. The schedule in section B shows a compounded growth rate of expenditures of nearly 15% over the eight-year period (faster in the early years, less in the latter years). This is about three times the projected growth rate of real GNP and would more than double the percentage of GNP spent on construction of these facilities by 1973.

It seems clear that this cannot be achieved without substantial increases in both Federal and non-Federal expenditures.

However, merely increasing Federal financial assistance is not sufficient. It is necessary to use Federal grant, loan and other programs to shift the financing of municipal and

industrial water supply and pollution abatement to a sound user fee and effluent fee basis, and to improve local planning and management.

These two aspects of the program will be discussed in successive sub-sections.

1. Level of grant and loan programs.

Existing legislation authorizes $100 million for 30% grants (with stringent size limitations) for treatment facilities, and $200 million for 50% grants (no size limitations) for water supply and collection facilities. There are also loan programs in Commerce, HHFA and USDA.

It is clear that there is room for choice as to the appropriate level of Federal participation in these programs. A stepped-up enforcement program, or a system of effluent fees that applied to municipal as well as to industrial wastes, would provide inducement to increase local financing with little increase in Federal financing. However, on grounds both of equity and political acceptability it is probably unrealistic to think of decreasing the percentage participation of the Federal

Government over the coming years if anything like the $20 billion program is to be attained.

A more realistic margin of choice is between increasing the percentage participation and removing the size limitation. For any given total Federal contribution, 30% grants can provide assistance for more treatment facilities than can 40% or 50% grants. Provided there is sufficient inducement for state and local governments to provide the other 70%, it follows that more facilities will be constructed with 30% Federal participation than with a higher rate. The principal inducement available are a vigorous Federal enforcement policy and effluent fees that apply to municipal as well as to industrial wastes.

A theoretical case can be made for greater Federal participation in treatment than in collection facilities. Collection facilities mainly benefit those whose wastes are collected, whereas treatment mainly benefits potential downstream users. However, it is probably not realistic to think of reducing the participation rate for collection facilities.

The following table shows the Federal support that could result over the next eight years if the $20 billion

program were carried out with existing Federal participation rates (50% for collection facilities, 30% for treatment facilities); but with no size limitations.

Potential Federal Support Under Current Participation Rates
(millions of dollars)

Year	Collection	Treatment	Total
1966	250	240	490
1967	300	300	600
1968	450	360	810
1969	650	390	1,040
1970	750	450	1,200
1971	825	495	1,320
1972	825	495	1,320
1973	825	495	1,320

This table suggests the need for substantial increases in Federal funding if the $20 billion program is to be carried out. That the increases are not beyond reason is suggested by the following calculation. Congress has just raised the HEW authorization to $150 million. The new HHFA authorization provides $200 million for water supply and waste treatment facilities. The Economic Development Act provides $250 million for public facilities. There is a pending authorization of $50 million for the Farmers Home Administration. If $100 million

of the HHFA authorization, $150 million of the Commerce authorization, and $25 million of the USDA authorization went for collection and treatment facilities, the total available would be $425 million. Although this is still short of the 1966 figure of $490 million in the above table, it is close.

The task group recommends that authorization be sought to meet the above schedule at least approximately during the coming years. The level of the Federal programs should be reevaluated on a continuing basis as data and experience accumulate. Congress has recently removed the size limitations on PHS grants provided States contribute 30% of costs in excess of $1.2 million ($4.5 million if communities band together). It is likely that this measure will suffice to induce adequate local contributions provided the recommendations for improved enforcement procedures and effluent fees are adopted. We are not persuaded of the need to raise the percentage of Federal participation in these programs at this time.

We assume that Congress will shortly pass, and the President will sign the bill removing size limitations on HEW grants.

We recommend the removal of all restrictions on the size of cities that can be assisted by Federal granst (except the requirement for State participation).

We recommend that at least part of the funds for HEW be distributed directly by the Secretary of HEW instead of going through the States. One way to do this would be for the Secretary to distribute directly those funds in excess of $100 million.

2. Improving local planning and management

   a. It is often most efficient to have industrial wastes treated by municipal treatment plants. We recommend that granting agencies continue to encourage industries to connect with municipal collection systems where feasible. This can be done by technical assistance, leadership and guidance. It can also be done by facilitating the formation of special local government districts for wastes where necessary. Such districts could provide treatment not only for industrial plants in the area, but also for population in the area. They possess taxing and borrowing power and are eligible for Federal financial assistance.

Further incentive for industrial firms to connect with municipal systems will be provided by the proposals for improved enforcement procedures and effluent fees.

b. The task group recommends that grants not be extended to operation and maintenance costs at this time. Such grants would be difficult to administer. Instead, we recommend that greater efforts be made -- through persuasion and technical assistance -- to encourage communities to employ well qualified supervisory and operating personnel.

We also note that improved enforcement measures and effluent fees would provide communities with added incentives to operate treatment facilities efficiently.

c. We believe it is important for municipal collection and treatment facilities to be placed on a self-financing basis. Communities should institute appropriate user fees to deter excessive use of collection and treatment facilities and to make it possible to shift the burden of financing from the general taxpayer to users of facilities. Federal grant programs

should be viewed as temporary assistance to communities during the transitional period. Program administrators should use technical assistance and persuasion for this purpose. They should be authorized to require a plan for the establishment of adequate user charges as a condtion for grant assistance when they deem it necessary.

d. It is important that sewerage systems be consistent both with metropolitan area-wide development plans and with river basin development plans. We therefore recommend that

1. HHFA grants for sewer facilities be conditional on certification by the Secretary of HEW that any waste material carried by the facilities will be treated so as to meet appropriate Federal or other water quality standards.

2. HHFA and HEW grants be conditional on certification by the Administrator of HHFA that the facilities conform to an areawide sewerage system as part of a comprehensive plan for the development of the area.

II. Registration of withdrawals and waste discharges

At the present time, the country is badly handicapped by lack of data on withdrawals from and effluent discharged to water bodies.

Such data are needed for research, and to permit evaluation of the scope and nature of water quality problems, and of alternative public policies. Such data are also needed to implement existing enforcement policies. However, withdrawals and discharges are not ordinarily market transactions, and the usual sources of market data do not provide information on their magnitudes. It is worth pointing out that better data on withdrawals and discharges are a prerequisite for almost any extension of public policy in the water pollution area, whether by improved enforcement procedures or by effluent fees. Growing public and private concern over pollution amply justifies measures to obtain better statistical data.

The task group recommends the adoption of a system of compulsory reporting of withdrawals and discharges. All identifiable discharges should be included, whether industrial, municipal or other. Conditions as to the categories and measures of discharges to be reported should be set by the Secretary of HEW.

It is important that these data be tabulated and made available to interested parties for research and other purposes. Since data on withdrawals and discharges for individual industrial plants may provide information to competitors and others on the detailed operation of the plant, it may be necessary to publish the data in a way that protects confidentiality.

III. Comprehensive River Basin Surveys

The Federal Water Resources Council should re-examine its standards for comprehensive planning to ensure that all aspects of water are adequately covered. Once this has been done, single purpose surveys needed by any agency including those of the Public Health Service should conform to the standards and to the framework established by comprehensive plans.

IV. Federal installations

Instructions are being issued to require secondary treatment or its equivalent to wastes from new Federal installations. Although this is a desirable step, it seems clear that further steps will be desirable as part of next year's pollution program. Congress has indicated considerable and well-founded concern with water pollution from Federal installations. Furthermore, the major proposals under consideration by the Committee are intended to apply to existing as well as new non-Federal facilities. It would place the Government in a bad light if it were to propose effluent fees or a strengthened enforcement program for existing non-Federal polluters, but to do nothing about pollution from existing Federal installations.

The task group recommends that appropriate instructions be drawn up regarding pollution abatement from existing Federal installations.

V. Water Resources Council

a. In order to carry out the investigative and coordination functions that are needed and that Congress has assigned to it, the Water Resources Council will need a strong permanent staff with strong economic capabilities. The amount Congress authorized for this purpose appears to be inadequate and the task group recommends that a larger authorization be sought.

b. The Department of Commerce has substantial responsibilities related to water resources. It would seem desirable to amend the Water Resources Planning Act to include the Secretary of Commerce on the Water Resources Council.

c. The Secretary of the new Department of Housing and Urban Development should also be a member of the Water Resources Council.

VI. Enforcement

This task group has not undertaken extensive study of enforcement since another task group has been assigned that task. We do, however, want to recommend three changes in the Water Pollution Control Act.

a. The Secretary's jurisdication for initiation of enforcement measures should be broadened to include all interstate and navigable waters, without having to prove interstate damage to health and welfare.

b. Responsibility for seeing that action is taken to carry out pollution orders should be placed on the Secretary. Section 8(f)(2), requiring the permission of the State Governor to bring suit against intrastate polluters, should be eliminated.

c. Section 5 places responsibility on the States for drawing up pollution control plans and specifies the conditions under which the Secretary must approve the plans. This Section should be amended to require the Secretary of HEW to see that State plans are consistent with the PHS plans authorized under Section 2a of the Act.

VII. Research

This task group has not surveyed this subject since that task has been assigned to another task group. We are, however, particularly impressed with the inadequacy of present knowledge in two closely related areas.

a. A good deal is known about the assimilative capacity of fresh water streams. Substantial research is underway on this subject, and Federal support should be increased. Much less, however, is known about the assimilative capacity of tidal waters. Much of our future effort to improve water quality will be directed at estuaries, bays, and harbors.

The Potomac and the Delaware are examples. Much more research is needed on this subject.

b. Much more information is needed on the behavior of water in reservoirs so that they can be operated efficiently to deliver oxygenated water for water quality control purposes.

This task group may wish to present other research recommendations after we have seen the PSAC panel's recommendations.

FOR UNITED STATES GOVERNMENT USE ONLY

JUL 31 1965

MEMORANDUM TO THE COMMITTEE ON THE USE OF ECONOMIC INCENTIVES FOR POLLUTION ABATEMENT

FROM: Working Group on Effluent Fees

The working group has completed its study of effluent fees for the control and abatement of water pollution. The attached report is submitted for consideration by the Committee.

The report is the joint product of staff from all agencies represented on the Committee. Participation on the working group was in a technical capacity; agency views have not been sought, and approval is not implied.

Attachment

FOR UNITED STATES GOVERNMENT USE ONLY

Effluent Fees for Water Pollution Abatement

I. Economic considerations

In its study of effluent fees, the working group could not undertake original investigations of the extent of water pollution or of the benefits and costs of abatement. The group did, however, attempt to review available data.

Increases in the amount of waste generated by our society are closely related to the growth of population and economic activity. In the absence of special public and private measures, a substantial part of this waste is discharged into natural bodies of water. Since the capacity of streams to assimilate wastes does not naturally increase through time (and may decrease as man's use of water reduces stream-flow), water quality tends to deteriorate. The most important ways of abating and preventing pollution are the treatment of wastes in public and private facilities, modification of industrial products and processes so that less waste is produced, disposal of wastes by other means (e. g. , by drying and burning), and increasing the assimilative capacity of streams by such means as building dams and reservoirs to augment low flows.

Federal, State and local Government efforts during the last decade have resulted in some progress in limiting the discharge

of wastes into the nation's water bodies. Many municipalities have built sewer systems and treatment plants, frequently with Federal assistance. There has been an increasing use of at least primary treatment by industry, and some efforts to redesign processes to reduce the generation of wastes. In many streams discoloration, odors and floating solids are less prevalent than they were a few years ago. Nevertheless, many streams suffer heavy seasonal pollution to the extent of becoming anaerobic during parts of the year. Many more streams suffer enough pollution to impair their use for some forms of recreation, for municipal water supply, and for some industrial uses.

Projections indicate that the generation of wastes will grow rapidly in the coming decades. It is clear that much greater public and private effort at abatement will be necessary in the coming years if extensive deterioration in stream quality is to be avoided.

Pollution abatement now costs substantial sums of money and will become more expensive in the future. The Federal Government now contributes more than $100 million a year for construction of waste treatment facilities; State and local Governments spend over $1 billion. Industry spends substantial but unknown amounts on treatment facilities and process redesign to reduce waste discharges.

Although comprehensive national data are lacking, investigations for particular areas, most notably in the Delaware estuary, have provided some information on the costs of further pollution abatement. Among the many dimensions of water quality, the simplest and most important single measure is the number of parts per million of dissolved oxygen. In the Delaware, some preliminary calculations indicate that the capital cost of additional treatment facilities that could raise water quality to the modest level of 2 p.p.m. of dissolved oxygen might be about $28 million. Total annual costs (including interest, depreciation, maintenance, operating and replacement costs) might be in the neighborhood of $5 million. Alternative methods of abatement, especially industrial process redesign, might be somewhat cheaper, but estimates have not been made. Two important lessons can be drawn for water quality management from available studies. First, flexibility is necessary to achieve economical pollution abatement. Calculations for the Delaware suggest that it may be twice as expensive to achieve a given stream quality by uniform treatment levels throughout the estuary as it would be to achieve the same stream quality by selective treatment levels at different points. This finding indicates the advantage of precise and detailed river basin planning. Second, economical pollution

abatement requires careful consideration of a variety of abatement techniques. Available evidence indicates that exclusive reliance on low flow augmentation is an expensive way to improve stream quality. A combination of high treatment levels (or other means of reducing waste discharges) and modest amounts of low flow augmentation appears to be much more economical. The combination of abatement methods that is most economical will vary from stream to stream and can only be ascertained by careful study of individual basins.

Measurement of benefits from pollution abatement has proven to be very difficult. In a major investigation in the Delaware, ranges of desirable quality are being established for a variety of uses. For most withdrawal uses, desired quality levels can be obtained by treatment before use, the cost of which depends on the quality desired and on the quality of the water withdrawn. Most difficult is the measurement of benefits from higher quality for instream uses such as fishing, boating, swimming and water-oriented park activities. Although there are no data to report on the benefits of pollution abatement, it is instructive to point out that the $5 million estimate reported above as the annual cost of maintaining a 2 p.p.m. oxygen quality alone in the Delaware estuary amounts to less than $0.50 per year per resident in the vicinity of the estuary. Recreation benefits alone would presumably approach or surpass this figure.

There are three major economic arguments for effluent fees. First, effluent fees will induce those who generate wastes to reduce discharges into streams. Although it is not known by how much waste discharges will be reduced in response to any particular schedule of fees, it is known that there are a variety of means by which discharges can be reduced, and it is reasonable to believe that the response to even modest fees would be substantial. Furthermore, effluent fees permit more flexible and economical responses than do other means of control. It is probable that in response to effluent charges, industries would expand their research and development aimed at more economical control of their own pollutants. Devices and methods developed by the ingenuity of this largely untapped pool of talent would almost certainly contribute to more effective pollution control in general. Second, to the extent that dischargers find it economical to continue to discharge wastes and to pay the fees, the cost of the resulting low water quality is imposed on those who benefit from the production and other activities that generate the wastes. Third, effluent fees provide revenues that can be used to finance other methods of pollution abatement -- such as low flow augmentation -- to the extent that effluent discharges are not deterred.

Effluent charges would be a valuable addition to the public policy tools available for pollution abatement. They could provide

an efficient mechanism for raising stream quality above levels achievable by primary treatment. Ideally, effluent fees should be set at the level such that the costs of further pollution abatement would just exceed the benefits resulting therefrom. Some of the difficult calculations necessary for this purpose are now being undertaken by the PHS in comprehensive water quality studies and by river basin compact commissions.

It is not desirable to have uniform schedules of effluent fees over the entire nation, since the benefits and costs of high quality water will vary from basin to basin. However, some degree of uniformity is desirable and, in particular, some mechanism is needed to avoid setting fees excessively low in some basins in order to attract industry or other polluting activities.

It is not possible to say what a reasonable schedule of effluent fees would be. However, the data quoted above for the Delaware estuary can be used to establish a rough order of magnitude. Since those who generate wastes have the alternative of treating their wastes rather than paying the fees, collections are unlikely to exceed the cost of treatment. The $5 million estimated annual cost of treatment therefore provides a rough approximation to the probable collections of effluent fees in the Delaware estuary for this modest

increase in the dissolved oxygen level. It would be useful to compare this amount with the value added of the twenty industrial firms whose wastes were included in the Delaware study, but data are not available. It is known however, that the major waste producing industries in the estuary are chemicals, petroleum, primary metals and paper products. In 1963, the value added produced by these industries in the Delaware estuary was well in excess of $1.5 billion. This crude comparison suggests effluent fee collections of less than one-half of one percent of value added even in heavy waste-producing industries. In evaluating this calculation; it should be recalled that it is based upon a modest degree of abatement and includes only the most important one of several dimensions of pollution.

This calculation creates a presumption that reasonable fees would not create undue disruption in the average industrial firm. Nevertheless, it is likely that some hardship would be created in a small number of marginal firms. One possibility would be a temporary, declining forgiveness provision in cases of established hardship, somewhat similar to provisions in the Trade Expansion Act. Another possibility would be to have the effluent fees come into effect only gradually, say over a three-to-five year period.

Effluent fees should be used as supplements to, rather than substitutes for, other methods of control. Procedures now available for direct regulation of waste discharges should be retained. In some cases, dischargers may fail to respond to even a minimum extent to effluent fees. In other cases, an especially high quality may be desirable on certain streams or certain stretches of streams where water is used for special purposes such as public water supply or swimming. Although effluent fees will be effective in dealing with many kinds of wastes, some wastes, especially toxic ones, must be dealt with by other means. Finally, it may be difficult to deal with some kinds of pollution with effluent fees. In this category, one should include sediment from agriculture and construction, acid mine drainage, salt used to melt ice on highways, and pesticides and fertilizers used on agricultural land.

II. The problem of implementation

There are many ways in which effluent charges could be implemented. In choosing among them, two major issues must be resolved: first, whether the imposition of effluent charges should be part of a general attempt to improve Federal and State mechanisms for water quality planning and control; second, whether it is desirable to add to our already complex set of water resources institutions.

A few paragraphs on the history and current status of water quality planning will place these issues in perspective.

Water pollution is a serious national problem which has been evident since at least 1948 when the first general Federal water pollution control act was passed. Prior to that time, Federal concern was mostly confined to control of pollution of coastal waters from oil by ships under a 1924 statute and to research and surveys, and technical assistance to State and local governments, chiefly in regard to waterborne disease hazards. These efforts were authorized under the general Public Health Act.

Congress made the Federal Water Pollution Control Act permanent legislation in 1956 and strengthened and extended its application in 1961. The Act now provides for technical assistance, financial assistance for municipalities to build sewage treatment plants, comprehensive planning, research, basic data collection and analysis, and enforcement.

The Act is administered by the Secretary of HEW. Interagency and Federal-State cooperation is also required by the Act. Other Federal agencies also have significant authority in water pollution control, notably the Corps of Engineers, the Fish and Wildlife Service, the Geological Survey, and the Bureau of Mines.

Except for the Corps of Engineers in regard to the 1924 statute involving pollution of the coastal waters by oil from shipping, only HEW has enforcement and general comprehensive planning authority for pollution control.

Since 1948, 35 enforcement cases have been undertaken involving interstate waters and two cases in intra-state waters. Six of these cases were instituted within the past year.

Studies to develop programs for the comprehensive control of pollution by major river or drainage basins, in conjunction with the States and other interests, have been completed or are under way in the Arkansas-Red, the Great Lakes, the Chesapeake-Susquehanna, the Delaware Estuary, the Columbia, the Hudson-Champlain, the Southeast, and the Ohio. Two new studies of this kind will be started in F. Y. 1966: the California region and the Missouri Basin. These studies are designed to determine what wastes enter the rivers, their sources, their magnitudes, and effects. The probable future situation, taking into account economic growth and change in the basins in time and in place, is also calculated. The studies, therefore, not only determine the present situation but also seek to anticipate future problems and to establish a course of action that will offset them. The general objective in each basin study is to establish

the present and probably future pattern of water uses, and to prepare a program of waste disposal regulation on the basis of economic analysis of alternative and incremental benefits and costs that will assure the necessary water characteristics for the uses. The most difficult aspect is to assure the in-stream uses such as fishing, recreation, and aesthetics, for the quality considerations for withdrawal uses can be met by water treatment. The programs will require continual monitoring and periodic updating to acknowledge changing conditions. Some form of organizational arrangement by major basins or regions will be necessary to manage the program of controls, taking into account combinations of treatment, flow regulation, land use controls, waste retention, and seasonal adjustments.

The most effective application of an effluent charge system would be on a regional basis; that is, it should be based on a significant stretch of a river or on a major basin to allow for the interplay of treatment, flow regulation, land use, and other means in meeting the control problem. There is evident need for an administrative arrangement to operate the payment system equitably and efficiently. Whatever arrangement is established to carry out the comprehensive programs of control could include the payment system.

At the present time, there are several water resource agencies with varying powers in particular major drainage basins. Most of these possess only planning and coordinating authority. One agency, however, the Tennessee Valley Authority, possesses a wide range of planning, construction, and operating powers completely as a Federal entity; but has no pollution control authority. Another agency, the Delaware River Basin Commission, is a recently-formed hybrid interstate compact organization with the Federal Government as a full contractual member.

There are at least four other formal interstate compact agencies dealing solely with water pollution control on a planning and coordination basis. These are the New England Interstate Sanitation Commission, the Interstate Sanitation Commission (New York, New Jersey, and Connecticut, with jurisdiction over the coastal water of those States), the Interstate Commission on the Potomac, and the Ohio River Valley Water Sanitation Commission (ORSANCO). The Federal Government participates in the activities of the latter two agencies. None of these agencies has operating authority, and only two of them -- the Interstate Sanitation Commission and ORSANCO -- possess enforcement authority.

Each of the interstate agencies receives Federal financial assistance for program development under the authority of the Federal

Water Pollution Control Act. Approximately $300,000 was allocated this year. With the possible exception of the TVA and the Delaware Commission, none of the above agencies now has legal authority to levy effluent charges.

There are several other interstate compact agencies dealing with various aspects of water resource management besides pollution control. Examples include compacts on the Tennessee River, the Arkansas River, and the Red River of Texas-Oklahoma, and pertaining largely to the apportionment of flows among the States. One interstate pollution control agency, on the Red River of the North, has become defunct through lack of State appropriations.

There are several water resource planning and coordinating committees for major river basins, composed of Federal and State water resource agencies. Such committees exist for the Columbia River Basin, the Missouri Basin, the Arkansas-White-Red Basin, the Southeast River Basins, and the Pacific Southwest area.

The Water Resources Planning Act of 1965 augments this planning and coordination situation by authorizing the establishment of river basin commissions with State-Federal memberships under the supervision of a Federal Water Resources Council, a cabinet level agency.

Despite this multiplicity of regional and major drainage basin agencies, only the TVA and the Delaware Basin Commission possess operating authority. Therefore, it is unlikely that an effective system of effluent charges could be applied without the establishment of some additional administrative arrangements. Because water pollution control is directly related to other aspects of water resource development and management, it appears likely that the arrangement must take into account other functions besides water pollution control.

In view of these recent developments, there appear to be two alternative ways of implementing effluent charges that ought to be considered.

The first way would simply add effluent charges to the existing set of policies to improve water quality, making no basic change in the institutions involved.

The second way would institute effluent charges as part of a major new set of institutions for improving water quality management. These institutions would employ effluent charges as one among a variety of policy instruments designed to tailor water quality management to the needs and potentials of each major river basin.

The following six points specify the main outlines of the proposal.

1. Establishment of regional authorities.

Federal legislation would provide encouragement and a framework for the development of effective River Basin Authorities. The Federal legislation would specify that the Authorities would ordinarily be created by compacts among two or more states. Where a river basin is situated in only one state, the regional Authority would be established by the single state. To ensure that all major basins of the country would be covered by these Authorities, the legislation could indicate in broad terms the geographical area of each, leaving the exact boundaries of each Authority to be specified by the states involved. The Federal legislation would further specify that the interstate compact should confer upon the Authority adequate powers:

a. to prepare and continually update a comprehensive plan for optimum development of the basin's water resources;

b. to regulate the discharge of pollutants from all private and non-Federal public establishments within the basin, including the power to prohibit discharges of particularly harmful pollutants;

c. to abate and control pollution by metering effluent discharges, physical inspections, imposition of effluent

charges on those who discharge wastes, levying user charges for the use of waste treatment facilities and related activities;

d. to plan, construct, finance and operate water resource facilities to complement existing and future facilities of other government bodies, private firms or individuals; and

e. to perform such other functions (such as advising or otherwise dealing with Federal agencies and rendering technical assistance) as may be necessary to achieve the goals of pollution control and abatement.

The compacts would be administered by appointees of the governors of the member states. The Federal Government should not be a signatory party to the compacts. There should, however, be a non-voting Federal representative on each compact, who would be a full participant in all deliberations.

2. Comprehensive plan.

It is recognized that pollution control cannot be carried on independently of other water management activities designed to satisfy the demands for withdrawal and instream uses. Therefore, the Authorities' comprehensive plans should give due consideration to

all significant aspects of water resource development, especially as they relate to water quality. The plan should include an inventory of existing water uses, waste dischargers, waste treatment facilities and water quality studies. It should include planned future treatment facilities, projections of future instream and withdrawal demands for the basin's water, and projections of future waste loadings and water quality. It should also include estimates of benefits and costs of pollution abatement, and a statement of the desirable kinds and levels of water quality improvements by waste prevention, waste treatment, low flow augmentation, etc. Finally, the plan should include the proposed schedules of effluent and user charges that are needed to achieve the desired water quality. It must be brought up to date frequently.

In developing its comprehensive plan, the Authority would conduct studies and investigations, hold conferences and public hearings, and compile data. It could, of course, utilize data and findings of the PHS water quality studies and other studies now underway. As appropriate, these materials should be published and otherwise disseminated to interested parties. The comprehensive plan, and periodic revisions, should be published.

The authority would be empowered to find that a proposed water resource facility would duplicate existing facilities, that it is poorly

designed or lacks adequate treatment facilities, or that it is likely to aggravate pollution problems in the basin. This would give the Authority a virtual veto power over all non-Federal water resource facilities.

3. Effluent and user charges.

To control and abate pollution, the Authority would have, among others, the power to impose effluent charges commensurate with such discharges. The schedules of charges, which would be part of the comprehensive plan, would be set at levels necessary to achieve the desired water quality, as indicated by benefit and cost estimates made by the Authority. It would be appropriate for the authority to be empowered to impose a variety of user fees on those who benefit from improvements in the location, time, elevation, quantity or quality of water available as a result of water management. Examples might be user fees for recreation, boating and navigation, diversion fees, and fees for hydroelectric "head." It is important that, at least after an initial period, the Authority's activities be largely financed through such charges and fees, and that they provide at least partial reimbursement for Federal construction activities (e.g., by Corps of Engineers and Bureau of Reclamation).

4. Federal incentives.

In order to qualify under the legislation, an Authority's comprehensive plan would have to meet the criteria stipulated under 2 above, and would have to be approved by a Federal Government body. The Water Resources Council, established by the Water Resources Planning Act of 1965 could become the appropriate agency for this purpose. Major revisions in the comprehensive plan should also be approved by the same agency. The requirement for Federal approval (in addition to the obvious need for State approval) would make it possible to ensure that States were providing more than token support for the Authority, that the effluent fees were appropriate, and that there was a reasonable degree of uniformity across the Nation. It would also provide a mechanism for ensuring that an upstream Authority (say, on the Ohio) took adequate account of the interests of a downstream Authority (say on the lower Mississippi). The legislation to implement this proposal could be an amendment to the Water Resources Planning Act which would, among other things, provide a means for transforming the river basin commissions into the Authorities described above.

Incentives for the prompt establishment of appropriate Authorities, and for the prompt formulation of an acceptable plan would be provided as follows:

(a) All Federal agencies responsible for

(1) the construction or operation of Federal installations or projects,

(2) the procurement of goods and services, and

(3) the administration of financial assistance programs (grants, loans, or insurance of loans or the liabilities of financial institutions) relating to activities contributing to pollution would be required to issue appropriate regulations to assure that contractors, beneficiaries, or recipients of Federal expenditures or financial assistance adopt such pollution control measures as may be necessary to abate pollution.

(b) Substantial Federal financial assistance would be necessary for the Authorities during their initial years. Two types of financial assistance are suggested:

(1) 50 percent matching grants to cover the Authority's administrative expenses during its first five years of operation; and

(2) 66-2/3 percent grants to pay for the major part of the cost of the comprehensive plans. Both forms

of assistance should be contingent on the establishment of an Authority meeting the conditions stated above, on the progress made in formulating a plan, and on the acceptability of the completed plan.

(c) Finally, legislation could stipulate that, if an Authority had not been established for a particular river basin within two or three years, and an acceptable plan formulated within five or six years, the Water Resources Council would be required to recommend an alternative institutional mechanism for water resource development in that basin.

(d) The legislation would state explicitly that all existing Federal programs involving construction, grants-in-aid, or direct loans for water projects, including water supply, sewage disposal, flood protection, watershed management, recreation, navigation, fish and wildlife, irrigation and hydroelectric power would not be affected by its provisions, provided that no Federal agency could expend, or make commitments for the expenditure of, Federal funds for the aforementioned projects within a river basin area unless:

(1) there exists an approved comprehensive plan (established pursuant to 2 and 4 above) for that basin, and

(2) the Authority (on the Water Resources Council in the case of Federal projects) certifies that the project or facility is consistent with the plan.

This requirement could come into effect five years after passage of the Federal legislation.

(e) The Federal Water Resources Council would be required to establish national water quality criteria to assist in evaluating plans submitted by basin Authorities. These criteria should make due allowance for the desirability of regional variation in water quality and water use. On behalf of the Federal Water Resources Council, a Federal agency would be required to institute a pollution control monitoring service. This service would be responsible for periodic measurement of pollution of the streams and waterways within the regions and river basins.

5. Other Powers of the Authority.

In addition to its powers discussed in detail above, the Authority would be expected to have the following powers subject to usual appeal and judicial review:

(a) to acquire, construct, own and operate water resource facilities and to finance such facilities through borrowing,

receipt of grants, levying user charges and other financial resources (whether an Authority does, in fact, use this power would largely depend upon the adequacy of municipal and industrial water resource facilities);

(b) to fix, alter and revise rates, rentals and charges for the use of facilities it may own or operate and for products and services rendered thereby, without regulation or control by any state agency (should the Authority operate facilities, the user charges levied presumably would not be subject to review by a state public service commission);

(c) to render technical assistance to establishments within its area with respect to design and construction standards, industrial plant location, pollution abatement devices;

(d) to receive technical assistance from, or to participate in research projects conducted by, Federal, State or local agencies;

(e) to exercise the power of eminent domain to acquire by condemnation property within the basin for any project or facility otherwise authorized;

(f) to prepare an annual budget for current expenses; and

(g) to submit an annual report on its programs, operations and finances to the legislative bodies of the signatory states, to the Congress and to the public.

6. Authority Financing.

It is contemplated that during the early years of its operation the Authority's administrative expenses would be financed by a combination of Federal and state grants. Similarly, the initial funds for the comprehensive planning would also be obtained from Federal and state grants. However, in time, as the effluent charges begin to produce a steady stream of revenues, the Authority would have its own independent source of funds.

It is assumed that the interstate compact authorizing the Authority would prescribe in detail the Authority's power to issue bonds to finance capital facilities. Article 12 of the Delaware River Basin Compact is an example of appropriate language. The compact would authorize the issuance of bonds, secured by revenues and other available resources (effluent charges).

Since the Authorities would be creatures of states, they probably would be construed for tax purposes as "a political subdivision of a state." Accordingly, the bonds issued by the Authority would be tax-exempt with respect to the interest income thereon. It is further assumed that the compact would state explicitly that the Authority may not pledge the credit of the Federal Government, the signatory State Governments or any political subdivision thereof for payment of the bonds.

Finally, the compact would state explicitly that the Authority does not have the power to levy taxes on persons or firms situated within the river basin area.

IV. Alternate proposal

1. The premises

This alternate proposal rests on the following premises:

a. That it is desirable to recognize the existence and to build on the present system of coordinated Federal-State water resources planning and development;

b. That the present system takes into account all aspects of water resource use and function including water pollution control and water quality management, though it has many apparent shortcomings;

c. That the recently signed Water Resources Planning Act, which establishes a Water Resources Council (the Secretaries of Army, Agriculture, Interior, Health, Education and Welfare, and the Chairman of the Federal Power Commission), authorizes Federal-State river basin commissions for planning and coordination of all aspects of water resource development and provides financial assistance for State plans. Therefore, it

constitutes the basis for considerable improvement in the planning and coordination system;

d. That the optimal allocation of resources is determined through the planning and decision process which is manifested in comprehensive river basin development plans and will be expressed through the regional or basin commissions and through the Water Resources Council to the Executive Office of the President, the Congressional committees, and the Congress. This process provides the means for determining objectives, for the adjustment of interests, the resolution of conflict, and therefore, for the analysis of data and the establishment of scale, timing, and scheduling of projects. The budgetary and appropriation process is a part of this planning and decision process;

e. The patterns of Federal-State and interest group relations at all levels and branches of government revealed in this process reflect value judgments and political power affecting economic considerations and optimization.

On the basis of these premises, therefore, the following proposals are made to modify and improve the law for water resource development.

2. The setting

The major difficulty in water resources planning has been in reaching the decision as to what should be done in time and place. Organization and procedure are both directly involved. The key problem has been to provide the means and the procedure for decision, taking into account the hydrologic and economic considerations and relating the individual basins to national goals. A tough problem is involved in determining the proper basin size for planning. A long history marked by much frustration and some improvement lies behind the present situation. The Water Resources Planning Act marks a major step in providing and improving the means and manner for coordinated comprehensive planning. All aspects of water resource development and interests, including governmental and private, will be emphasized and intensified. Operating authority to implement, adjust, and follow the plan remains with the agencies now involved. The activities of those agencies, however, will have to acknowledge the objectives of the plan. Those features of the plan which require management of reservoirs or other river system controls might be covered by instructions from the commissions to the operating agencies. Adjustment of the plan to changed conditions can take place through the participation of the operating agencies in the discussions and other procedures of the river

basin commissions and through the continual interchange of information and data. Unilateral planning and decision will be discouraged.

Water quality objectives will be a part of the comprehensive plans developed by the commissions with the participation of both Federal and State pollution control agencies and other interested parties. The plans could become the basis of the operating instructions of the agencies for the management of the basins. The Federal water pollution control agency, in conjunction with the States and other Federal agencies, will continue to operate monitoring systems to assure the fulfillment of the water quality objectives. The commissions and the operating agencies would make known to the governmental and private entities using the rivers for waste disposal and other purposes not only the water quality objectives but the hydrologic characteristics expected to prevail periodically and seasonally by specific reaches of the rivers. The waste-disposing entities would respond to this knowledge according to their own ingenuity as influenced by their economic situation and the regulatory system. That is, the entities would respond so as to meet the public objectives and to minimize the cost to themselves. The monitor system would detect any deficiencies and provide notice to the entities and to the responsible agencies for correction.

Adequate State and local government authority now exists for the construction of waste treatment facilities for small regions or large

metropolitan areas as well as for the more conventional municipal arrangement. Considerable success has been achieved in pollution control through this system with Federal financial assistance. Present legislation encourages communities to unite in centralized systems for waste treatment by providing financial aid up to $2.4 million in such situations. Proposed legislative amendments would double this amount.

Since the local government waste treatment facilities already handle much waste from commercial and manufacturing plants and since many private enterprises of this nature are actively seeking to tie their waste disposal to treatment facilities provided by local government, it is not necessary to enable river basin organizations directly to enter this field. The manufacturers and commercial firms would have the choice of tying into a local government treatment facility as one of the alternatives to meet the pollution control objective. With the stimulus and guidance of both the Federal and State water pollution control agencies, the opportunity for this alternative could be enlarged through the creation of special local government districts for waste collection and treatment. Firms availing themselves of the municipal waste treatment plant tie-in must make payments reflecting both capital and operating costs to the municipality. Therefore, the firms would be induced to reduce their waste disposal to reduce costs.

Large amounts of wastes, sediment, and debris may enter streams in such a way that they are not amenable to collection and treatment. Examples are acid mine drainage and drainage from agricultural and urban lands. These types of problems have to be solved by land use controls.

The alternate proposal is outlined in the following steps.

a. Amend the present Water Pollution Control Act to authorize water quality criteria for interstate waters. Legislation of this nature is now pending before the Congress.

b. Additional Federal legislation would be required to institute the effluent charge. The legislation should be in two parts, one part applicable to those rivers and water bodies clearly under Federal jurisdiction and control. That is, any entity discharging wastes into those waters would be required to pay a charge. The charge system would be established and managed through the Federal water pollution control agency on the basis of the comprehensive plan. In those water bodies outside Federal jurisdiction, the States could be induced to levy the charge as a quid pro quo for Federal financial and technical assistance including all the present forms of

assistance for water pollution control, and other Federal water resource legislation. Such assistance could be withheld to provide leverage for compliance. Federal enforcement authority, under the Federal Water Pollution Control Act, would be available in cases of non-compliance.

These two steps of the alternate proposal would not require extensive change in the present pattern of organization and law. Therefore, it would be more readily instituted. Water quality objectives are retained as a central feature of planning for all aspects of water resources development. The present relationship of Federal and State jurisdiction are not disrupted, and local government activity in waste collection, treatment, and disposal is not diminished. Private firms with waste disposal problems are permitted to consider how to respond to water quality objectives on the basis of greater knowledge of stream characteristics. The Federal interest in the planning process is recognized in the major decisions, and in the implementation and enforcement.

c. In addition to reimbursement now required in Federal reservoir and other construction programs, consideration should be given to authorization of charges for increased utility of waters due to river management systems.

d. Congress might establish a general policy for operating organizations to manage river basins along the pattern of the Delaware Commission. Special inducements might be offered by the Congress to encourage the establishment of such Federal-State operating authorities. These might be in terms of special financial and technical assistance. For example, grants and long-term low or no-interest loans as well as direct Federal construction might be offered to initiate the program. Consideration should be given to a resource development fund into which all revenues would be placed and made available for reinvestment in resource development or used for repayment of the Federal loans or cost sharing.

The Federal-State commission would deal with all water problems but might assign to local districts those functions not requiring basin-wide management.

e. Congress and the affected States would decide whether a recommended river basin organization would be established. This alternative would offer to those areas that have the most difficult water problems an opportunity for a special organizational arrangement for development and management. In areas where the problem is less serious a simpler organization might be sufficient.

The Water Resources Planning Act authorizes the river basin commissions to recommend means of implementing the comprehensive plans. These recommendations could be the basis for the transition to the more complete river basin organizations.

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS
WASHINGTON, D. C.

August 25, 1965

MEMORANDUM FOR MEMBERS OF THE PRESIDENT'S COMMITTEE ON POLLUTION

Subject: Case Studies of Effluent Fees and Enforcement Policy

New policies for pollution abatement should build on the substantial success that has been achieved by existing regulations under the Water Pollution Control Act. Enforcement of this Act has brought about major improvements in the quality of many U. S. rivers and, for the most part, without recourse to time-consuming and expensive litigation. Whatever additional measures might be adopted, it is perfectly clear that existing enforcement powers should be retained.

In considering next year's legislative program, it is necessary to ask what additional steps can be taken to achieve a broad and substantial improvement in stream quality throughout our major river basins. It is felt that for this purpose it is desirable to add to existing enforcement authority a market-type incentive in the form of effluent fees. The following paragraphs indicate, in greater detail than has been done before, the reasons for believing that effluent fees will be a desirable supplement to enforcement authority.

1. A schedule of effluent fees would relate the payments directly to the discharge of BOD and other various wastes. Firms and municipalities would tend to reduce their discharges in whatever ways would be cheaper than paying the fee. The higher the fee, the greater the number of ways of reducing discharges that would be cheaper than paying the fees. Therefore, it is always possible to find appropriate effluent fee schedules to obtain reasonable degrees of pollution abatement. Effluent fees are an incentive to which industrial managers can and do respond effectively and imaginatively. There is every reason to believe that reasonable schedules of fees would produce substantial abatement. At the end of this paper there are some further calculations concerning the magnitude of the costs that substantial abatement of pollution would impose on industrial firms.

2. Effluent fees would provide firms with continuous incentive to search for new ways of abating pollution. In an enforcement action, a firm is directed to perform specific actions, such as primary treatment. Having done so, it has no incentive to reduce waste discharges further. With an effluent fee scheme, the firm has incentives to search continuously for means of further abatement as long as it discharges away wastes. It will search for savings in effluent fees from new technology, from process and product changes, and from new investment which produces relatively little waste.

3. As public policy seeks to achieve higher stream quality, the methods by which firms can reduce waste discharges become more numerous and complex. Choice among alternative methods requires detailed investigation of technical and economic matters, some of which are peculiar to the individual firm. There is clearly a desirable continuing Federal role in providing technical assistance in this process. However, enforcement proceedings inevitably involve public officials in a large role in this investigative process. The use of effluent fees would transfer part of the investigative and decision making process from public officials to management, who are generally better placed to make the adjustments that will be best for the firm while meeting the goals of public policy.

4. Effluent fees would help to achieve a degree of flexibility in the pattern of waste discharge abatement that is hard to achieve by the judicial and quasi-judicial procedures used in enforcement. Any given stream quality can be achieved by many combinations of abatement on the part of different dischargers. A certain water quality may be achievable by having discharger A reduce his discharge by a great deal, and B reduce his discharge relatively little; or it can be achieved by a small reduction by A and a large reduction by B. Which of these combinations is the most economical way to achieve the stream quality is difficult to discover by enforcement procedures. Effluent fees will induce those firms for whom abatement is relatively

cheap to abate their discharges to a relatively great extent. Effluent fees will therefore help to determine an economical combination of abatement by different dischargers.

5. Because of economies of scale in waste treatment, it is often most economical for industrial wastes to be treated by municipal treatment facilities rather than in the firm's own treatment plant. Yet the fact that there is a charge for municipal treatment may deter a firm from "hooking up" to the municipal system unless it is faced with an enforcement procedure. If the firm had to pay an effluent fee for the discharge of waste into a stream, it would have an incentive to pay for municipal treatment instead when that alternative was cheaper. This would obviate the need for some enforcement cases.

6. Effluent fees are "reasonable" as well. It seems equitable to impose the social costs of pollution on the sources of unusable water. Moreover, the output and employment effects of these fees are likely to be negligible. This is indicated by estimates of the financial burden that would be imposed on major waste-producing industry by primary or secondary waste treatment (removal of approximately 35% and 85% of BOD wastes respectively).

The PHS study of sample effluent fee schedules for the Delaware is the best source of such estimates. This study is under-way, and the data presented below are in no way a substitute for the

results of that study. The data in this section are all taken from a recent study undertaken for the State of Maryland by David F. Bramhall and Edwin S. Mills. Copies of this study have been distributed to the effluent fee task group. Although the estimates are for Maryland, the data mostly originate from national sources, and there is no reason to believe that the results presented below are peculiar to Maryland.

Although we cannot say what pattern of industrial waste treatment would be required for a broad improvement in stream quality, we can be reasonably sure that it would not be more expensive (at least as regards abatement of BOD wastes) than secondary treatment. A substantial improvement in stream quality would probably not require abatement to the extent that would be achieved by secondary treatment in every industry. And even if this degree of abatement were necessary, there are cheaper ways to achieve it than standard waste treatment methods in some industries. Thus, the following data can be regarded as upper limits to the cost of a high level of abatement of BOD wastes in the five major BOD waste-generating industries in the U. S. The burden of abatement would be much smaller in most other industries.

The procedure is as follows. From a variety of sources, population equivalents (P. E's) of BOD wastes generated per employee can be obtained for major waste-producing industries. These are presented on page 165 of the Bramhall-Mills report. The Census of

Manufactures provides data for value added (or income generated) per employee in the same industries. From standard sources, we get estimates of treatment cost per P. E. of waste as a function of treatment level and the size of the treatment plant (see page 226 of the Bramhall-Mills study). From these three sets of data, we can compute the ratio of annual treatment cost to value added for each industry. The results are as follows:

Industry	Value added per employee (Annual)	P.E.'s of waste per employee (Annual)	Treatment cost as % of value added	
			Primary	Secondary
Food processing	$10,800	50	0.9%	1.8%
Pulp and paper	$11,190	150	2.7%	5.3%
Chemicals	$18,450	35	0.4%	0.8%
Petroleum and Coal	$14,490	25	0.3%	0.7%
Primary metals	$10,320	5	0.1%	0.2%

The data refer to treatment of all wastes. Since many firms already partially treat wastes, the burden of increased treatment (e.g., going from primary to secondary treatment) would be smaller than is indicated in the table. Since the production of waste per employee varies widely within broadly defined industries such as those considered

above, the burden of waste treatment would vary widely among firms within each industry. Even so it appears that, with the possible exception of the pulp and paper industry, the costs of primary and secondary waste treatment would be relatively small compared with value added.

Simple effluent fees might be set equal to the costs of primary and secondary self-treatment. In this case, fees would not increase costs in the petroleum, primary metals, and chemical industries by as much as one percent of the value added to output by firms in these industries. Costs in food processing would not increase by two percent, or in pulp and paper by much more than 5%. It is expected that cost increases from fees would be much lower than these "maximum estimates," since most plants already incur the costs of primary treatment: effluent fees provide "burdens" of less than 1% of value added in these instances.

Paul W. Mac Avoy

Edwin S. Mills

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COUNCIL OF ECONOMIC ADVISERS
WASHINGTON, D. C.

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Effluent Fees in the Sugar Beet Industry

The processing of beets for sugar in the mountain states and the Far West has produced large quantities of solid wastes. Some of these wastes, such as precipitated lime and the drainage from silos of wet beet pulp, have been extremely noxious and have long been subject to treatment. The method most frequently used -- that of storing the wastes in ponds until high stream flow -- removes most suspended solids and a small part of the BOD poundage. But this method does not provide more than primary treatment unless the ponds are several hundred acres in size and storage takes place for a number of months. Even in the case of the large pond, there is extensive air pollution from decomposing organic materials. Further treatment could be provided for the benefit of others utilizing the water resources of western streams and for the benefit of neighbors affected by air pollution.

Treatment in this industry may take a number of unorthodox forms. The recirculation of water used in cooling and cleaning, after some preliminary screening, renders most wastes in solid form without storage

in goods; more than one-third of 57 plants owned by the largest 11 beet-processing companies are now carrying out such recirculation. Treatment by means of technical improvements in the process has been successful. With the prodding of profits and of California authorities, two plants in that state provide the equivalent of secondary treatment by new sugar production techniques involving complete recycling. There has also been limited success with running thin streams of water over large areas of sloping farm land. Given such a wide variety of techniques, and rapid advances in new techniques, it is inefficient to set public standards for treatment requiring particular treatment equipment. Rather, effluent fees based upon the demand for water of alternative users directs research and the application of new techniques towards different low cost treatment methods at different locations.

As a preliminary step to setting such effluent fees, annual changes can be set equal to the cost of secondary treatment using orthodox facilities. The use of lower cost, newer techniques for achieving the same level of water quality is not retarded, since the operator of the plant can choose to use the technique in self-treatment rather than to pay the effluent fee on every pound of BOD deposited in the stream.

A number of plants now have primary and secondary treatment facilities not too different from those in municipal sewerage plants, as a matter of conforming with local regulations. Forty-six plants had equipment costs for such plants which totaled $5.44 million, and

which averaged $118 thousand for each plant as of 1962. These plants (and two more) reported operating expenses which averaged $7.4 thousand per annum; total expenses in any one year, assuming a ten-year life for the equipment and a 6% annual cost of capital on this investment, averaged $23.9 thousand.

Assume now that an effluent fee of $23.9 thousand per annum is charged the beet processing companies on each of the approximately 60 plants in the industry. The companies have the choice of paying the fee rather than treating the effluent; if the first is cheaper, then payments for public processing should equal $1.434 million annually. This is a negligible expense for pollution abatement, given that value added by processing beets has been more than $130 million since 1959. Moreover, this is a high estimate of the costs to the industry for abatement because many plants would install cheaper self-treatment processes involving lower costs than the $23.9 thousand effluent fee

Note: The source of statistics is questionnaire response by 11 large beet processors to the staff of Resources For The Future. In order to protect the publication rights of RFF to these statistics, it is requested that this paper not be circulated outside of the Ackley Committee

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August 9, 1965

EFFLUENT FEES OF THE GENOSSENSCHAFTEN IN THE RUHR VALLEY

During the last sixty years successive governments in the Ruhr industrial region have been developing political institutions for area-wide utilization of water resources. The most mature of the institutions are the Genossenschaften, involuntary co-operatives which construct facilities for water treatment and operate these facilities upon the basis of charges levied on inhabitants in the region. The Genossenschaften treat wastes discharged into the Ruhr, Emscher, Lippe, and Wupper Rivers before these enter the Rhine River, to make water suitable for drinking and recreation -- water that, at average natural low flow, is less than the volume of effluents at many points.

With obligations to set and maintain standards of water quality, the Genossenschaften have experienced changes in legal rights, and also in administrative approaches, to the problems at hand. What is of interest here is that, in the last fifteen years, this organization has collected much of its income from industrial firms and city inhabitants responsible for discharging the wastes. For those located along the Emscher River, higher charges are levied on those firms or cities with higher "dilution factors" (where dilution depends upon sediment, BOD, excess potassium permanganate, and toxicity, all of which have measurable damage to fish population). The authorities of the Ruhr River organization (the Ruhrverband) have developed a scale for reduction in the self-purification capacity of the stream and, the higher the value on the scale, the larger the required payment from the firm responsible. The charges are assessed to apply for semi-annual or annual periods and are not dependent upon volumes of effluents discharged by other firms.

Even though the formulas for dilution factors are complex, the theory is simple. Standards are set for water quality by the Genossenschaften. Assessments are made against those leading to a departure from the standards, and the revenues received by the

organizations are used to construct and operate treatment facilities. This procedure is theoretically simple because it does not allow for a schedule of standards which would take account of different values to consumers of different qualities of water; simplicity is maintained by not increasing charges during periods of low flow when the dilution factor is greater. As a consequence, the charges do not clearly result in the amount of waste treatment for which treatment costs equal the gains to household consumers.

The question is whether the results from using simple rules depart significantly from the optimal. The results are in the direction expected: "wastes loads delivered to the Genossenschaften's quality control system have responded to effluent charges." [1] Economies from specialization have also been realized: with "the concept of stream specialization . . . water quality of the Ruhr is maintained at the minimum standard . . . (while) the Emscher is intensively managed as a large open sewer with up-to-date treatment plants at strategic points making full use of the economies of scale . . . . The results are impressive . . . . Because of the small distances involved the water supply and the recreational opportunities of the Ruhr basin are fully accessible to the Emscher basin." [2] Most important, increases in effluent charges over time have resulted in savings of water as it has become more scarce; in a steel mill at Dortmund "a series of recirculation processes virtually eliminated effluent from the plant. This is attributed to a combination of water costs and effluent charges." And in Westfallenhuette "the use of high pressure feed water in several of the cooling systems (is utilized so that) not only water but also heat is conserved in the plant." [1]

This is to say that the simple rules used by the Genossenschaften have not been thoroughly assessed. The cost of simplicity include possible significant departures from the socially optimum rate of effluent discharge. What is clear from the literature, however, is that the simple effluent charges reduced the volume of waste discharged, allowed for reductions in costs of waste treatment, and conserved volumes of water for alternative uses.

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FOR UNITED STATES GOVERNMENT USE ONLY

August 1, 1965

MEMORANDUM TO THE COMMITTEE ON THE USE OF ECONOMIC INCENTIVES FOR POLLUTION ABATEMENT

FROM: Task Group on Air Pollution from Motor Vehicles

The attached report is submitted to the Committee to indicate the progress and direction of the work on auto effluents. Although it is intended to reflect the direction of the task group's thinking, it has not been read by most members of that group, and parts may be subject to substantial disagreement. It was felt desirable, however, to submit a progress report to the Committee before the August 5 meeting to assist the Committee in directing the task group's further work.

Attachment

Auto Air Effluents

1. Background

There are three sources of emission from gasoline engines: tailpipe exhaust, crankcase ventilation (sometimes called blowby), and evaporation losses from fuel tank and carbureter. The significant air pollutants are hydrocarbons, carbon monoxide and nitrogen oxides. Lead from fuel additives is an unconvicted suspect and is excluded from the following discussion. It is estimated that 50 to 60 percent of auto effluents come from tailpipe exhausts, 30 to 40 percent from blowby, and 15 to 25 percent from fuel evaporation.

The major deleterious effects of automotive air pollution are irritation of mucous membranes, vegetation damage, rubber cracking, visibility reduction, soiling, and odors. Carbon monoxide is, of course, fatal in sufficient doses. Moderate doses reduce one's ability to withstand stress and continued exposure may have chronic effects. Photochemical smog has been clearly associated with auto effluents.

The extent of the damage from auto effluents has not been measured. Manifestations of photochemical smog have been observed in at least 19 states, and are most obvious in Los Angeles. It has been estimated that autos are responsible for large proportions of the air pollution in many communities. Examples are:

Los Angeles (83% of total emissions, 69% of hydrocarbons, 97% of carbon monoxide, and 68% of oxides of nitrogen), Detroit (19% of total, 49% of hydrocarbons, and 30% of nitrogen oxides), Philadelphia (42% of total).

So far, only California and New York have set compulsory standards for emissions. The California standards apply to exhaust, blowby and fuel evaporation. New York standards apply only to blowby. All domestic manufacturers now voluntarily install blowby devices on all new cars. These are assumed to be 80 to 90% effective. Beginning with the 1966 model year, all new cars sold in California will have to meet an exhaust standard of not more than 275 p.p.m. hydrocarbons, and 1.5% carbon monoxide. Effective in 1970, these standards will be lowered to 180 p.p.m. and 1% respectively.

Legislation now before Congress (S. 306) would authorize and direct the Secretary of HEW to set standards for all new cars manufactured or imported for sale in the U. S.

Until recently, it was believed that the best way to meet the California standards for tailpipe emissions would be to install a catalytic afterburner on each car. In the last few months, however, the auto companies have said that they will meet the California standards without an afterburner. Instead, they will modify and

refine engines, providing lean carburetion and spark retardation. The auto manufacturers have stated that in this way they will be able to meet the California standards for 1966 cars and these or similar standards for all cars in 1968.

Estimates have been made of the average annual cost (including installation, maintenance and operation) of devices to meet the California standards over the first five years of a car's life. Blowby devices cost $5 to $10. Exhaust controls: catalytic afterburner, $25 to $40; direct flame afterburner, $15 plus tune-up costs; engine modification, almost nothing (except for normal tune-up costs which are incurred in a proper maintenance program). The costs of installing devices on used cars are estimated to be much higher.

There is still considerable uncertainty concerning the efficacy of these control methods after a car has been driven for a period of time. It appears that neither the afterburners nor the engine modifications will continue to be effective after more than 10,000 or 20,000 miles of use without substantial maintenance or replacement. Within the last few weeks, at least some auto manufacturers have stated that they believe their engine modifications will continue to meet the California standards throughout the life of the car provided the car is inspected and maintained by a certified mechanic. The required

maintenance would apparently include little more than a major tune-up each year. At present, many cars do not receive major tune-ups that often.

2. Discussion

There is still considerable uncertainty concerning technical matters related to the control of auto effluents. Indeed, some of the facts stated in section one are subject to disagreement among experts. In choosing among alternative public policies, there are several additional matters that need to be considered, and some of them are subject to considerable uncertainly.

a. S. 306 refers only to control devices on new cars. As was stated above, a car that meets a standard when new is unlikely to do so after it has been driven more than about 10,000 miles unless the control devices are maintained. For the purpose of this discussion, a used car is any car that has been driven more than 10,000 miles or so. In any year, more than three-quarters of the driving must be in used cars. It is therefore clear that an effective auto effluent control program must make provisions for used as well as new cars. It is, however, important to distinguish between those used cars that were made before standards were imposed on new cars and those that were made after the imposition of standards. The former group will

be a rapidly declining percentage of the car population shortly after standards come into effect. Within five to eight years after the imposition of new car standards, no more than about 20 percent of the car population will have been made before the imposition of standards. If the auto companies had decided to meet new car standards with afterburners, it might not have been implausible to require their installation on used cars made before the imposition. As stated above, however, afterburners are not likely to be employed to meet new car standards. To require their installation on cars made before the imposition of standards would require that manufacturers make large quantities of afterburners for a few years, knowing that the market would die out after five years or so. It is almost certain that this would be extremely costly. It would also be very costly to modify or replace an engine made before the imposition of standards on new cars. It therefore seems inevitable that used cars made before the imposition of new car standards be excused from any standards.

All cars manufactured after the imposition of standards should be subject to standards even after they become used. Otherwise, the control program will be largely ineffective. It is this class of cars that needs to be covered, but is not covered by pending Federal legislation.

b. The problem of auto effluents is one of large metropolitan areas. Rural areas and small towns are hardly affected and are not likely to be in the foreseeable future. It is therefore desirable that any control program be flexible in applying more stringent standards where the problem is more severe. Given the mass production methods used in the manufacture of cars, it is unlikely that regional variation in new car standards would be in the interests of the auto companies. It would, however, be perfectly feasible to apply used car standards that varied from region to region. The mobility of the auto makes it difficult to do this in a precise way. It can, however, be done approximately since most driving in large metropolitan areas is in cars whose owners live within a few miles of the city. In some cities, a substantial amount of this driving does take place across state boundaries. New York City and Washington, D. C. are examples.

c. An appropriate standard should be in terms of effluents discharged per mile under average driving conditions. The California standards are in terms of the parts per million of effluents in the car's exhaust. But a large car will discharge much more effluent per mile than a small car, even though both cars have 275 p.p.m. of effluent in their exhausts. Standards should take into

account varying gasoline consumption, load transported and efficiency of combustion.

d. No very precise calculations have been made concerning the appropriate effluent standard for either new or used cars. The California standards were set by calculating what it would take to produce the air quality that prevailed in Los Angeles in 1940. That standard would not necessarily be appropriate elsewhere. Whatever standard is set, it is likely that it will have to be made gradually more stringent, as the number of cars grows. Furthermore, it would be desirable to announce new standards several years in advance, as California has done, to permit the companies to undertake research and development. A radical change in auto technology, such as the introduction of turbine engines, could drastically alter the situation.

e. Whatever method is chosen to control effluent from new or used cars, some way is needed to measure, directly or indirectly, the effluent discharged from an auto. There are two general approaches to this problem.

(1) The first approach would be to develop a device that would measure the effluent as it is discharged from the auto's exhaust system. This would presumably be accomplished by a device that could be attached to the tailpipe. At present, no such device

exists except perhaps of an experimental kind. The group inquired about the prospects of developing an economical metering device that could be used, for example, as a part of routine safety inspections. There is considerable doubt as to how long and how expensive the developmental effort would be. There seems little doubt, however, that a substantial effort could lead to the development of a device that would not be prohibitively expensive to manufacture, at least after a few years.

(2) The second approach would be to develop a mechanical inspection procedure that would indicate, at least approximately, how much effluent the car would discharge. It is unlikely that an economical inspection procedure could be developed that would indicate very precisely the car's effluent level. There is, however, reason to believe that an inspection procedure can be developed that would indicate whether the car has a reasonable chance of meeting standards such as the California ones under normal driving conditions. If the car was manufactured with the engine modifications that the auto companies now propose to make in order to meet the California standards, the inspection system would consist mostly of certification that certain maintenance -- such as a major tune-up -- had been performed.

3. Alternative proposals

The task group is not yet prepared to submit an agreed-upon proposal. There are two kinds of proposals the task group has been considering.

The first would be to levy an effluent fee on the manufacture or ownership of a vehicle that depended on the amount of effluent discharged by the car. At the manufacturers' level, this could be accomplished by sample meterings of different types of cars. At the used car level, it would presumably have to be part of an annual inspection, though the schedule of charges would vary from state to state to reflect differing conditions. The major advantage of such a scheme would be that it would provide manufacturers and owners with an incentive to meet the highest standard they could without undue expense. The disadvantages are that it would require a reliable and inexpensive metering device, that it would be administratively difficult, and that only a minority of states now require annual inspections.

The second proposal would be a further development of legislation now before Congress to empower the Government to set effluent standards on new cars. This proposal is based on three premises:

First, that standards for effluents (per mile traveled under average load) will be established.

Second, that vehicles can be manufactured that will meet these standards at the time of manufacture and with appropriate maintenance will be able to continue to meet them for the life of the vehicle, and

Third, a certification system will be established where necessary at the State or local level to assure that appropriate maintenance is carried out.

a. Establishment of effluent standards. The intent in establishing effluent levels should be to equalize the requirement for each class of vehicle so that account is taken of its total contribution to the air pollution problem. Therefore, effluent standards established must take account of the varying gasoline consumption, load transported and efficiency of combustion of different vehicles. Thus, the standards as measured in the exhaust will not be the same for all vehicles. Rather, the "standard passenger car" should be used as the basic unit. To comply with the intent of the 275 parts per million standard on hydrocarbon emissions proposed for California, economy cars or small foreign cars, for example, could be permitted a higher level of concentration in the effluent because the total quantity of effluent emitted per mile of travel or unit of time would be less; conversely, allowable effluent concentrations

would be lower in larger vehicles, such as high powered cars and also gasoline powered trucks. Insofar as the present state of the art would not permit reaching appropriately low effluent concentrations for these larger units, effluent charges might be levied against them which would serve as a stimulus to industry to develop more efficient combustion systems, or other energy conversion systems.

b. Factory inspection system. A system would need to be devised to assure first that vehicles were inherently capable of meeting the required standard at the time of manufacture and could continue to meet the standard with appropriate maintenance for a prolonged period of time. A second facet would be inspection to assure that the production models conformed to the specifications included in the vehicles tested.

c. Local certification system. At the local level, a certificate of maintenance could be required as a prerequisite to annual registration and could serve instead of an elaborate inspection system. However, a system would have to be devised to assure availability of adequate maintenance and validity of certification. A warranty system by the manufacturer, included in the cost of the car or at additional costs, could fulfill both needs. State or locally licensed mechanics also could be authorized to perform necessary maintenance and to

issue certificates of compliance. Any such system would, of course, require at least spot-checking to assure that maintenance levels were adequate.

Inducements involved in this proposal include: 1) inability to register a vehicle unless it is in compliance with the effluent standards, 2) competition among manufacturers for the most economical way for the customer to meet the standards.

The system would be flexible, economical and equitable: Flexibility -- all vehicles manufactured would be capable of meeting standards. The decisions on enforcement of maintenance to assure continued meeting of effluent standards would be a local option. Thus, communities with severe air pollution problems could enforce rigorous maintenance schedules, whereas those with less severe problems or no problems could disregard the maintenance requirements. Economy -- inspection systems would be imposed only where needed and the cost of the inspection system would be borne by the individual motorist rather than by tax monies, except for spot-check enforcement costs. Equitable -- the costs of the system would be borne by those who pollute rather than by the public at large.

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COUNCIL OF ECONOMIC ADVISERS
WASHINGTON, D. C.

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The Removal of Junk Autos: Introduction

The abandonment of automobiles on city streets and the subsequent stockpiling of auto bodies in graveyards, have adverse effects on living conditions in the vicinity of graveyards, mar the approaches in cities, and impede traffic flow in urban areas. There is some indication of an increased accumulation of dead automobiles; the following seeks to explain this trend and to explore economic means for reversing the trend.

There is some evidence that the number of automobiles carpeting the landscape as increased each year except for the last two years. Dead automobiles either enter the inventory of stripped-down bodies in the yards of "auto-wreckers" or are processed in "scrap yards" to #2 bundles of scrap steel, to unbundled heavy steel, or to shredded steel bits. The processing of an auto results in approximately one net ton of #2 bundles; ignoring other output, the number of tons of #2 bundles purchased each year provides an estimate of the dead automobiles not added to roadside graveyards. In 1958, 3.0 million tons of #2 bundles were produced and sold, while 3.6 million cars were retired from service, so that approximately 0.6 million dead cars were accumulated (as shown in Table 1). The accumulation was approximately 0.8 million in 1959; it was 0.3 million in 1960, 0.9 million in 1961, and 1.3 million in 1962. According to this estimating procedure, approximately 3.9 million automobiles were not processed as #2 bundles and were probably stockpiled. This was approximately 18% of the total cars retired from service in that period.

This trend of accumulation was sharply reversed in 1963 and 1964. In the first of these two years, 5.3 million cars were retired, while 5.8 million tons of #2 bundles were produced and sold, so that approximately 0.5 million automobiles were taken out to graveyards for processing for scrap. In 1964, 5.5 million cars were retired from the highways, but 6.5 million were processed as #2 bundles, so that 1.0 million junk autos were removed from the accumulation.

These statistics suggest that there was accumulation of junk autos in the late 1950's and early 1960's, but that this was reversed in the last two years. The conclusion may be somewhat extreme: consumption of #2 bundles is not the only means for disposing of junk autos, and if the other means resulted in substantial tonnage of shredded or cut steel, then the trend was reversed earlier and to a much greater extent than shown here. But the reversal of the trend to accumulate is clear.

Economic Reasons for the Accumulation of Junk Autos.

There is some basis in public statements for believing that the auto wreckers have been stockpiling automobiles on the expectation of higher future prices for scrap. Their behavior is consistent with this belief: prices in the middle 1950's were close to $35 per net ton for #2 bundles while, in the later 1950's, they fell to between $18 and $25 per ton; inventories increased during the drastic price decline (as shown in Table 2). In 1963, the price leveled off and inventories began to decline. In 1964, there was a $3 increase in the price of #2 bundles, and 1 million more of these bundles were produced than cars removed from service. The reversal in the accumulation was concurrent with the reversal in the trend of prices: with the exception of 1961, price decline was accompanied by an increase in inventories.

This is to argue that the managers of wrecking yards decide not to dispose of skeletons and wrecks at today's prices, because the cost of holding them is exceedingly small and there is "some chance" that future prices will be higher. If this is the case, then the autowrecker can be induced to reduce the size of the inventory by higher present prices for dead autos or by higher costs of holding this inventory.

TABLE 1. --Accumulation of Junk Autos

(1) Year	(2) Cars Out of Service (Millions)	(3) Consumption of #2 Bundles (Millions of Net Tons)	(4) Cars Not Sold as #2 Bundles (Millions) (2) - (3)
1958	3.6	3.0	+0.6
1959	4.6	3.8	+0.8
1960	4.2	3.9	+0.3
1961	4.4	3.5	+0.9
1962	4.7	3.4	+1.3
1963	5.3	5.8	-0.5
1964	5.5	6.5	-1.0

Sources: Institute of Scrap Iron and Steel; Automobile Manufacturers Association.

TABLE 2.--Scrap Prices and the Accumulation of Junk Autos

(1)	(2)	(3)	(4)
Year	Cars Not Sold As #2 Bundles (Column (4) of Table 1)	Price of #2 Bundles ($ Per Net Ton)	Production of Steel by Electric and Crucible Furnaces (Millions of Net Tons)
1958	+0.6	$34.00	6.7
1959	+0.8	24.91	8.5
1960	+0.3	19.78	8.4
1961	+0.9	22.07	8.6
1962	+1.3	18.25	9.0
1963	-0.5	17.71	10.9
1964	-1.0	20.24	12.7

Sources: Iron Age Magazine; American Iron and Steel Institute; Institute of Scrap Iron and Steel.

Preliminary Estimates of the Response to Subsidies for the Removal of Junk Autos: Part I

Paul W. MacAvoy, Council of Economic Advisers
August 18, 1965

One approach to the "junk auto problem" is to consider it the result of over-accumulation of the "inventory" of automobile scrap, and to provide profit incentives to wreckers or processors to decumulate by shipping larger amounts of #2 scrap to steel mills. This approach leads to a proposal for some type of subsidy to the processor, to the wrecker, or to city governments removing unsightly hulks from public and private property. The specific nature of the subsidy is not at issue; for the purposes of the paper, it can be assumed that a subsidy to the wrecker is passed on to the processor if it exceeds the marginal costs of wrecking, or that a subsidy to the city government is passed on to the processor in the form of negative prices for abandoned cars. That is, any subsidy has the same effect as a subsidy directly to the processor. This allows examination of the scant evidence bearing on the question: what are the responses of quantity and price of #2 scrap to a substantial subsidy for processing junk autos.

1. The Expected Effects from a Subsidy

Any payment of money to a scrap processor for producing #2 bundles should increase the supply of this type of scrap. With the quantity demanded conditioned to increase only with a price reduction, and

with constant prices for #1 scrap and other substitutes, the increased supply leads to a reduction in price in order to clear the market. This is illustrated in Figure 1: the supply curve of scrap processors is shifted downwards and to the right from S to S^* by the amount of the subsidy; the quantity demanded D increases only at lower prices; market clearing (or the quantity supplied equaling the quantity demanded) results in a lower price and a larger quantity of #2 bundles. What are not shown in the illustration are the relative magnitudes of price and quantity changes. If the demand and supply curves are "elastic" -- if the quantity responses are much greater percentages of original quantities than the price changes are of original prices -- then the subsidy has the effect of greatly increasing scrap supply without much scrap price reduction. If supply and demand are inelastic, the subsidy is "passed on" to the steel purchaser in the form of scrap price reductions.

2. Estimates of Price and Quantity Changes

A preliminary assessment of the relative magnitude of price-quantity changes follows from fitting supply and demand curves to historical statistics. Given the fitted demand curve D (as in Figure 1), the fitted supply curve S can be shifted down by the amount of the subsidy to S^*, and the new equilibrium quantity and price E_2 read from the diagram.

These curves have been fitted to combined cross section and time series data for scrap consumption in seven regions for the period 1959-1962. The data include consumption of #2 bundles and of all scrap in electric and cupola furnaces (the equipment of the principal users of automobile scrap). These statistics are selected for seven states -- New York, Pennsylvania, Michigan, Illinois, Ohio, Alabama, and California -- from the Mineral Industry Surveys of the Bureau of Mines, and "matched" with the annual averages of first week-of-the-month prices of #1 and #2 bundled scrap in the largest cities in these States (from issues of Iron Age Magazine). Thus the data include the following: quantity of #2 scrap, price of #2 scrap, quantity of all scrap, price of #1 scrap, for seven states in four years.

The fitting process minimizes the sum of the squares of the deviations of the statistics from the computed curves. This is a two-step procedure. The first step is the formalization of the assumptions for conditions of supply and demand such that:

$$q_s = \alpha_1 + \beta_1 P + \delta T \qquad (1)$$

$$q_D = \alpha_2 + \beta_2 P + \gamma PS \qquad (2)$$

$$q_s = q_D \qquad (3)$$

The supply equation indicates that quantity supplied q_s depends upon price P of #2 bundles and a variable T equal to "0. 0" in 1959-1960 and "1. 0" in 1961-1962 (as a surrogate for unavailable statistics on

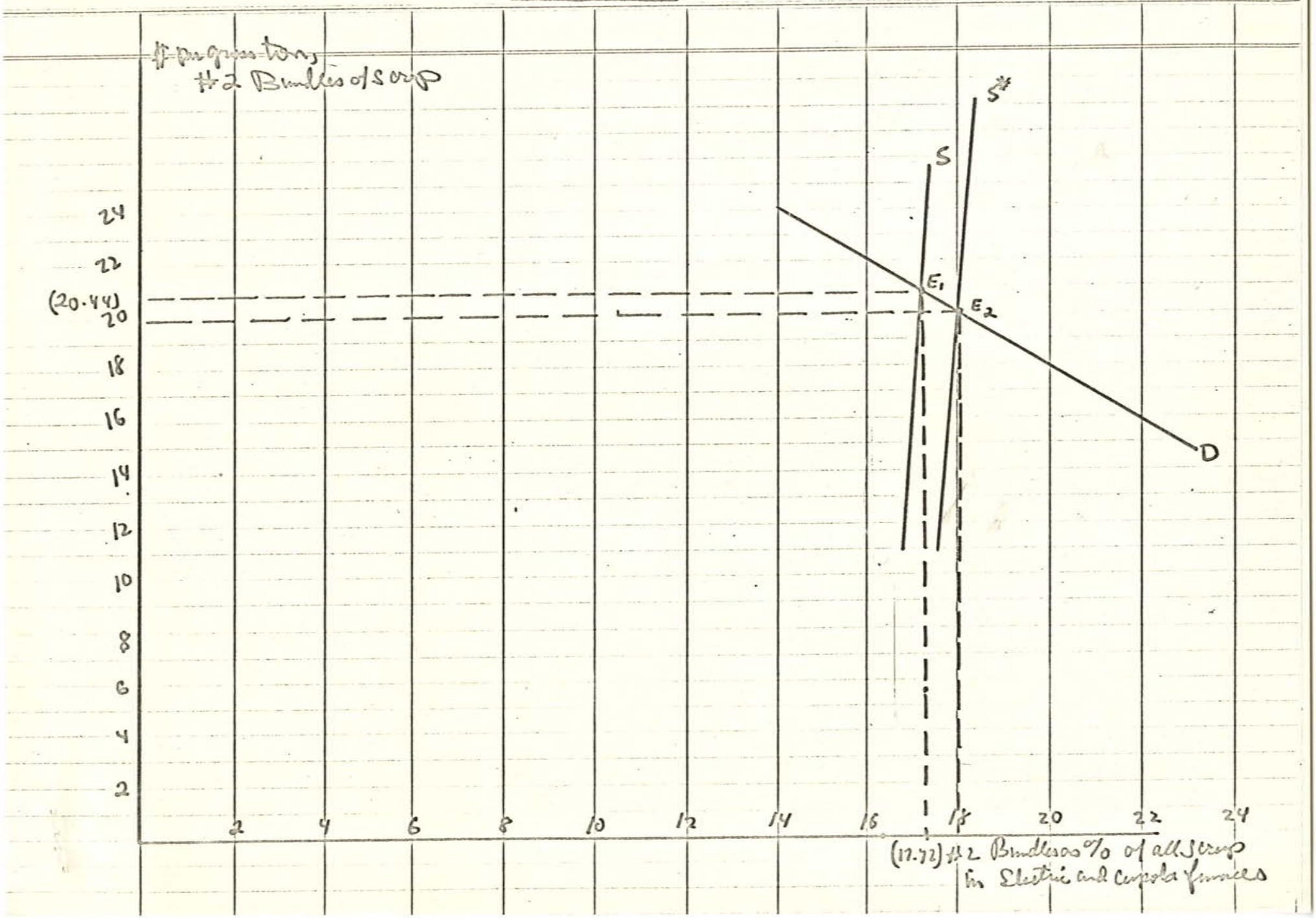
the number of automobiles available for scrapping). The demand equation indicates that the quantity demanded q_D depends not only upon #2 price P but also upon the price of #1 heavy melting steel PS. It is assumed that $q_D = q_s$ in a "cleared" market. The second step consists of solving these equations successively for the variables of interest, q and P; this provides two "reduced form" equations which are fitted to the data by "least squares" -- so as to minimize the sum of the square of the deviations of the statistics from the two computed equations.

The computed "reduced form" equations do not prove to be "close" fits of the data. The equation for quantity was fitted after these statistics were transformed so that q equaled the percentage of #2 scrap of all scrap in electric and cupola furnaces. This averaged 21.56% for 1959-1962 in the seven regions, and the "T" and "PS" variables explained only 2.874% of the variance of individual statistics from the average; little "explainability" was gained from fitting the equation. The computed equation for price provided more basis for prediction: the average #2 price was $20.48 per net ton for this period, and the equation with "T" and "PS" explained 75.61% of the variance from this average. Solving the two equations for the estimated value of β_1 (the slope of the supply curve) and β_2 (the slope of the demand curve) provides $\hat{\beta}_1 = .0553$ and $\hat{\beta}_2 = -1.7402$.

These estimates have been graphed in Figure 1, assuming that the 1962 average #2 price of $20.44 per gross ton and quantity of 17.72% of total scrap are the equilibrium values. For each $1 decrease in price, the quantity supplied decreases by .05% to .06% of the total scrap. For each $1 decrease in price, the quantity demanded increases by 1.74% of total scrap. Both are indicative of inelastic responses to price changes.

The implications of inelasticity might be illustrated by considering a $15 subsidy per ton of #2 scrap -- or a $15 payment for each auto processed -- that shifts the supply curve from S to S^*. The market clearing price for #2 scrap declines to $20, while quantity increases from 17.72% of the total to approximately 18.50%. In terms of the 21.5 million tons of scrap used in these furnaces in 1962, the "quantity response" to a $15 subsidy would be an increase of 1.6 million tons of #2 scrap or 1.6 million junk autos out of the graveyard. This is a "costly" response, in the sense that the subsidy paid for 3.4 million tons processed that year as well as for the additional 1.6 million tons is $75,000,000; for each additional automobile processed, this amounts to $47 per auto.

Figure 1


$ per ton, #2 Bundles of Scrap
24
22
(20.44)
20
18
16
14
12
10
8
6
4
2
2
4
6
8
10
12
14
16
18
20
22
24
S'
S
E1
E2
D
(17.72) #2 Bundles % of all Scrap in Electric and Cupola Furnaces

Preliminary Estimates of the Response to Subsidies for the Removal of Junk Autos: Part II

Paul W. MacAvoy, Council of Economic Advisers
August 20, 1965

The question remains: What are the responses of quantity and price of #2 scrap to a substantial subsidy for processing junk autos. The materials available for providing an answer are limited to historical statistics on prices and quantities of scrap consumed in a number of states; by assuming that the scrap industry's--steel industry's responses to any price change are the same in each state, these materials can be considered equivalent to equilibrium prices and quantities in one state for different processing costs and demands. Demand and supply curves have been fitted to annual data 1959-1962 for seven states in Part I. A second estimate of these curves can be made from more detailed statistics for these states for the years 1963 and 1964 in Part II.

1. Sources of Information

The quantity of #2 bundles consumed each month of the two years in each state has been compiled by the Mineral Industry Survey of the Bureau of Mines. The price of #2 bundles and of #1 heavy melting steel, in the largest consuming cities in each of seven states, have been obtained for the first week of each month from Iron Age Magazine; price statistics for

the remaining weeks were not collected because there were not more than three price changes a month for the 14 series in a sample of six separate months. An estimate of the supply of the necessary input factor for producing #2 scrap -- of the number of automobiles removed from the streets -- has been obtained once a year for each state by subtracting the number of registered vehicles last year and new automobile registrations this year from the number of registrations this year. [From the Automobile Manufacturers Association.] Then there are sufficient statistics to estimate the slope β_1 in the supply curve $\{q_s = \alpha_1 + \beta_1 P + \gamma K\}$ where q_s is the volume of #2 bundles of auto scrap, P is the price of these bundles, and K is the stock of automobiles to be scrapped. Also, the slope β_2 of the demand curve $\{q_D = \alpha_2 + \beta_2 P + \delta PS\}$ can be estimated given values for $q_s = q_D$ the quantity demanded, for price P and the price of #1 heavy melting steel PS. 1/

1/ Calculations of these slopes have been made with the statistics for April, August, and December of the two years only (in order to reduce the correlation between successive observations of q_s and P from all months' data). The stock K of scrap autos for each month is set equal to that estimated for the year; all other statistics are specific to these three months for the two years.

2. Estimates of the Effects from a Subsidy

The fitted equations indicate approximately the same response to price both in demand and in supply as in Part I. The "reduced form" equations for the two relevant variables P and q explained larger percentages of the variance of individual observations from mean P and q. The variance in q associated with PS and K was approximately 22.2% of total variance; the variance in P associated with these two independent variables was 80.7% of the total. More important, the calculated values of β_1 (the slope of the supply curve) and β_2 (the slope of the demand curve) indicated some response to price. With $\hat{\beta}_1 = 0.5319$, any $1 decrease in the per ton price of #2 bundles decreases the quantity supplied in one of the seven states by 532 tons per month. With $\beta_2 = -42.0103$, any $1 decrease in the price increases the quantity demanded by 42,010 tons per month. Such supply and demand responses are similar in nature to the previous -- the supply response is relatively less than the demand response. Relative magnitudes can be indicated by the response to a $15 subsidy per processed ton of auto scrap with these supply and demand curves in comparison with the response to this subsidy with the curves in Figure 1, Part I. Given 1963 and 1964 statistics, the supply "S" and demand "D" in Figure II might be assumed to intersect at E_1, the average price of $18.1 per ton and average

quantity for month of 38.1 thousands ton in each state. The subsidy shifts the supply curve down by $15 from S to S*, moving equilibrium from E_1 to E_2. The new equilibrium price can be expected to decline by approximately $.40 per gross ton, and the new quantity to increase by 7,900 tons per month in each state. For all states together for an entire year, this increase over 1964 tonnage of #2 bundles would be approximately 1.65 million. Thus the predicted response to a $15 per ton subsidy -- or a $15 payment for each processed junk auto -- is a depletion of the inventory by 1.7 million junk autos per year. This is comparable to the quantity response to a $15 subsidy "of 1.6 million tons of #2 scrap or 1.6 million junk autos out of the graveyard" from the supply and demand curves fitted in Part I.

3. Conclusion

There are three separate sources of information on the supply-demand response to subsidies for removing dead autos. Each is incomplete and each allows conflicting interpretations.

The first consists of the time series of unregistered autos and autos processed for scrap (as in the MacAvoy Memorandum of August 6). The interpretation provided there seems exaggerated; rather than decumulation of 3 million autos for a

$10 subsidy per auto, some smaller decumulation could be expected since this analysis did not take account of an (estimated) $5-$7 decrease in the price paid by processors for junk autos in the critical years of decumulation of inventory. That is, the analysis assumed that the decumulation was in response to a $3 per ton increase in #2 bundle prices, rather than to this increase and a concurrent decrease of $5-$7 in the price of junk autos, so that the response was overstated.

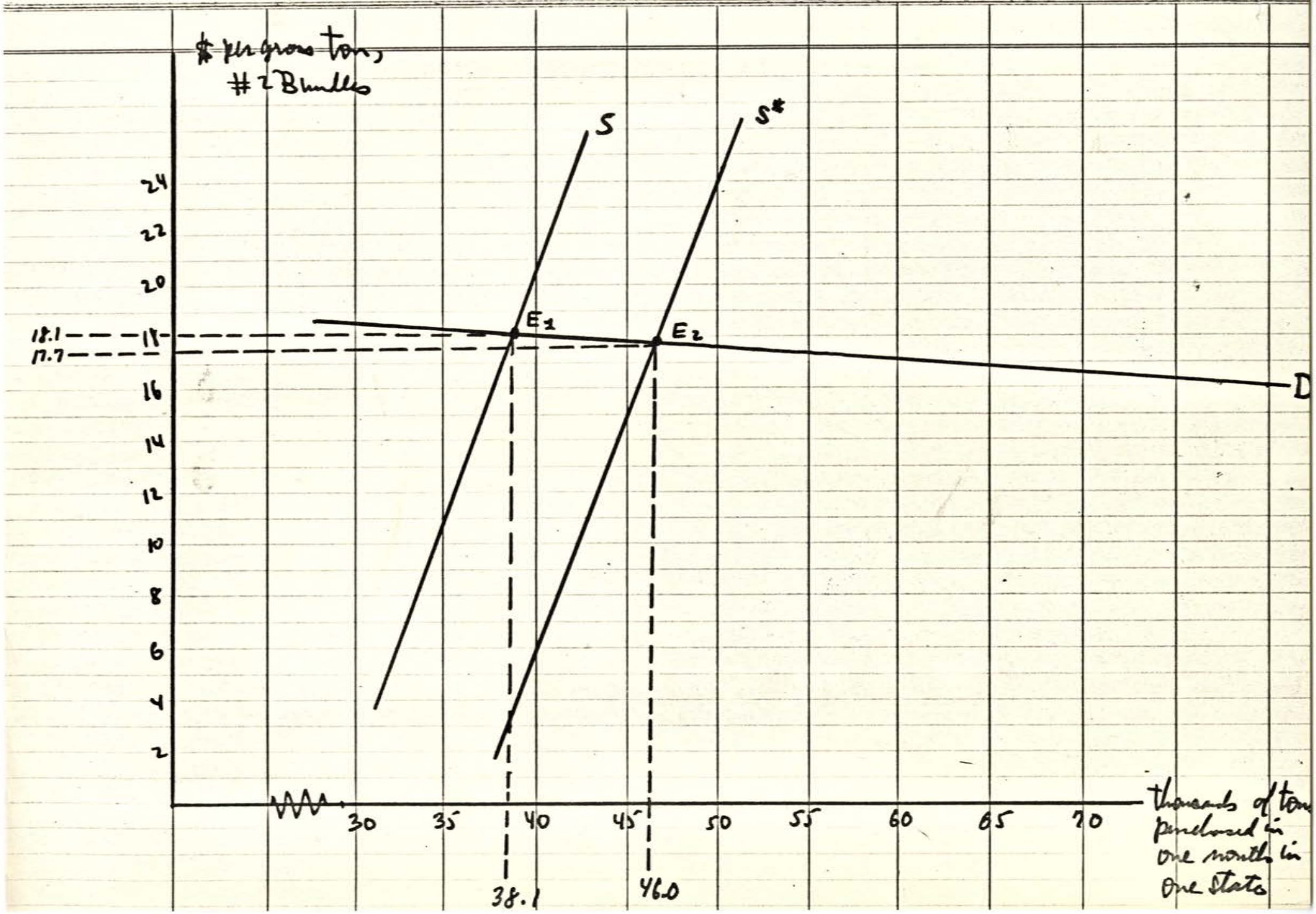
The second consists of cross-section statistics on annual prices and quantities of #2 scrap consumed in the period 1959-1962 (as in Part I of this paper). These statistics are from scattered sources and are not altogether comparable in time and product characteristics; the important supply variable for the number of autos to be scrapped in each state was grossly approximated by a "zero" - "one" variable. Nevertheless, the fitted demand and supply equations, when adjusted for the effect of the subsidy, suggested that 1.5 million autos would be removed from inventory for $15 per auto.

The third consists of more detailed monthly cross section statistics on the last two year's experience. The materials are subject to the same criticisms of non-comparability as the second source, except that the time period of data

recording is more exact and the series on the supply of newly-junked autos more reflective of variations from state to state. The fitted demand and supply curves lead to the same prediction as the second series: a $15 subsidies moves some 1.7 million junks out of storage.

Perhaps the whole is greater than any one of these predictions. No one source of information leads to findings widely varying from those of other sources; all point to removal of most of the 1958-1964 accumulation of junk autos within two to three years with a subsidy of $15-$20 per junk auto.

Figure 2


$ per gross ton, #2 Bunker C
S
S*
E1
E2
D
24
22
20
18.1
17.7
16
14
12
10
8
6
4
2
30
35
40
45
50
55
60
65
70
38.1
46.0
thousands of tons purchased in one month in one state