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The Emissions Trading Policy in the United States of America: an Evaluation of its Advantages and Disadvantages and Analysis of its Applicability in the Federal Republic of Germany

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The Emissions Trading Policy in the United States of America: An Evaluation of its Advantages and Disadvantages and Analysis of its Applicability in the Federal Republic of Germany

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A Study for the Federal Republic of Germany Ministry of the Interior, The U.S. Environmental Protection Agency, and the German Marshall Fund of the United States

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Abbreviations

APCA	Air Pollution Control Agency
AQCR	Air Quality Control Region
AQMR	Air Quality Management Region
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
CAA	Clean Air Act
CBE	Citizens for a Better Environment
CEQ	Council on Environmental Quality
CO	Carbon Monoxide
CTG	Control Technique Guideline
EPA	U.S. Environmental Protection Agency
ERC	Emission Reduction Credit
FECA	Federal Emissions Control Act
GAO	General Accounting Office
IRC	Internal Revenue Code
LAER	Lowest Achievable Emissions Rate
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NRDC	Natural Resources Defense Council
NSPS	New Source Performance Standard
NSR	New Source Review
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
RFP	Reasonable Furthes Progress
SIP	State Implementation Plan
SO_2	Sulfur dioxide
TPH	Tons per hour
TPY	Tons per year
TSP	Total suspended particulates
VOC	Volatile organic compounds

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Preface

For more than a decade, economists have discussed the potential advantages of using market-oriented techniques to achieve environmental quality goals. In contrast to the traditional "command-and-control" form of regulation, which specifies detailed requirements for compliance, these alternative approaches are designed to increase private decision making and the effectiveness of environmental policies.

Plant managers are given greater flexibility and more incentives to devise innovative and cost-effective ways to control pollution.

For example, standard regulatory approaches to controlling air pollution have generally imposed uniform emission limits on each stack or vent within a plant. These approaches do not consider the wide variation in control costs that exist among plants because of age, design, size, and production factors. However, the U.S. Environmental Protection Agency, through its Emissions Trading Program, allows plants to take advantage of these differences to find the most efficient, least-cost, or even profitable way of controlling air pollution.

"Emission Reduction Credits" are created when plants decrease their air emissions beyond current legal requirements. Plants will usually make these reductions when they are least expensive. For example, when old equipment is being replaced or new pollution control requirements must be met. These credits can be used as soon as they are created to offset pollution resulting from existing plants that expansion. They can be "banked" for future use, or traded with other plants that may find it cheaper to buy those credits than to create their own.

The costs of controlling a pound of same pollutant from adjacent processes in plants often varies by as much as 100 to 1. This new flexibility can save plant managers millions of dollars on control expenditures without adversely affectin air quality.

Another example of the market-based approach to controlling pollution is the system of effluent charges administered by the States in the Federal Republic of Germany, which is closely tied to the traditional regulation system of the Federal Water Management Act. Under this act dischargers are required to meet minimum standards of waste water treatment. Simultaneously, a fee is levied under the Federal Waste-Water Charges Act for every unit of discharge depending on the quantity and noxiousness of the effluent. Dischargers have the choice of paying the charge or reducing the discharge - consequently reducing the payment - through increased pretreatment. They can develop individual control and payment strategies that are least expensive.

The advantage of this charge system is that pollution control may become cost-effective for all dischargers. Every discharger facing an effluent charge has an incentive to reduce pollution to the extent that is less expensive to install controls rather than pay the ligher charge. Therefore, all dischargers facing the same charge will spend the same amount per unit of removal at the margin. This equalization of marginal costs means that the cost of control will be the lowest possible. Moreover, what ever the total expenditure on controls, the reduction in discharge will be the maximum possible for expenditures of that magnitude.

An Effluent Charge Program that is designed to induce firms to pretreat is unique to the Federal Republic of Germany. Similarly the Emissions Trading Program is well established only in the United States. The implementation problems associated with these approaches have been more or less extensively studied in the respective countries. However, no information has been developed or exchanged that would allow the governments to determine the applicability of these approaches to their own systems.

Therefore, the governments of both the United States and the Federal Republic of Germany, in cooperation with the German Marshall Fund of the United States have launched in July 1982 a unique cooperative research program on "Achieving Environmental Quality through Economic Incentives: A Comparative Analysis of Alternative Regulatory Approaches in the United States and the Federal Republic of Germany" which was set up under the terms of the US-FRG Environmental Agreement of 1974. The purpose of the program was to ficilitate an exchange of information and experience concerning effluent charges and emissions trading between the U.S. Environmental Protection Agency and the West German Ministry of Interior. Using existing literature and empirical studies of these market-oriented approaches, the research program should determine the advantages and limitations of implementing such techniques in the United States and West Germany.

The study reported in this volume was done as part of this research program. The report summarizes the results of a one-year effort to evaluate the U.S. Environmental Protection Agency's Emissions Trading Policy and to analyze its applicability in the Federal Republic of Germany.

Many people made important contributions to the project by providing assistance, by sharing their insights and research results, by providing very helpful comments on an earlier draft, and debate with the authors.

The work could never have begun without the cooperation and assistance of the bilateral panel of experts.

The American panel members were:

-- o Joseph Cannon, Associate Administrator for Policy and Resource Management, U.S. EPA, Washington, D.C.;

-- o Christopher DeMuth, Administrator for Information and Regulatory Affairs in the Office of Management and Budget, Washington, D.C.;

-- o Allen V. Kneese, Senior Economist at Resources for the Future, Washington, D.C.;

-- o Marvin H. Kosters, Director, Center for the Study of Government Regulations at the American Enterprise Institute, Washington, D.C.;

-- o Charles D. Malloch, Regulatory Management Director, Monsanto Corporation, St. Louis, Missouri;

-- o Michael T. DeBusschere, Air Pollution Control Officer, Louisville, Kentucky.

The German panel members were:

-- o Gerhard Feldhaus, Director, Office of Environmental Policy and Emissions Control, Federal Ministry of the Interior, Bonn;

-- o Walter Loeth, Deputy Director, Federal Ministry of Economics, Bonn;

-- o Franz-Josef Dreyhaupt, Deputy Director, Ministry of Labor, Health, and Welfare, Land Nordrhein-Westfalen, Düsseldorf;

-- o Jürgen Salzwedel, University Bonn;

-- o Horst Siebert, University Mannheim;

-- o Malte Faber, University Heidelberg;

-- o Martin Uppenbrink, Director, Department of Environmental Planning, Umweltbundesamt (ex officio), Berlin.

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We are grateful for the cooperation and assistance of the Regulatory Reform Staff of the U.S. Environmental Protection Agency. In particular, we would like to thank Michael H. Levin and Ivan J. Tether, who suffered with the utmost patience and good humor our interminable questions, and Mahesh K. Podar, who spent a lot of time to make the arrangements for our interviews.

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This cooperative project produced two reports:

The Emissions Trading Policy in the United States of America: An Evaluation of its Advantages and Disadvantages and Analysis of its Applicability in the Federal Republic of Germany, Eckard Rehbinder, Professor of Law, at the J.W. Goethe University, Frankfurt; Rolf-Ulrich Sprenger, Senior Fellow, Institute for Economic Research (IFO Munich).

The Effluent Charge System in the Federal Republic of Germany, Gardner M. Brown, Professor of Economics, and Ralph W. Johnson, Professor of Law, University of Washington, Seattle.

Copies of these publications can be obtained in the United States through the EPA and in Germany through the Federal Ministry of Interior and the Institute for Economic Research (IFO Munich). Both documents are available in English and German.

Executive Summary

I. Introduction

This report summarizes the results of a one-year effort to evaluate the U.S. Environmental Protection Agency's Emissions Trading Policy under six criteria meant to be relevant, neutral and fair: the Policy's ability to improve air quality; and its real or potential effects on cost-effectiveness, economic development, technological innovation, the administration and enforceability of the Clean Air Act, and its legal feasibility.

Such an evaluation must state several caveats. First, as for any innovation, it is critical not to compare the effects of the new policy against an idealized version of the existing regulatory regime. The test must be the new policy's incremental effects, for better or worse, on the Clean Air Act as it actually operates, rather than its effects on a statute assumed to operate perfectly.

Second, it is not always possible to identify those impacts directly attributable to EPA's regulatory reforms. For instance, it is not possible to determine whether certain emission reductions only have occurred owing to the banking and trading system or would have occurred anyway without an emissions bank (e.g. as an incidental side-benefit of projects undertaken for some other economic reason, such as energy conservation or solvent recovery).

Third, the criteria are difficult to apply in a quantitative sense. For instance, it is not possible to quantitatively evaluate the cost-effectiveness of the new strategy. It is possible, however, to ask whether the new policy is likely to be more or less cost-effective than the existing policy. Therefore, we do not attempt to quantify the extent to which the emissions trading policy will meet any particular criterion. Rather, we indicate where it appears that emissions trading is more or less successful in meeting a criterion than the existing policy.

Fourth, the policy is new and rapidly evolving. The Policy Statement issued in 1982 was an interim policy, was followed by a request for further public comment (August 31, 1983), and will soon be replaced by a final revised policy, both of which address concerns identified here. This evaluation is therefore preliminary. The issues it identifies are based more on fears than on adverse effects that have actually materialized; and steps taken by the policy to preclude such effects must also be recognized.

Furthermore, the experience with emissions trading is limited so we can make no pretense of fully understanding all there is to know about how it will work out. However, it is nature enough that some clear insights are beginning to emerge. The purpose of this paper is to isolate those insights.

Fifth, we are confronted with the problem that our analysis aimed at a variety of targets since there are a number of state and local versions aside from the EPA policy on emissions trading as articulated in the Policy Statement. The Policy Statement only sets forth minimum legal conditions EPA considers necessary for emissions trades to satisfy CAA requirements. Therefore states are free to adopt generic rules which incorporate all or any combination of the proposed trading approaches or to let trades continue to be implemented as individual SIP revisions. Furthermore, states are free to stipulate additional criteria for assuring that certain loopholes are avoided and their attainment strategy will not be jeopardized. This evaluation is therefore incomplete.

II. Emissions Trading

Generally speaking, the policy allows plants to reduce pollution control costs by substituting inexpensive extra emission reductions for costly required ones, so long as this "trade" produces equal or better environmental results. Savings are possible because the cost of removing one unit of the same pollutant often varies widely. They may be pursued by <u>bubbles</u> which allow emergers of existing one or more plants to re-allocate their SIP emission limits, controlling cheaply-controlled stacks or vents more in exchange for less control of those which are expensive to control; by <u>netting</u>, which excuses expansions or modernizations in clean areas from stringent requirements applicable to "new sources", provided plant-wide emissions do not significantly increase; by <u>offsets</u>, which allow new sources to locate in nonattainment areas, so long as they secure greater reductions from existing plants; and by <u>banking</u>, which encourages plants to create extra reductions at optimal times and store them in a legally-protected manner for future use or sale.

The components of emissions trading complement one another. Where a bubble produces an overall reduction in emissions, that reduction may be stored in a bank for future use or sale; where banked reductions exist, they can be used either by existing sources to meet State control requirements inexpensively, or by new sources seeking to locate, expand or modernize in non-attainent areas.

Transactions under the emissions trading system can only use reductions (ERCs) that are surplus (greater than required by law), permanent, quantifiable, and enforceable. They must involve emissions of the same pollutant. They cannot be used to avoid limits applicable to hazardous emissions or new facilities. Applicants must demonstrate, through dispersion modelling or specified surrogates, that they will produce ambient results equal to or better than regulations applicable before the trade. All trades must be confirmed by specific enforceable permit changes, before they can be used.

III. Conclusions

Air Quality Improvement. Traditional regulation has achieved only qualified success (despite progress, after 13 years many areas have still not met statutory deadlines or air quality standards). It will become increasingly complex as regulators attempt to squeeze more reductions from already-regulated sources or regulate small unregulated ones. Emissions trading can break this regulatory deadlock in theory, and in at least some respects has produced better air quality improvement in fact. Each offset, for example, must by definition improve air quality in nonattainment areas. Banked reductions produce extra air quality while surplus reductions remain in the bank. Though bubbles are not required to improve air quality, many have produced more reductions and faster compliance than traditional regulations. The policy's general criteria for approvable emissions trades seem well calculated to encourage such results and achieve air quality objectives.

Nevertheless, the ways these criteria might be implemented raise concerns that trades could adversely affect air quality. Some of these are: that nets may worsen overall air quality in attainment areas through cumulative "insignificant" increase in emissions; that equal trades of the same pollutants might worsen air quality due to these emissions' different biochemical characteristics, undetected trace elements, unknown synergies, or effects on longrange transport; and that trades shown by dispersion modelling to produce ambient equivalence may nevertheless result in "hot spots" due to modelling ambiguities. Perhaps the most serious concern is that trades allowing credit for the shutdown of elderly facilities may unacceptably increase long-term emissions, if the source securing those credits can continue to use them beyond the "supplying" source's useful life.

These concerns are fears of effects which do not yet seem to have materialized. They must be evaluated against both the Act current operation and steps prescribed by the policy to counteract them. Under the policy and associated regulations, for example, any cumulative increases in emissions due to nets must be tracked by states for individual plants (to protect the integrity of New Source Review) and for the area as a whole (to protect the PSD increment). Adverse effects are further minimized because netting sources must still meet stringent NSPS, and because nets can only occur in areas well below ambient health standards. Equal trades of emissions with different biochemical characteristics, etc., may well improve air quality, since such ancillary effects are not considered in the original regulations. Modelling is more likely to produce "hot spots" under the traditional regime, where emission increases showing modelled attainment must be granted despite similar ambiguities --- and without an accompanying decrease. Even shutdown credits raise cognizable problems only where a state plan to promptly attain standards has not been approved by EPA. If such a plan has been approved, the area will attain without regard to any shutdown credits or the trading sources' remaining lives. If a plan has not yet been approved, no more than one-fifth of the shutdown source's emissions may be given credit under the 1982 policy, and a full plan must still be developed.

Trading should produce neutral or better ambient results than traditional regulation, if implemented with an eye toward these concerns. The 1982 policy noted several ways states could address such issues. EPA recently requested comment on further options, including a ban on shutdown credits or a requirement that they produce extra improvements, in nonattainment areas without approved plans.

Cost-effectiveness. Emissions trading can substantially reduce both the direct and indirect costs of traditional U.S. air pollution control for individual firms, state agencies and society. Unlike traditional regimes it provides strong incentives for industry to seek out low-cost innovative control methods, to control emissions more than the minimum required, to capitalize on control opportunities presented by site-specific variations, and to disclose this information, thereby facilitating air quality management.

By December 1982, EPA had approved or proposed to approve 34 bubbles saving more than $ 164 million over the cost of traditional control, with many producing greater reductions than conventional regulation. More than 100 other bubbles with average compliance savings of $ 3 million each were under review by EPA and states. These bubbles enabled more cost-effective compliance by existing sources.

Offsets and netting serve analogous functions by allowing new and expanding sources to locate, modernize or increase production more easily and cost-effectively. Between 1976 and 1982 more than 1900 offset transactions also produced considerable cost-savings. (A March 1982 report by the U.S. Congress' General Accounting Office estimated compliance savings in the billions per year from broader use of all three approaches.)

Banking can produce further savings by smoothing state agencies' workloads and making a pre-approved pool of reductions readily available for use in bubbles, offsets or nets. It also reduces the risk of control innovations, by making ERCs available should a new technique perform less well than required.

Economic Development. The traditional regime attempts to reconcile industrial growth with air quality progress by imposing very stringent "technology forcing" requirements on new sources and major modifications. The net effect has been to discourage modernization, protect existing sources from competition, and perpetuate older sources, leading to greater pollution than if regulatory barriers to replacement were not so high. Emissions trading can better allow normal industrial expansion by easing entry of new sources and revitalization of existing ones, without sacrificing air quality to development. Indeed, trading apprears to have done so, since by October 1982 nearly all states had adopted offset provisions and about 1900 offset transactions had taken place. However, less than 5 % of these offsets were between firms (as opposed to within the same firm), suggesting that development effects turn on the details of the trading system adopted by a state. I.e., the past market for interfirm transactions has been limited --- perhaps because banking was not available to help cources find outside reductions and better accomodate these competing goals.

Technological innovation. Trading appears preferable to traditional "technology-forcing," which is slow, based on inevitably poor information, and capable of worsening air quality by discouraging modernization. The policy encourages firms to control more than required, to use their superior knowledge of creative control opportunities, and to disclose such opportunities in order to profit by them. While most ERCs to date have come from low-cost investments such as transfers of available technology, or as side-benefits of other projects, this may be related to "command-and-control" tendencies to make new approaches mandatory requirements. Moreover, such results should be expected in the early stages of a new program, where regulatory risks to users are perceived to be high, where the most inexpensive alternatives would be used first, and where firms would seek to minimize large research or development costs. Nevertheless some firms did make substantial investments in alternative control strategies that seem "innovative", either in ways of managing pollution or in actual controls.

Administration/enforceability. In general the policy will neither lighten nor aggravate complex current processes for limitsetting and enforcement, though in many cases it can ease such burdens. Needs for meaningful operating permits and better compliance data are examples: it may be easier for states to require production limits or continuous monitoring on a case-by-case basis as conditions of trades from which applicants stand so save millions of dollars, than to impose such requirements across-the-board. Generic trading rules, netting, banking, and the fact that applicants must document acceptability can also simplify traditional procedures, while screening out applications whose administrative costs are likely to be high.

Major concerns here are the policy's potential to delay compliance through last-minute bubble proposals, and its potential to increase state permitting burdens through the need to evaluate novel control techniques or permit previously unregulated sources. However, the policy explicitly provides that no enforceable compliance schedule can be extended without EPA approval; and bubble applications do not defer such schedules, which remain fully enforceable until a bubble assuring equal or better progress is actually approved. Moreover, in view of the situation faced by states whose current regulations are inadequate to attain health standards, novel control techniques and increased permitting are inevitable, whether or not trades are used. The need for such additional knowledge, and for incentives to encourage sources to request regulation instead of resisting it --- put another way, the defect of centralized efforts to mandate further controls without such knowledge or flexibility --- was the main reason trading was conceived.

A. Introduction

I. Background

Economists and other analysts of government policy have long contended that the imposition of detailed rules may not be the best way to accomplish derived goals in environmental management. While such rules appear to go directly to the heart of things and guarantee the desired outcomes, they have been criticized for being economically inefficient, subject to excessive administrative and litigative delays, and demanding of far too much detailed technical knowledge for the capabilities of state and federal agencies. For a variety of reasons - perhaps the most important of which is the growing concern with the costs implied by the environmental laws of the 1970s - this concern of academics has come to be shared by many people in the U.S. government.

The U.S. Environmental Protection Agency has developed and encouraged the application of new regulatory techniques and incentives under the Clean Air Act whose objectives are to enhance the cost-effectiveness of regulation and to demonstrate the compatibility of the nation's economic development and environmental protection goals. The specific regulatory reforms, collectively referred to as "emissions trading" include:

-- the Bubble Policy: existing sources (or groups of sources) may be permitted to increase emissions beyond the current standard in exchange for compensating emission reductions at other sources at the same facility or at other facilities (owned by the same or another firm).

-- The Netting Policy: an existing source expanding or modernizing will not be subject to resource-intensive and time-consuming administrative procedures for new plants if the sources compensate for added emissions by reducing the pollution from existing emission sources in the same plant.

-- the Offset Policy: a new source may add emissions in a nonattainment area if it pays for a greater reduction in emissions somewhere else in the same area;

-- Emissions Banking and Trading: a firm that beats its emission standard may deposit as a credit some fraction of its excess emissions reductions in an emissions bank, which can be stored in a legally-protected manner for possible future expansion needs, used as a hedge against future reductions in permissible emissions, or sold to some other firm that seeks emission permits.

All of these approaches are intended to encourage the use of emissions trades to achieve a more rapid attainment of national ambient air quality standards by stimulating faster compliance. They are designed to introduce flexibility into the means by which firms comply with environmental regulations by introducing the possibility of trading emissions at one place for emissions somewhere else. They are designed to produce significant savings in pollution control costs and to remove existing barriers to technological innovation. They are also intended to make extra pollution control profitable generating voluntary control by unregulated sources as well as improved control by regulated ones and to produce better information for air quality planning.

II. Objectives, Scope, and Methodlology

Given the foregoing background, the objectives of this study are:

-- to summarize available information on EPA's regulatory reforms under the Clean Air Act

-- to trace the evolution of the new market-oriented approaches

-- to identify the factors influencing their design and implementation

-- to describe initial experience implementing the new approaches

-- to evaluate their advantages and disadvantages

and finally,

-- to examine whether the U.S. experience may provide lessons useful to future efforts in the Federal Republic of Germany to implement such market-oriented approaches to pollution control.

To meet these objectives, we have focussed on the following main issues:

First, we have attempted to characterize EPA's emissions trading policy by focusing on:

-- the history and goals of EPA's regulatory reforms under the Clean Air Act

-- the evolution of the emissions trading policy

-- the design of the new concept and its key terms

-- the basic requirements that have to be satisfied by any applicant

-- the political, legal, administrative and economic framework of these reforms

-- and the number of transactions that have occured thus far.

This summary of the major facts about EPA's regulatory reforms has served as a necessary background for the subsequent evaluation of these reforms.

A second focus of the study was on the environmental impacts, cost-effectiveness, growth effects incentives for innovation, administrative ease, enforceability etc. of the emissions trading policy from a theoretical and empirical point of view. Here we have tried to examine a wide range of questions related to the evaluation of any environmental policy. EPA's regulatory reform has been assessed in accordance with evaluative criteria derived both:

-- from the specific objectives of U.S. air pollution control policy, and

-- from reasonable expectations one should have about any environmental policy.

A third focus of the study was on the usefulness of an export of EPA's new policy across the Atlantic and a future application in the Federal Republic of Germany.

Here we have engaged in analyzing the problems associated with an application and implementation of novel regulatory reforms in the Federal Republic of Germany.

We have focussed most of our attention upon any significant differences in the environmental goals and in the legal, institutional, or economic structures of the United States and the Federal Republic of Germany that may effect implementation of novel regulatory reforms. We have attempted to identify some of the questions West German decision-makers must confront when developing an emissions trading system in the Federal Republic of Germany.

To meet the objectives of this study, we first conducted a thorough review of the Emissions Trading Policy Statement and other government publications, literature, economic studies, and articles pertaining to the Clean Air Act, command-and-control regulation, and emissions trading. This research effort provided an overview about regulatory development at the federal level and nation-wide efforts toward implementing market-oriented approaches.

Second, armed with hypotheses as to the possible working of the emissions trading policy we performed an extensive program of interviews with experts and interest groups (see Appendix XIII).

Our methodological approach thus consisted of a review of literature and field work. Throughout the report, we rely heavily on legal and economic analysis. Moreover, we made every effort to obtain documented evidence on implementation problems associated with the emissions trading policy.

Since the experience with emissions trading is limited we cannot pretend to fully understand all there is to know about how it will work out. It is mature enough, however, that some clear insights are beginning to emerge. The purpose of this report is to isolate those insights.

B. The Emissions Trading Policy in the Context of the Present Regulatory System

I. The Regulatory System

The Clean Air Act 1970[1)] seeks to keep the ambient concentrations of selected pollutants at a level considered to be sufficient to protect public health and public welfare by establishing ambient air quality standards that are to be enforced by state implementation plans. Furthermore, it limits the emissions of certain hazardous pollutants by requiring the determination of emission standards. Finally, it establishes performance standards, i.e. regularly emission standards, for new and modernizing existing sources reflecting the application of advanced control technology (New Source Performance Standards).

The Clean Air Act Amendments of 1977[2)] added two complex regulatory frameworks which supplement the general requirements, the nonattainment and the non-deterioration programs. The nonattainment program mandated the states to revise the state implementation plans in areas that did not attain the ambient air quality standards by the statutory deadline and introduced stricter requirements for sources regulated under these implementation plans, especially by imposing the use of advanced control technology (lowest achievable emission rate for new and modernizing existing sources, and reasonably available control technology for existing sources). The non-deterioration program attempts to maintain the existing air quality in areas of the country where the ambient air quality is better than the ambient air quality standards require; it permits only specified increases of the existing pollution levels and requires new and modernizing existing sources to use advanced control technology (best available control technology). Since any area in the country is, with respect to a particular criteria pollutant, either a nonattainment or a clean (attainment) area, either of the two regulatory frameworks is applicable throughout the country.

1. Key Elements of the Regulatory System Established by the CAA of 1970

a) National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency specify maximum concentrations of pollutants legally permissible throughout the country.[3)] The standards define the quality of air which must be achieved to prevent adverse effects. Two kinds of standards are provided: primary and secondary. The primary standards are designed to protect public health, while allowing an adequate margin of safety, and establish levels of pollution which cannot be exceeded without causing adverse effects on human health. The secondary standards are designed for the protection of public welfare, e.g., vegetation, property damage, scenic value. Air quality standards are set for a limited number of pollutants which the legislature considered to be most critical, the so-called criteria pollutants,[4)] namely particulates, sulfur oxide, photochemical oxidants (measured as ozone), hydrocarbons, nitrogene oxides, carbon monoxide, and lead (See Table 1). There is no ambient air quality control program for any other pollutant.

Table 1

National Ambient Air Quality Standards a/

Pollutant	Averaging Time	Standard Levels Primary	Standard Levels Secondary
PM	Annual (geometric mean)	75 ug/m3	60 ug/m3
	24 hrs b/	260 ug/m3	150 ug/m3
SO_2	Annual (arithmetic mean)	80 ug/m3 (0.03ppm)	-
	24 hrs b/	365 ug/m3 (0.14ppm)	-
	3 hrs	-	1300 ug/m3 (0.5ppm)
CO	8 hrs b/	10 ug/m3 (9 ppm)	10 ug/m3 (9 ppm)
	1 hr b/	40 ug/m3 (35 ppm)	40 ug/m3 (35 ppm)
NO_2	Annual (arithmetic mean)	100 ug/m3 (0.05 ppm)	100 ug/m3 (0/05 ppm)
O_3	1 hr b/	235 ug/m3 (0.12 ppm)	235 ug/m3 (0.12 ppm)
HC (non-methane) c/	3 hrs (6 am to 9 am)	160 ug/m3 (0.24 ppm)	160 ug/m3 (0.24 ppm)
Lead	3 months	1.5 ug/m3	1.5ug/m3

a/The National Ambient Air Quality Standards (NAAQS) are classified as either primary or secondary, and cross-classified according to various time periods of compliance. The primary NAAQS are designed to "protect the public health." The secondary standards are more severe and are designed to "protect the public welfare from any known or anticipated adverse effects...." The functional meaning of a tandem NAAQS can be best described as that of a target and goal relationship; i.e., the primary NAAQS serves as a target with the secondary NAAQS as the goal. The Clean Air Act calls for attaining the primary standard "as expeditiously as practicable" while specifying a reasonable time at which such secondary standard will be attained."

b/Not to be exceeded more than once per year. Previously, this standard governed concentrations of photochemical oxidants, which are approximately 90 percent ozone.

c/A nonhealth related standard used as a guide for ozone control.

Source: Environmental Quality: The 11th Annual Report of the Council on Environmental Quality-1980, p. 172.

The principal NAAQSs were set in 1971. The lead standard was determined only in 1978, and in 1979 the (short-term) ozone standard was somewhat relaxed; all other standards have remained unchanged since their original specification. The secondary standards are largely identical with the primary standards. Exceptions are sulphur dioxide and particulates, for which there are stricter long- and/or short-term standards. Since the NAAQSs are designed to prevent adverse effects by air pollution and scientific evidence demonstrates that such adverse effects presented by air pollutants may depend on the time of exposure, the standards often determine two kinds of limitations of concentration levels - long-term standards which may not be exceeded on an annual average, and short-term standards which may not be exceeded for periods between one or 24 hours, depending on the pollutant. The annual standard is applied as a (geometric or arithmetric) mean, while the short-term standards are applied as maximum concentrations which, over the period indicated, may not be exceeded more than once per year.[5)]

As stated, the standards are designed to protect against adverse effects of air pollutants. With respect to primary standards, economic considerations are irrelevant; in particular, the economic feasibility of achieving a primary standard does not justify non-enforcement of the standard .[6)] The secondary standards may contain an element of economic feasibility only to a limited extent. The Act does not require that these standards allow for an adequate margin of safety; to this extent, economic considerations are legitimate.[7)]

The Clean Air Act 1970 provided that the primary standards should have been attained by 1975, subject to a two-year extension under certain conditions. July 31, 1977 was the ultimate statutory deadline for attainment of the primary standards.[8)] The secondary standards should be achieved within a "reasonable time".[9)] Since by

Table 2

NUMBER OF COUNTIES NONATTAINMENT FOR PRIMARY STANDARDS

EPA Region	Primary TSP	Primary SO_2	NO_2	CO 1982*	CO 1987*	O_3 1982*	O_3 1987*	Total N/A**
I	5	2	0	3	12	18	27	49
II	2	1	0	9	17	22	31	53
III	20	8	0	0	9	64	35	104
IV	27	9	0	1	8	34	12	66
V	58	41	1	22	6	116	29	171
VI	12	1	0	3	1	32	2	41
VII	14	1	0	5	2	6	5	22
VIII	18	6	6	4	12	0	8	27
IX	31	8	4	7	22	19	17	55
X	10	2	0	4	9	4	5	20
Totals	197	79	11	58	98	315	171	608

+The "1982" column shows the number of nonattainment counties where no extension of the 1982 attainment deadline was requested. The "1987" column shows the number of counties where states were granted an extension through 1987.

++The "Total N/A" column shows the number of counties that are nonattainment for the primary standard for one or more pollutants.

NOTE: ere are 3,140 counties in the United States.

Source: Information provided by the U.S. Environmental Protection Agency.

the ultimate deadline many areas had not attained the primary standards - attainment was highest with respect to sulphur dioxide and carbon monoxide and lowest with respect to photochemical oxidants and hydrocarbons - the Clean Air Act Amendments of 1977 extended the ultimate deadline for compliance with the primary standards until December 31, 1982, for carbon monoxide and oxidants until December 31, 1987. It can be predicted that these relaxed deadlines will not be met, either, by all AQCRs, so that a new extension may become necessary.

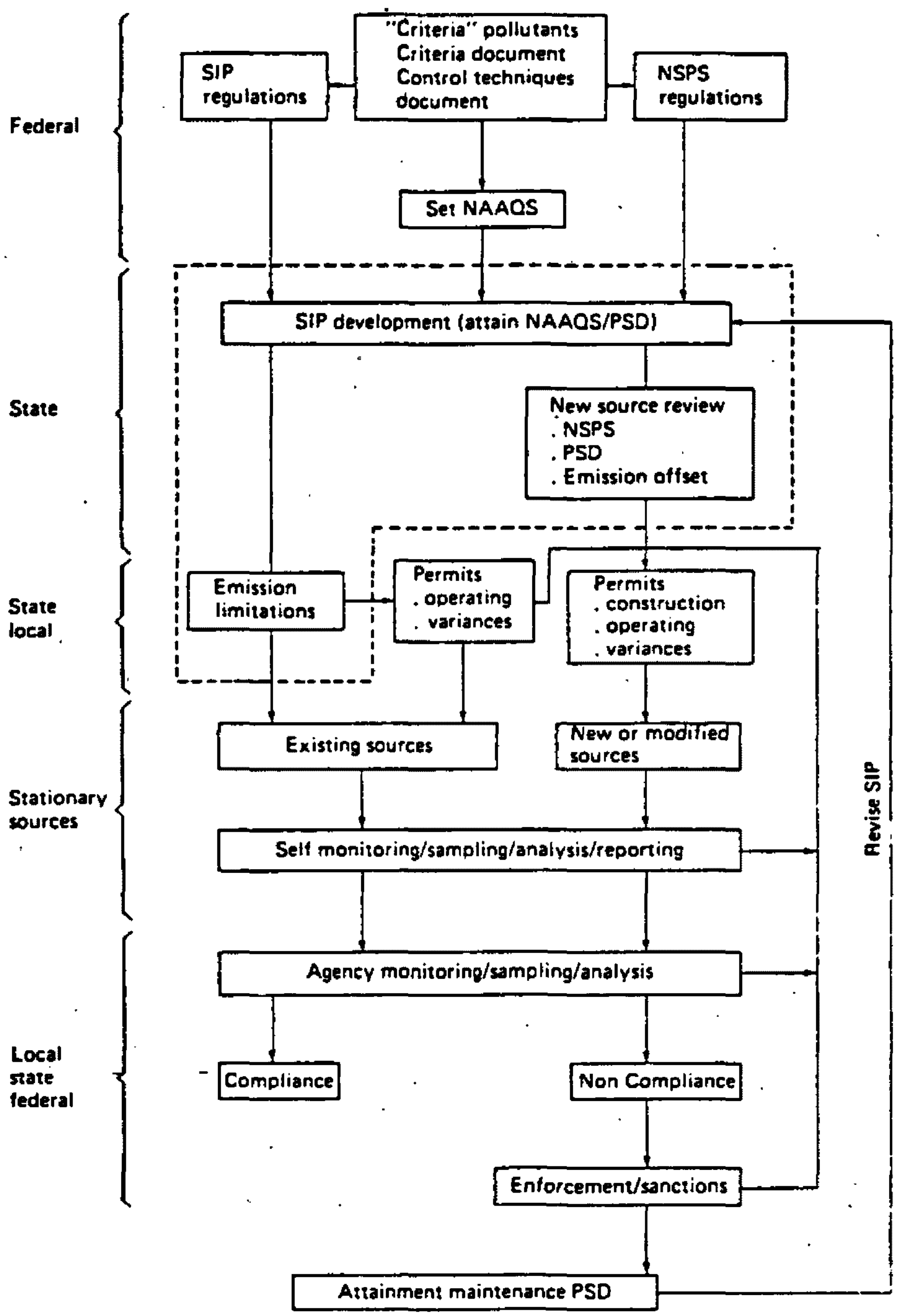
b) State Implementation Plans

The primary instrument for ensuring the implementation, maintenance and enforcement of the primary and secondary standards is the State Implementation Plan (SIP). The responsibility to develop and adopt the SIP is delegated to the state agencies; however, the SIPs must be submitted to EPA for approval, and where a SIP does not ensure attainment of the standards by the statutory deadline, EPA may substitute its own SIP for that submitted by the state agency.[10)] To provide basic geographic units for the air pollution control program, the country was divided into 247 air quality control regions (AQCRs) which were composed of smaller air quality management areas (AQMAs). Attainment must be achieved in any AQCR or AQMA; however, with the exception of California, the states would adopt only a single SIP for their whole territory (based on partial plans developed by the regions).

For obtaining EPA approval, the SIP must set forth a combination of control measures whose combined effect will result in attainment by the statutory deadline.[11)] The applicable control measures are emission limitations, schedules and time-tables for compliance, and, if necessary, other measures that are necessary to ensure attainment and maintenance of the standards such as technical specification standards, input standards and transportation controls. Dispersion techniques such as stack heights and intermittent controls are in principle not allowed as a means of achieving the NAAQSs; since 1977 stack height can only be considered to the extent that it does not exceed good engineering practice as determined under regulations promulgated by the EPA.[12)]

The first generation of SIPs were rather deficient.[13)] Due to the lack of available air quality data and adequate modelling, many SIPs utilized a simplified concept of making a single computation for the whole AQCR and applied a standard rollback approach, estimating the total quantity of the pollution of the AQCR and the amount of reduction necessary to attain the standards, and requiring all major sources to reduce their emissions by the percentage so calculated. This approach had the result that in many portions of the AQCR, the controls required of the polluters were inadequate, while in - fewer - other parts excessive controls were imposed upon polluters. The 1977 amendments therefore required a complete revision of all implementation plans in all areas where the standards have not been achieved by the original statutory deadline. This revision was to be completed by July 1, 1979, and it was expected that the revised SIPs were based on better monitoring data and modelling with respect to particular sources. The deadline of 1979 has not been met by many states. In the Spring of 1984, there still were some states that did not have approved SIPs for their or some of their non-attainment areas, and other SIPs had only been approved conditionally.

EXHIBIT 1 Major Elements in Air Quality Management in the U.S.



Source: Brady and Bower, Benefit-Cost Analysis in Air Quality Management, 15 *Environmental Science and Technology* 256 (1981)

The implementation plans set forth individual requirements with respect to all sources, new sources as well as existing sources. The most frequent control technique are requirements applicable to particular categories of sources rather than individual sources. In this case, the individual emission limitations applicable to a source can only be tracked by reference to additional computerized lists of sources and requirements applicable to them. Generally, there are no absolute emission limitations but, rather, emission rates per production unit or operating hours. However, the SIP normally assumes, in a rough fashion, a certain production capacity of the regulated sources.

The major control device for ensuring compliance with the SIP is a preconstruction review program for major new sources and the (significant) modification of existing sources.[14)] However, the Act of 1970 did not require the granting of permits for these sources.

c) <u>National Emission Standards for Hazardous Pollutants</u>

In addition to the ambient air quality standards, the Clean Air Act requires EPA to promulgate National Emission Standards for Hazardous Pollutants (NESHAP).[15)] These standards apply to pollutants to which no ambient air quality standard is applicable and which cause or contribute to an increase in mortality or serious irreversible illness. EPA listed more than 40 pollutants that qualify for potential regulation but has listed only seven as hazardous. Hazardous pollutant standards apply to substances such as asbestos, beryllium, mercury, vinyl chloride, and benzene. The enforcement of these standards is ensured by the requirement of preconstruction review which is applicable to new sources and the modification of existing sources; however, the standards are in principle also applicable to all existing sources.

d) New Source Performance Standards

Independent of ambient considerations, the construction of major new sources and the (significant) modification of existing sources is subject to new source performance standards (NSPSs).[16] These standards are uniform technology-based emission standards which are set forth by EPA for individual industrial categories. Source is defined as any building, structure, facility, or installation which emits or may emit any air pollutant.[17] Modification of an existing source is any physical change in, or change in the method of operation which increases the amount of any pollutant or causes new pollution.[18] The regulation of major sources, i.e. sources with an emission potential of more than 100 tons per year, has priority; however, minor sources that contribute significantly to air pollution, shall also be regulated, and there are a number of NSPSs that cover such minor sources.

In principle, the law permits only the establishment of performance standards, not of other standards such as specification and operation standards. Only where performance standards are not feasible, other standards may be set.[19] With respect to fossil fuel fired sources, emission limitations as well as percentage reductions can be prescribed; with respect to all other sources, the law only provides for the setting of emission limitations. The NSPSs shall reflect the application of the best technological system of continuous emission reduction which has been adequately demonstrated.[20] This formula contains a dynamic element; it is not necessary that the control technology is already routinely achieved in industry. In prescribing the standards, the cost of achieving the standard as well as energy considerations must be taken into account. This calls for some cost-benefit considerations; in the practice of the EPA, the firms' ability to bear the cost of a particular standard as well as marginal cost-effectiveness are taken as basis for standard setting.[21]

The requirements are technological. Therefore, in the case of fossil fuel fired sources, the use of low sulfur coal is not a means to comply with the standard. However, desulphurization of fuel may be credited.[22] EPA is empowered to set forth, in respect of a pollutant, different standards for different categories of sources.[23]

As of December 31, 1983, EPA had promulgated NSPS for more than 70 categories of industrial sources. These standards sometimes apply to the whole plant, more often to certain facilities or equipment within plants.

The standards promulgated so far are no absolute limitations of total emissions; normally, they set forth a quantitative limitation per production unit. For example, the emission standard for SO_2 for coal-fired power plants is 1.2 pounds per million BTU; in addition an emission reduction rate of 90 or 70 percent is prescribed. With respect to particulate matter originating from cement production the emission standard is 0.3 pounds per ton of input. Although the law prescribes that the standards reflect the best emission reduction system available, and it was expected that the standards would be quite strict, effectively preventing the deterioration of air quality and contributing to attainment of NAAQSs, the practice of the EPA shows that this is not the case. The standards are relatively lenient; they normally are at the weak end of performance achieved by reference technology.[24)]

The instrument for enforcing the NSPS is the requirement of preconstruction review. Sources subject to the standard may only be constructed or modified if the competent state agency has granted the operator a permit.[25)] For that purpose, the operator must give advance notification to the state before beginning construction or modification, further notification is required before starting operation of the source, and finally the operator must submit operating data after start-up.

2. The Nonattainment Program

a) Background of the Nonattainment Program

The provisions of the 1977 Amendments are a Congressional response to the failure of the states to achieve the NAAQSs within the time limit provided in the Clean Air Act 1970.[26)] As stated, in developing SIPs to achieve the NAAQSs, the states used incomplete data and, if any, inadequate modelling; they concentrated on cleaning up pollution from existing sources, normally by using a rough roll-back strategy of equal reduction of pollution from these sources; delays occurred because many polluters were able to negotiate extensions for compliance. This had the result that in many areas the controls of existing sources to achieve compliance were inadequate. Moreover, the control of new and modified sources was not satisfactory. Although the Clean Air Act 1970 required the states to adopt, in the framework of the SIP, a program for preconstruction review of new and modified sources and these sources were also subject to preconstruction review to achieve the NSPSs, little attention was laid on review of these sources for the purpose of achieving the targets of the SIP. It was assumed that the NAAQSs would be attained and that, due to the NSPSs, new sources could not be expected to contribute considerably to ambient quality problems. With the passage of the initial deadline for achieving the NAAQSs in 1975 it gradually became clear that in many areas the standards would not be met. This would have had serious consequences for the construction of new and the modification of existing sources. Under the concept of the Clean Air Act 1970, no new construction or modification permits could be issued if the deadlines for attainment were not met. Thus, the Clean Air Act could have stopped new industrial construction in substantial parts of the country. In 1976 EPA made an attempt to limit the rigor of this restriction and reconcile the conflicting national interests in clean air and continued industrial growth by issuing an Interpretative Ruling which introduced the "offset policy".[27)] The Ruling provided that new plants could be constructed and existing ones modified in non-attainment areas, but only if stringent conditions were met; in particular, emission increases from new or modernizing existing sources had to be offset by decreases from other sources. Congress responded to the no-growth dilemma by adopting the Clean Air Act Amendments 1977 which contain many elements of the EPA offset policy.

Under the Clean Air Act Amendments 1977, the country is divided into nonattainment and attainment areas. Where an AQCR or, more frequently, an AQMA violates a primary or secondary NAAQS, with respect to any criteria pollutant, it is considered a nonattainment area for that pollutant; for pollutants that do not exceed the NAAQSs, the same area is an attainment (PSD) area. The final determination of areas as nonattainment areas is made by EPA.

b) Revision of SIPs

The states are required to revise their implementation plans with respect to nonattainment areas by June 30, 1979. If approved or conditionally approved, the revised SIP is the framework for pollution control in these areas. In particular, it applies to all sources that seek to construct or modify in nonattainment areas. If a state fails to adopt a revised SIP or approval has not been given by EPA by mid-1979, the 1977 Amendments provide for a construction ban for major new or modified sources.[28)] The major impact of this threat was not so much that new construction was actually stopped; rather, it lead to a speedy revision of SIPs (although the 1979 deadline was met only by a few states). The reason for this is that pending permit applications could be processed and EPA avoided the construction ban by giving deficient SIPs conditional approvals.[29)]

The revised SIP must ensure the attainment of any of the NAAQs as "expeditiously as practicable".[30)] The ultimate deadline is December 31, 1982, and with respect to photochemical oxidants and carbon monoxide December 31, 1987. As many as 29 states applied for such extensions for all or parts of the state, especially for metropolitain areas. Before the scheduled attainment of the NAAQs, the revised SIP must provide "reasonable further progress" (RFP) towards achieving the NAAQSs.[31)] Reasonable further progress is defined as annual incremental reductions in emissions, including substantial reductions in the early years following approval of the revised SIP and regular reductions after that period that provide attainment by the deadline.

c) Preconstruction Review

Moreover, the revised SIP must provide a permit program for new sources and modified existing sources.[32] The Clean Air Act Amendments of 1977 substituted this direct permit program for the previous preconstruction review which left the states latitude in determining the applicable control program for these sources. Its purpose is to ensure that the construction or modification of major sources does not prevent attainment of the NAAQSs by the statutory deadline.

The precontruction review program does not apply to all new sources or modified existing sources. Rather, it is confined to major sources; in the case of a modification of a major source, only a significant modification is relevant.[33] Major source is defined as a source which emits, or has the potential to emit, 100 tons per year of any criteria pollutant for which a NAAQS exists. Some states, such as California, have introduced lower cutoff levels for new source review. A significant modification is defined as a change in the design or mode of operation of a source which increases the annual emissions by 40 tons per year.

The interpretation of the new requirements caused a number of difficulties. First of all, the definition of "potential to emit" which is designed to extend the coverage of the control program for new or modified sources was controversial. EPA determined that the threshold would be calculated on the basis of the source's uncontrolled emissions, disregarding emissions that are controlled by the operation of control technology.[34] After the decision of the US Court of Appeal for the District of Columbia in Alabama Power Co. v. Costle[35], the interpretation of the term "potential to emit" is based on the controlled emissions of the source. The threshold is to be calculated on the assumption that air pollution control equipment is incorporated into the design of the facility and will function to control emissions in the manner anticipated when the calculation is made; in other words, for determining the threshold only those emissions are taken into account that are likely to be emitted when control equipment has been installed and is operating, and emission limitations are federally enforceable (according to recent suggestions: are enforceable, i.e. contained in SIPs, NSPSs, construction permits issued under SIPs or NESHAPs). The new definition narrows the scope of application of preconstruction review but it sets a more realistic standard; as a practical matter, it allows for greater initial growth in non-attainment areas.

Problems with the interpretation of the term "source" have also arisen. They are, in particular, relevant for the determination whether a modification of an existing source is subject to new source review or emission increases from new equipment can be compensated by decreases from existing equipment to avoid new source review. The "netting policy", which is a part of the "Emissions Trading Policy", permits modernizing plants to "net out" of preconstruction review (see below pp. 38-9).

d) Requirements for Major New Sources

Major new and modified existing sources are, within the framework of preconstruction permit procedure, subject to four sets of requirements:

- lowest achievable emission rate,
- compliance of all other sources operated or owned by the

applicant with existing regulations or orders,
- the applicable SIP must be carried out,
- a net reduction of total emissions in the area.

First, the applicant must demonstrate that the emissions of the relevant source are within the lowest achievable emission rate (LAER) for that source[36]. The Act states that this rate must reflect the most stringent emission limitation which is contained in any implementation plan or which is achievable in practice, whichever is more stringent. The objective of this provision is to force new or modified sources in nonattainment areas to use the best control technologies and processes available in practice. Availability in theory is not sufficient. In contrast to the BACT standard applicable in PSD areas, the law does not direct that cost considerations be taken into account; however, the requirement of availability in practice means that a control technology that is so expensive as to prevent the construction or operation of the source is not to be considered as "achievable".[37] It is safe to say that cost considerations have less weight than in NSPSs. Therefore, theoretically, the LAER standard is the strictest among the various technology-based standards established under the Act.

The LAER standard is to be set forth by the state in the SIP. It is to be determined class-by-class or category-by-category of sources. The statute assumes that a certain variation among the states in determining LAER standards will occur. The statutory requirement that LAER determinations by the states may not be less stringent than the federal NSPSs limits the discretion of the states. In practice, the LAER standards do not set absolute emission limitations; normally, the sources are subject to specified emission rates per unit of production or time. LAER in general requires control technology that is similar to the NSPSs or even RACT (CTG).[38] It must be noted that, due to different cutoff levels, a source in a nonattainment area may be subject to NSPSs but not to LAER.

Second, the applicant must demonstrate that all other stationary sources owned or operated by the applicant or by any entity controlling, controlled by, or under common control with the applicant within the same state are subject to emission limitations and are in compliance with all applicable regulations or orders.[39] Each source must either comply with the applicable emission limitations, *i.e.* must have fully completed the required abatement program, or be on an approved schedule for compliance. Where a source is in delay with its abatement program, the SIP must be revised in order to formally incorporate a revised timetable for compliance, or EPA must have approved the new schedule in a delayed compliance order. Mere approval by the state agency is not sufficient.

Third, a permit may be granted only if the applicable SIP "is being carried out".[40] This requirement links the permit with the progress of the whole state air pollution control program as set forth in the revised SIP and hence with factors entirely beyond the control of the applicant. The requirement means that there must be actual "reasonable further progress" towards achieving the NAAQSs within the statutory deadline. Where a revised SIP has been unrealistic or is not enforced with sufficient vigor, it may be difficult to demonstrate that the SIP is being carried out.

Fourth, new sources or modified existing sources may be allowed in nonattainment areas only when it is ensured that a net reduction of total emissions occurs.[41] The 1977 Amendments require reasonable further progress towards achieving the NAAQSs including substantial reduction of emissions in the early years after the adoption of the revised SIP and regular reductions after that period. For meeting this requirement, the states have the choice between two options:

- growth allowance, or
- offset.

To make room for additional development, the states can create a growth allowance by requiring reduction of emissions from existing sources beyond the extent necessary for meeting the AAQSs;[42] in this case, a new or modified existing source will be permitted where its emissions will not exceed the allowance for new sources in the area. This method amounts to a mandatory creation of emission reduction credits and transfer to the state which then distributes them on the basis of "first-come-first-served". It is not frequently used because the states found it difficult to reduce emissions from all existing sources to an extent that not only the NAAQSs could be achieved by the statutory deadline but also room for new sources was created.[43] The only exceptions are states that had adopted SIPs on the basis of the old ozone standards which were then relaxed by EPA; these states were able to use the existing emission limitations for creating a growth margin.

The other more realistic option for a state is to simply require reductions of emissions from existing sources which are sufficient to meet the NAAQSs in the future; in this case, the 1977 Amendments allow the construction of a major new or the modification of an existing source only when total allowable emissions from existing sources, from new sources which are not major emitting sources and from the proposed facility are less than total emissions from existing sources allowed under the SIP prior to the application and this net reduction of emission represents further reasonable progress. For achieving such reductions, the relevant new source will have to seek reductions of emissions from other (existing) sources which offset its emissions.[44] This offset concept had been adopted by the EPA in the Interpretive Ruling of 1976 when it became clear that non-compliance with the NAAQSs in many AQCRs and the ensuing construction ban for new sources in these areas threatened industrial growth. The Amendments of 1977 incorporate its essential elements into the Act.

It must be noted that in case of coal conversion EPA allows a new source or a modification of an existing source in a nonattainment area without obtaining offsets if the source is in a locality within the area that meets the NAAQSs.

e) Requirements for Existing Sources

Besides the requirements for major new or modified existing sources, the 1977 Amendments also contain special requirements for existing sources in nonattainment areas. The revised SIPs must provide such emission reductions from existing sources in an nonattainment area as may be obtained through the use of reasonably available control technology (RACT)[46]. This is a minimum standard which must be imposed on all major existing sources, except where the necessary technology is not available. It requires a determination that a given control technology, considering the costs of installing and operation, is feasible for the average source of a class or category of sources.[47] The SIP may go beyond RACT or revise RACT definitions once accepted or it may, with respect to particular sources or groups of cources, set forth less stringent requirements if this can be based on the particular conditions of the relevant sources, although in practice this is rare.

EPA has published Control Techniques Guidelines (CTG) which define available control technology (design standards) as a basis for the states to determine RACT.

f) Requirements for Minor Sources

With respect to new or modified existing sources which, due to their low size, are not considered as major emitting sources, the Act does not contain particular requirements. However, the states are free to set a lower threshold for preconstruction review than mandated by the Act and thus subject certain minor sources to major new source requirements.

3. The Prevention of Significant Deterioration Program

a) Key Elements of the PSD Program

The Prevention of Significant Deterioration (PSD) Program which originally was developed under doubtful statutory authority by EPA and the courts and then adopted in its basic elements by the 1977 Amendments seeks to ensure that economic growth and associated air pollution does not severely compromise the existing ambient air quality in areas in which the air is cleaner than the NAAQSs require.[48)] In these areas (PSD areas), only a specified growth ("increment") of air quality deterioration is permitted, and major new and modified existing sources are subject to a permit procedure that seeks to ensure that these increments are not exceeded. The PSD program applies, with respect to TSP, to all or portions of 90 percent and with respect to SO_2, to 97 percent of the country's AQCRs.[49)]

Under the PSD program, the AQCRs that achieve the NAAQSs with respect to any criteria pollutant are divided into three classes according to the relative degree of protection to be provided each.[50)] Certain pristine areas such as national parks and wilderness areas of a certain size are permanently designated by statute as Class I. This category is afforded the highest degree of protection and allows only for minor air quality deterioration. All other areas are initially designated Class II allowing more intensive growth (amounting to roughly 25 percent increase in pollution levels). States are authorized to redesignate areas either as Class I or, subject to some exceptions, also as Class III, put in practice, this has only seldom been done. Thus, the regime for class II is the normal PSD regime.

The 1977 Amendments themselves determine the allowable increments for sulfur dioxide and particulates for each of the three PSD classes[51)].

"(b)(1) For any class I area, the maximum allowable increase in *concentrations of sulfur* dioxide and particulate matter over the baseline concentration of such pollutants shall not exceed the following amounts:

"Pollutant	Maximum allowable increase (in micrograms per cubic meter)
Particulate matter:	
Annual geometric mean	5
Twenty-four-hour maximum	10
Sulfur dioxide:	
Annual arithmetic mean	2
Twenty-four-hour maximum	5
Three-hour maximum	25

"(2) For any class II area, the maximum allowable increase in concentrations of sulfur dioxide and particulate matter over the baseline concentration of such pollutants shall not exceed the following amounts:

"Pollutant	Maximum allowable increase (in micrograms per cubic meter)
Particulate matter:	
Annual geometric mean	19
Twenty-four-hour maximum	37
Sulfur dioxide:	
Annual arithmetic mean	20
Twenty-four-hour maximum	91
Three-hour maximum	512

"(3) For any class III area, the maximum allowable increase in concentrations of sulfur dioxide and particulate matter over the baseline concentration of such pollutants shall not exceed the following amounts:

"Pollutant	Maximum allowable increase (in micrograms per cubic meter)
Particulate matter:	
Annual geometric mean	37
Twenty-four-hour maximum	75
Sulfur dioxide:	
Annual arithmetic mean	40
Twenty-four-hour maximum	182
Three-hour maximum	700

The increments which are expressed in numerical values (micrograms per cubic meter) are a measure of how much dirtier the air may become at a particular location; their structure corresponds to that of the NAAQSs. In each class, the increments allow for the same absolute increases in pollution levels. The upper limit of the increment is the ceiling. It is the baseline concentration plus the increment. As a practical matter, the ceilings are a kind of differentiated tertiary ambient air quality standard for clean air areas specifying maximum levels of allowable pollution from increases over the (varied) baseline concentrations of individual pollutants.[52)]

There is as yet no comparable PSD program for other pollutants. By mid-1979, the EPA was required to promulgate regulations to prevent the significant deterioration of air quality resulting from other pollutants such as hydrocarbons, carbon monoxide, photochemical oxidants and nitrogen oxides[53)] but has not done so. However, this does not mean that these pollutants are outside the scope of PSD regulation. All other requirements of the PSD program, especially the analysis of anticipated emissions to determine applicability of PSD review, the analysis of impact on ambient air (maintenance of NAAQSs) and the technology-related requirements apply to these pollutants.[54)]

Moreover, the Act contains provisions for the protection of soil and vegetation as well as the protection of visibility in pristine areas.

b) Role of SIPs

The implementation of the PSD program primarily is carried out through the SIP. The SIP must ensure that the allowable increments for sulphur dioxide and particulate matter as well as the NAAQSs are not exceeded. EPA takes the view that this concept also mandates special SIP requirements to prevent a violation of the increments - beyond those necessary for simply maintaining the NAAQS - for all, including existing, sources (*e.g.*, periodic review of emission increases outside new source review and additional emission limitations when necessary to cure a violation of the increment). This view was upheld by the courts.[55] However, the emphasis of the PSD program is laid on major new and modified existing sources (facilities).

c) Preconstruction Review

Under the 1977 Amendments, major new and modified existing sources (facilities) in PSD areas are subject to the requirement of a preconstruction permit.[56]

Major emitting facilities are facilities whose potential emissions exceed 100 tons per year if they fall into one of the 28 categories specifically designated in the Act.

"Sec. 169. For purposes of this part

"(1) The term 'major emitting facility' means any of the following stationary sources of air pollutants which emit, or have the potential to emit, one hundred tons per year or more of any air pollutant from the following types of stationary sources: fossil-fuel fired steam electric plants of more than two hundred and fifty million British thermal units per hour heat input, coal cleaning plants (thermal dryers), kraft pulp mills, Portland Cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than two hundred and fifty tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, secondary metal production facilities, chemical process plants, fossil-fuel boilers of more than two hundred and fifty million British thermal units per hour heat input, petroleum storage and transfer facilities with a capacity exceeding three hundred thousand barrels, taconite ore processing facilities, glass fiber processing plants, charcoal production facilities.

The term "major emitting facility" also covers facilities with an emission potential of more than 250 tons per year of any criteria pollutant.[57] These levels are relatively low. 90 percent of emissions from new sources in PSD areas stem from sources that emit 100 tons and more.[58] As in the case of the nonattainment program, the notion "potential to emit" does not mean the uncontrolled emissions; rather, it refers to the facility's emitting capacity after application of control technology, provided the emission limitations are federally enforceable.[59)]

Modifications of major facilities are only subject to PSD preconstruction review where a certain threshold of significance is exceeded. This level is 25 tons per year for TSP, 40 tons for SO_2, NO_x and VOCs, 100 tons for CO, and 0.6 tons for lead; for hazardous pollutants, the significance level is 10 percent of the emission standard.[60)] A modification of an existing facility requires a permit where, due to the modification, the facility's potential to emit increases so as to exceed these thresholds.

In contrast to the nonattainment program, the notion of "facility" is broad, and the operator of a modernizing plant can "net out" of preconstruction review where the net increase of emissions is below the <u>de minimis</u> thresholds.[61)] If the threshold is exceeded, the PSD requirements apply (only) to the modernized parts of the plant.

d) <u>Requirements for Major New Sources</u>

The 1977 Amendments set forth two basic substantive requirements for granting a preconstruction permit under the PSD program: the applicant must demonstrate that the source does not consume the allowable increment over the baseline concentration and does not violate the NAAQSs, and he must apply the best available control technology (BACT) for all pollutants regulated by the Act. Furthermore, there are procedural requirements, including the requirement of a public hearing.

First, a permit for a new or modified existing source in a PSD area requires that the applicant shows that the additional emissions caused by him <u>do not consume the applicable increments</u> for sulfur dioxide or particulates.[62)] Since the allowable increment relates to the preexisting ambient air quality, such a demonstration requires the determination of the baseline concentration of the relevant pollutant which existed at the time of the first application for a PSD permit in the area beginning August 7, 1977. The baseline level also includes projected emissions from major emitting facilities on which construction commenced prior to January 6, 1975 but which has not yet begun operations before the application.[63] All other increases in pollution - from major new or modified facilities constructed after January 6, 1975 as well as from non-major and existing facilities (not assumed in the SIP)- are charged against the allowable increment.[64] Any emissions not included in the baseline are counted against the increment. The determination of the baseline and of increment consumption is based on actual emissions even if allowables are higher.[65]

A demonstration by the applicant that sulfur dioxide or particulates emitted from the new facility do not consume the increment requires adequate monitoring data and accurate dispersion models in order to determine the baseline concentration, increment consumption due to the contribution of previously approved major new sources and existing sources not in the baseline and the consumption of the increment by the applicant's source. The Act requires, above certain insignificance levels, monitoring of pollutant levels before application either by the applicant or the state.[66] In addition, EPA may also demand monitoring after construction when necessary. EPA has also issued modelling guidelines that shall facilitate the determination whether the increment is consumed.[67] Nevertheless, the monitoring and modelling requirements of the Act have remained controversial; in particular, concerns have been raised about the uniformity of monitoring and modelling techniques employed by the EPA regional offices, and about overlap problems.[68]

In practice, increment consumption is not very important. The application of federal and state emission standards, including BACT, and the gradual retirement of existing sources normally prevent an increment consumption. Apart from some areas in the Northwest and Texas, the major effect of the increment consumption review seems to be on industrial planning.[69)]

Beyond increment consumption, the applicant must also demonstrate that the pollutants emitted from the new or modified source do not contribute to a violation of the NAAQSs.[70)] This requirement is important in PSD areas where the concentration levels, although not exceeding the NAAQSs, are high and any additional source may cause a violation of the standards ("pre-nonattainment areas"). Moreover, this requirement is not only applicable for pollutants for which increments have been established by the Act, namely sulfur dioxide and particulates, but for all other criteria pollutants.

Second, the applicant must use the best available control technology (BACT) for all pollutants covered by NAAQSs, NSPSs or NESHAP, not only those for which the source is major (but subject to *de minimis* exceptions).[71)] In case of modernization, BACT is required only for the modernized unit and pollutants for which there is a significant net increase. In contrast to the NSPSs, LAER and RACT standards, the BACT determination is made on a case-by-case basis.[72)] Since the statute directs that "energy, environmental, and economic impacts and other costs" must be taken into account,[73)] one can say that the standard is less stringent than LAER. In theory, it is marginally stricter than the NSPSs As in the case of LAER, the NSPSs are the minimal level of technology which must be used in making a BACT determination. In view of the laxity of the NSPSs, there is a margin for stricter PSD requirements.

In practice, BACT often corresponds to the NSPSs; however, there are cases where BACT has led to emission limitations that are stricter than the NSPSs as well as normal SIP requirements.[74)] Consequently, the main importance of the BACT requirement is that it may also be imposed on sources which are not (yet) covered by NSPSs.

The concept of the Act to determine BACT on a case-by-case basis raises the problem of inconsistent determinations in the states.[75)] EPA attempts to give the states guidance by publishing abstracts of existing BACT determinations.

e) Requirements for Other Sources

Minor new or modified existing sources as well as existing sources are not subject to special PSD requirements. However, there are retrofit obligations for existing sources for the protection of visibility,[76)] and sources not covered by the PSD program may be required by the SIP to reduce their emissions if this is necessary to cure an existing increment violation.

II. The Emissions Trading Policy as a Market-Oriented Concept in the Regulation of Air Pollution

1. Objectives of, Reasons for and Background of the Emissions Trading Policy

a) Introduction

Generally speaking, one can define emissions trading as a regulatory policy that permits operators of sources to create reductions of emissions at certain emission sources beyond the applicable requirements and to use these reductions to meet requirements applicable to other sources.[77)] Emissions trading involves the exchange of "rights to pollute" granted the operator by a permit in conformity with ambient requirements. However, in contrast to the various proposals for introducing marketable rights to pollute, emissions trading is a simple modification of the existing regulatory system of air pollution control. Emission reduction credits can only be used in the framework of permitting procedures, either to fulfill substantive requirements or to avoid the institution of such procedures.

Emission trading consists of emission offsets, bubbles, netting and emission reduction banking. These elements of the emissions trading policy are united by a common economic rationale.[78)] The emission trading policy is designed to save pollution control costs by permitting the operator or several operators to decide themselves about control measures so long as the net result is that the aggregated requirements of the sources involved are met (or, in the case of offset, there is a net reduction of emissions); furthermore, the policy is designed to give firms an incentive to develop more efficient control technology or production processes. EPA's Emission Trading Policy Statement of 1982 establishes common minimum legal requirements for creating, using and banking of emission reduction credits. It makes the attempt to present a uniform legal concept of the whole emissions trading policy. Nevertheless, emissions offsets, bubbles, netting and banking have quite distinct roles in the regulatory system. Their historical development is quite different.

The development of the emissions trading policy[79)] is characterized by two features: on the one hand, a strong differentiation, if not fragmentation, into several elements which only in the recent past has shown signs of a certain unification; on the other hand, a gradual expansion of the policy and relaxation (liberalization) of regulatory restraints. The reason for this development is the incremental character of modern regulatory policy, but even more the concept of deregulation that had already prevailed during the Carter administration and was continued by the even more market-oriented Reagan administration. It must be emphasized, though, that forms of emissions trading had already been practiced under the Ford administration. It was the Carter administration that took the initiative to formally introduce emissions trading as a supplemental concept of US air pollution control. The Reagan administration expanded the concept and attempted to relax certain restraints which had previously been considered to be mandated by the policy goals of the Clean Air Act but which, in the view of the new administration, imposed too heavy economic and administrative burdens and impeded the acceptance and use of emissions trading by industry.

The conceptualization of the emissions trading policy as a uniform policy also obscures another important fact, namely the paramount role of the states. The emissions trading policy only affords options for the states.

It is spelt out in the Policy Statement - although this idea could have been emphasized more strongly - that the emissions trading policy clearly is voluntary. The states have often been more restrictive than EPA in devising their own emissions trading policy, and there is a relatively high degree of variation among the states. Even the position of EPA's regional offices is not entirely uniform. All this adds to the already existing complexities of the emissions trading policy.

b) The Offset Policy

The offset policy is the oldest emissions trading concept. The offset policy allows new major stationary sources or modernizing existing sources to comply with ambient requirements in nonattainment areas by securing sufficient surplus emission reductions from other (existing) sources to more than offset their new or increased emissions.[80] The offset policy allows new growth while improving the air quality in nonattainment areas. It is a response to the threat of a complete ban on new industrial development in nonattainment areas which would have been the consequence of the mandate of the Clean Air Act of 1970 to attain the NAAQSs by July 31, 1977 at the latest. Under the Act, new and modified existing sources that emit any criteria pollutant could not be constructed where the NAAQSs for that pollutant are exceeded. On the other hand, the Act was relatively lenient towards existing sources. It was understood that existing sources should not be imposed, by the SIP, the same emission limitations as applicable to new or modified existing sources. Thus, one may also state that the threat of a construction ban in nonattainment areas was the result of a grossly unequal treatment of new and existing sources to the disadvantage of the former.

The EPA Interpretive Ruling of 1976, which was amended in

1979 and 1981,[81] introduced the offset policy as a response to the no-growth dilemma. The basic elements of EPA's offset policy were then adopted by Congress as part of the Clean Air Act Amendments of 1977. The Interpretive Ruling is since then only applicable in exceptional cases. The offset program is administered by the states as part of their (revised) SIPs. However, the Interpretive Ruling still serves as a guideline for the states in administering their offset program.[82]

The offset policy represents a pragmatic relaxation of the original ambient air quality goals of the Act of 1970 in that it allows new emitting sources in nonattainment areas; however, it uses the construction of such sources to achieve a new ambient air quality benefit beyond that achieved by tougher requirements for existing sources.

c) <u>The Bubble Policy</u>

The bubble policy is not directly related to ambient requirements; rather, it is primarily oriented at emissions. The bubble policy allows existing plants in attainment as well as non-attainment areas to increase emissions at one source beyond the emission limitations set forth in the applicable SIP in exchange for compensating decreases of emissions at other sources.[83] The bubble concept considers the several sources as one source and seeks to impose on the group of sources an emission limitation which is equivalent to the aggregated emission limitations previously applicable to these single sources. It does not change the "status" of existing sources; in particular, the relatively preferential treatment of existing sources which still exists under the Clean Air Act Amendments of 1977, is not modified or even abolished by the policy. It is an alternative means of meeting emission limitations set forth in the SIP for several existing sources.

The bubble policy is designed to give managers of existing plants flexibility to develop less costly ways of meeting emissions limitations while ensuring that the present air quality in the area is maintained.[84)] Plant managers may choose a more cost-effective combination of emission reductions while not exceeding the applicable emission total. Moreover, it is expected that anticipated cost savings will promote technological progress. Firms have an incentive to develop cheaper control technology or low-pollution processes if they do not lose the emission reduction created by the use of these technologies or processes but are accorded a credit that can be used to offset increased emissions at another source. The bubble policy is a response to the specific problems of existing plants in meeting (especially new) emission limitations set forth in the (revised) SIP. Since retrofit expenses normally are higher than expenses for pollution control equipment for new plants, it was thought that operators of existing plants needed more flexibility for deciding on the use of control technology to meet SIP requirements.

The bubble policy was first formally introduced by EPA in 1979[85)] and then liberalized in the 1982 Emission Trading Policy Statement. It has no express statutory basis in the Clean Air Act. However, the provisions of the Act on SIP requirements are considered by EPA as flexible enough to allow the use of the bubble policy in devising or revising SIPs.

d) <u>The Netting Policy</u>

Netting exempts operators of existing plants expanding or modernizing from new source review requirements, as long as any increase in plant-wide emissions is insignificant in the meaning of preconstruction review regulations.[86)] (25 to 100 tons per year, depending on the pollutant, or

0.6 tons for lead). In calculating whether the increased emissions from the modified source are significant, only net increases in plant-wide emissions are considered. A plant can compensate increased emissions from the modified source by decreasing emissions from other sources within the same plant. The rationale underlying this emission trading concept is the saving of business and administrative cost in cases having no or only a de minimis impact on ambient air quality. By "netting out" of preconstruction review, the operator of a modified source removes all the - procedural and substantive - burdens of new source review. The administrative workload decreases correspondingly since the competent agency must only make sure that the prerequisites of netting are fulfilled.

Netting is one of the oldest, perhaps - as far as actual practice is concerned - the oldest of all emission trading concepts, although it is only recently that it has been formally recognized as a separate concept within the emission trading policy. The concept was first adopted in 1979 as part of the offset policy in nonattainment areas. In 1980, EPA allowed netting in PSD areas; with respect to nonattainment areas, the concept was repealed but in 1981 reintroduced.[87)] To this extent, in the light of a decision of the Court of Appeal for the District of Columbia of 1982, its legality had become doubtful; however, a recent US Supreme Court decision has reversed the decision of the Court of Appeal and confirmed the netting program in nonattainment areas (see below pp. 44). EPA's Emissions Trading Policy Statement of 1982 expressly refers to the term of "netting". Previously, netting was often referred to as part of the bubble concept; even recent court decisions use this terminology.

e) Emission Reduction Banking

Under the concept of emission reduction banking, firms that cannot (fully) use an emission reduction to effectuate a contemporaneous offset, bubble or netting transaction can be granted an emission reduction credit and store it for later use in offset, bubble or netting transactions or - except for netting - for sale to another firm.[88] There are two kinds of banking: informal and formal banking. Informal banking is sufficient where the relevant firm only seeks to store the credit for its own use in the future. Formal banking is necessary where a firm that has created an emission reduction credit wants to store it for later sale to a third party; also, formal banks serve as a clearing house for transactions in emission reduction credits between different parties.

The rationale underlying the banking policy[89] is that loss of emission reductions that cannot be used contemporaneously would deter firms from reducing emissions before they could use them themselves or sell them for contemporaneous use by another party; as long as unused emission reductions are banked, they have a (temporary) positive impact on ambient air quality. Moreover, the prohibition of banking would decrease the number of possible trades and thereby weaken the cost-saving potential of the emission trading policy.

EPA originally considered banking of emission reduction credits as inconsistent with the basic policy of the Clean Air Act (1976). However, together with the extension of the emissions trading policy in 1979, EPA allowed banking.[90] Since then, informal banking has been widely practiced as part of the permitting procedure in respect of netting and internal offset transactions, while formal banking still is limited to a few areas. The Emissions Trading Policy Statement of 1982 gives a detailed description of the necessary components of a complete state (formal) banking rule. EPA also has recently published draft model banking rules that can be used by the states as a model to devise their own banking rules (as part of generic emission trading rules or as separate rules).[91]

2. The Role of the Emissions Trading Policy in the Regulatory System

As stated, emission offsets, bubbles, netting and banking, although united by a common economic rationale, have quite distinct legal features and their place in the regulatory system of air pollution control is different.[92]

The offset policy is ambient quality-oriented. It allows new major stationary sources and modified existing sources to comply with ambient requirements in nonattainment areas if they secure sufficient surplus emission reductions from other sources to more than offset their new or additional emissions. The policy allows the location of new sources or modernization of existing sources inspite of the nonattainment status of the area if, by virtue of emission reductions the operator has obtained for other sources, the air quality in the area is improved in such a way as to constitute reasonable progress towards achieving the NAAQSs by the (prolonged) statutory deadline. These offsets may be created within the plant (internal offset), they may also be created in other plants owned by the operator of the new source or by a third party (external offset). Since the offset policy is designed to enable sources to comply with ambient requirements, offsets may not be used to meet technology-based standards for new sources in nonattainment areas, such as NSPSs and LAER requirements.[93]

The offset policy has been developed to cope with the particular problems of industrial growth in nonattainment areas and in practice it is almost exclusively applied in such areas. However, the underlying concept has a broader scope of application. It can also be used to comply with ambient requirements in PSD areas.[94] For example, it can be used in a PSD area where pollutant concentrations are relatively high and the emissions of a new source, without consuming the increment, would result in a violation of a NAAQS. If the application of BACT does not secure sufficient reductions to comply with the standard, the operator may seek reductions from other sources to offset the increased emissions so that the standard is met. Moreover, the offset concept is applicable where a new source in a PSD area will have emissions that would violate an allowable increment. However, since the practice shows that increment violation in PSD areas is not very frequent, the use of the offset policy in PSD areas for offsetting an increment violation that would otherwise occur is relatively rare.

As in the case of nonattainment, offsets in PSD areas may not be used to comply with technology-based requirements for new sources such as NSPSs and BACT standards.

The bubble policy primarily is emissions-oriented. There is an indirect link to ambient requirements in that the bubble policy affords existing sources an alternative way of meeting emission limitations set forth in the SIP for attaining the NAAQSs. Furthermore, the requirement of "ambient equivalence", *i.e.* the requirement that a bubble transaction may not deteriorate the ambient air quality, links the bubble policy to ambient considerations. The bubble policy allows existing plants to increase emissions at one source beyond the applicable emission limitations in exchange for compensating decreases of emissions at other sources. This compensation can occur at the same plant (internal bubble), it may also occur at two or more plants (of the same owner or different owners) (external bubble).[95] The bubble concept considers the several sources as one source and seeks to impose on the group of sources an emission limitation which is equivalent to the previous individual emission limitations with respect to its impacts on ambient air quality. Bubbles are allowable both in nonattainment and in PSD areas.[96] The focus of the bubble policy is on nonattainment areas; however, bubbles are also frequently used by existing plants in PSD areas to meet the requirements of the applicable SIP in a less costly way. It should be noted that not all states allow bubbles; especially states that have serious air pollution problems such as California have taken the position that emission reductions from existing sources should not be credited but rather used for improving the existing air quality.

The bubble concept applies to all emission limitations imposed upon existing sources by the applicable SIP, including technology based requirements such as the RACT standard in nonattainment areas.[97)]

Bubbles cannot be used to meet technology-based requirements for new and modified existing sources, such as NSPS, LAER and BACT standards.[98)] However, the extension of the bubble concept to NSPSs under particular circumstances, e.g. a combination of multiple sources each subject to the same NSPSs, is being considered.[99)]

<u>Netting</u> exempts operators of existing plants modernizing or expanding from new source review requirements as long as any increase in plant-wide emissions is insignificant in the meaning of preconstruction review regulations. In determining whether the threshold levels are exceeded, only net increases in plant-wide emissions are considered. A plant can, therefore, compensate increased emissions from a modified source by decreasing emissions from other sources within the same plant, provided the decrease is contemporaneous, i.e. does not date back further than 5 years. External netting is not possible. Technically, the netting policy is based on a broad definition of "facility" (in PSD areas) or "source" (in nonattainment areas). EPA regulations provide that for the purposes of preconstruction review, the notion "facility" or "source" means the whole plant; even reconstruction of a source at the same site is considered as a modification, while the addition

of new equipment to an existing plant is considered to be the construction of a new source.[100] This gives the operator of a plant the possibility to net plant-wide emissions to avoid preconstruction review.

The netting policy applies both to attainment and nonattainment areas. However, in a recent decision, the US Court of Appeal for the District of Columbia[101] declared the extension of the netting policy to nonattainment areas to be inconsistent with the Clean Air Act and directed EPA to restore the narrow source definition and the reconstruction rule. Since then, the status of the netting policy in nonattainment areas has been insecure.

The effects of "netting out" of preconstruction review are much farther-reaching than those of using the offset and the bubble concepts. By "netting out" of preconstruction review, the operator of a modified plant removes all the burdens of a new source review requirements, including the consideration of ambient violations (violation of NAAQSs or violation of PSD increments) and associated monitoring and modelling requirements, applicable bans on construction and installation of BACT.[102] In the case of nonattainment, the regulations provided for the possibility to "net out" of ambient requirements as well as of the requirement to install technology that keeps emissions within LAER.

However, since even in PSD areas the broad definition of "facility" is not applicable to NSPS, the netting concept does not exempt modified sources from emission limits established by NSPS. The most important practical consequence of the netting policy is that the operator of a facility can avoid the procedural requirements of the preconstruction review procedure.

3. Elements and Features of Emissions Trading

EPA's Emissions Trading Policy Statement of 1982 establishes common minimum legal requirements for creating, using and banking of emission reduction credits (ERCs). Since most emissions trades amount to a modification of SIP requirements and, therefore, can in principle only be effectuated through a revision of the SIP which in turn requires the approval of EPA, the Policy Statement describes the policy EPA will follow in processing applications for SIP revisions involving emissions trades. Where emissions trades are effectuated outside the SIP review process through application of state generic rules, these rules represent a "generic" SIP revision and therefore, assuming EPA has authority to approve such SIP revisions,[103)] require EPA approval; here, the Policy Statement determines EPA's policy in processing applications for approval of state generic rules.

The statutory requirements for EPA approval of SIPs, in particular the requirements of attainment of NAAQSs "as expeditiously as practicable" and of "reasonable further progress", are relatively vague and EPA is accorded a high degree of discretion. Thus it may be assumed that the principles pronounced by EPA in the Policy Statement will essentially determine the future policy of the agency in the field of emissions trading. This justifies it that the following presentation of the emissions trading policy primarily is based on the Policy Statement. It must be noted, however, that the Policy Statement is a draft only and that EPA may change the Statement in several respects following court developments and the many critical comments it has received.

a) Creation of Emission Reduction Credits

The Policy Statement refers to four general requirements that emission reductions must meet to qualify as emission reduction credits (ERCs) and be used or banked in an emissions trade. They must be

-- surplus,
-- enforceable,
-- permanent, and
-- quantifiable.[104)]

First, all emission reductions must be surplus.[105)] Surplus reductions are such reductions that go beyond what a particular source is required. Only surplus reductions at a particular source can be substituted for a reduction required at another source in an emissions trade. Otherwise, the trade would have an adverse ambient impact and would run counter to the goals of the Clean Air Act.

In order to determine whether a reduction is "surplus", it is necessary to establish a level of baseline emissions of a source beyond which the reduction must occur to receive a credit. Generally speaking, the determination of the baseline depends on whether the area is nonattainment or attainment, and by the way the SIP has been developed by the state.

Table 3

SUMMARY OF PERMISSIBLE TRANSACTIONS IN EMISSION REDUCTION CREDITS UNDER THE EMISSIONS TRADING POLICY

	EXISTING SOURCES	NEW SOURCES AND MAJOR MODIFICATIONS
PSD REGION		
At ceiling of PSD increment or primary standard	Bubble allowed (unchanged)	Offsets allowed (unchanged) BACT and NSPS required (must show no violation of increment)(unchanged) Netting allowed to avoid review as new source with possible LAER determination (unchanged) ERC transactions cannot be used to meet uniform technology standards, e.g., BACT, NSPS
Regions with some or all of the PSD increment remaining	Subject to the same requirements as above, with PSD program required but without a requirement for a formal SIP	Subject to the same requirements as above, with PSD program required but without a requirement for a formal SIP
NONATTAINMENT REGIONS		
SIP demonstrates attainment by 1982 (or conditionally approved SIP)	Bubble allowed (unchanged) RACT may exist as a control requirement for some activities in SIPs that failed to demonstrate attainment on initial submittal (unchanged)	NSPS required (unchanged) LAER required (unchanged) Offsets required (unchanged) Netting allowed to avoid review as a new source with possible BACT determination (unchanged)
SIP not demonstrating attainment by 1982	Bubble allowed (change) RACT required (unchanged) Margin of growth required by use of offsets or an accommodative SIP (unchanged)	Same as above
SIP not demonstrating attainment by 1987; or region without approved SIP that demonstrates attainment	Same as above, with the exception that it is not currently clear whether or how the bubble may be used; likely that installation of uniform technology standards will be required	Same as above

ERC = Emission Reduction Credit

Source: Adapted from Brady, Morrison, Emissions Trading: An Overview of the EPA Policy Statement, 1982

In nonattainment areas, the baseline may be either maximum allowable emissions or actual historical emissions, depending on the assumptions used in the SIP in developing a strategy for attainment by the statutory deadline. It should be noted, however, that where actual emissions are taken as a baseline, this normally requires that the source does not violate existing emission limits; in other words: the actual emissions must be lower than the allowable emissions.

In nonattainment areas that used allowable emissions as the basis for their attainment strategy, the allowable limits can be used as the basis for creating ECRs, even if actual historical emissions of a source are lower than the allowables.

In nonattainment areas where actual emissions, based on inventories or back-calculated from ambient values, were used as the basis for demonstrating attainment, the actual emissions of a source normally are the baseline for creating ERCs. The Policy Statement contains little guidance on the reference period (average or average of highest year in larger period, seasonal operations). However, the new source review regulations of 1980 cover some of these questions. EPA admits under certain prerequisites also the use of allowable emissions on a case-by-case basis where this conforms with reasonable further progress and the source does not create a new ambient violation or prevent the planned removal of an existing violation.[106)]

The creation of ECRs is also possible in areas which still lack an approved SIP that demonstrates attainment by the statutory deadline, provided this is consistent with reasonable further progress towards attainment and ultimate attainment of the relevant ambient standard[107)]. If RACT has already been defined in the SIP for existing sources, it is the baseline. If it has not yet been defined, an agreed RACT baseline may be taken as the baseline for creating ECRs. In this case the source can agree on acceptable RACT limits for the emission sources involved in the trade. Any reduction in excess of those required by the agreed RACT limits would be considered surplus. The problem is that the state, when adopting the SIP, might determine that more stringent RACT standards are necessary to meet the NAAQSs. The policy of the EPA is to encourage the states to protect the ERC as long as possible in view of the statutory deadline (i.e., with respect to CO and VOC: 1987). However, the acceptance of the agreed RACT baseline does not mean that the state can "give away" the RACT determination. If ambient considerations require so, it may and must impose stricter RACT limits that must be complied with either by the source that had created the credit or by the user of the credit who would have to acquire new credits.

Instead of using a negotiated RACT baseline, areas that have received extensions for attaining the primary ozone or carbon monoxide standards until 1987 as well as areas that do not meet the secondary ambient standards for sulfur oxide or particulates, may also use current actual emissions of a source as the baseline for creating ERCs. The prerequisite for admitting such a transaction is that the sources involved commit themselves to produce additional reductions equivalent to future RACT limits when the state imposes them. This gives industry the possibility to create and use ECRs at the earliest date until RACT is imposed without having to negotiate individual RACT baselines. The problem, of course, is how to achieve future reductions when RACT is imposed. As a practical matter, this concept will only be used where an operator already anticipates the possibility of future emission reductions, e.g. originating from a scheduled shutdown, or can easily buy ECRs from third parties.

In PSD areas, the baseline for creating a surplus reduction will generally be the actual emissions of a source.[108] Since actual ambient air quality is the basis for determining increment consumption and attainment of the NAAQSs, and the maintenance strategy is based on actual emissions, these normally must also be the baseline for creating an ERC. However, EPA also accepts allowable emissions as baseline if "proper consideration is given to increment usage". This means that an emissions trade based on allowables, e.g. in a case where actual emissions are lower than allowables, may not contribute to a violation of the increment or a violation of the NAAQSs. Contrary to what the Policy Statement seems to suggest, allowable emissions may not be used in netting transactions[109].

A very controversial issue is the question whether and to what extent plant shutdowns (as well as production curtailments) can be considered in determining whether an emissions reduction is surplus. EPA in principle allows the use of shutdowns as a means of creating ERCs[110] The Policy Statement seems to limit this to bubble trades but existing regulations also seem to allow the use of shutdowns in offset and netting transactions.[111] Pursuant to a settlement concluded in a litigation between EPA and the Chemical Manufacturers' Association (CMA), EPA considers to abolish certain restrictions with respect to offsets that are contained in the Interpretive Ruling (time-limits, limitation to replacement projects, legal enforceability of the reduction via shut-down)[112]. However, the principles governing the treatment of pre-existing reductions must be observed in order to avoid double-counting. An emissions reduction may not already be included as part of the baseline of the source's emissions used for demonstrating attainment of the NAAQSs in the relevant SIP.

The treatment of pre-existing reductions is different according to the assumptions of the SIP for demonstrating attainment of the ambient standards. If the SIP for a nonattainment area is based on allowable emissions for demonstrating future attainment, there is, according to the Policy Statement, no objection based on principle against using pre-existing reductions in excess of the allowable. If the SIP is based on actual emissions, reductions that occurred before monitoring data were collected for use in developing the SIP cannot be used to create ERCs because monitoring levels already reflect these reductions and their use would amount to double-counting. Reductions made after the inventory or monitoring data were collected for developing the most recent (revised) SIP are admissible, even if they were made some time before the application to grant a credit for the reduction.

In attainment (PSD) areas, reductions that were made before the PSD emissions baseline was established do not qualify for credit since these reductions are already assumed by the relevant state in establishing the PSD baseline.

The requirement that shut-downs do not qualify for creating credits if they have already been assumed in developing the area's attainment strategy decreases the importance of the shut-down problem.

Difficult questions arise where the SIP already assumed a given quantity of net "turnover" reductions from new plant openings having cleaner sources and existing plant shutdowns having dirtier sources and incorporated these assumptions into its attainment strategy. Where the total number of shutdowns assumed in the SIP has already occurred, EPA allows additional shutdowns as a source for creating emission reduction credits without further restrictions[113)] (such as consideration of the geographical distribution of the previous shutdowns; however, to a limited extent, this deficiency is compensated by the necessary ambient tests when using the credit). If the requisite number of shutdowns has not yet been reached, EPA offers states two options for creating ERCs while avoiding double-counting which amount to a certain deviation from the attainment strategy chosen in the SIP. The states may choose not to take credit for "turnover" reductions or they may credit a percentage of the total emission reductions realized from a shutdown if they can show that such credit is consistent with the SIP's demonstration of attainment and reasonable further progress.

State generic and banking rules show that states tend to be more restrictive than EPA. Some rules expressly disallow the use of shutdowns; others require contemporaneous trades, limit the duration of credits created by shutdowns, exclude certain trades or require a determination that there is no increase of the same pollutant at a similar source (in order to cope with the problem of local elasticity of demand and ensuing increases of the production of existing sources or the location of new sources).

Baseline problems also exist in respect of <u>uninventoried sources</u> (often open dust and fugitive emissions). According to the Policy Statement, the use of uninventoried sources to create an ERC depends on the attainment strategy of the SIP.[114] For example, where a state used allowable emission limits for inventoried sources for demonstrating attainment in a nonattainment area, reductions from uninventoried sources can be credited using actual emissions as the baseline. Where the SIP is based on actual total emissions, some emissions limits such as RACT or the same percentage reductions as are applicable to inventoried sources must be imposed on uninventoried sources before a credit for reductions in excess of these limits can be granted. In PSD areas, all sources that reduce emissions beyond the baseline qualify for ERCs.

Second, alternative emission limits, i.e. the creation of ERCs and their use to meet requirements elsewhere, must be enforceable. Each offset, bubble, netting or banking transaction must be federally enforceable and must be approved by the state.[115] There are two ways to ensure federal enforceability, either through existing procedures, in particular a revision of the SIP imposing on the source new enforceable emission limitations, or through generic rules. EPA is considering to dispense with the requirement of federal enforceability in offset and netting transactions.[116] In the case of generic rules, additional requirements must be observed. Emission trades effectuated in application of generic rules are deemed to be part of the SIP, in other words they amount to a SIP revision. However, in order to be enforceable, such emission trades must be incorporated in a compliance document which is legally binding and practically enforceable, such as an agreement between the source and the state, an operating or construction permit, or a consent decree that sets source-specific emission limits.

Third, all emissions reductions eligible for creating an ERC must in principle be permanent.[117] EPA recognizes an exception to the principle of permanence in cases where a firm creates or needs a temporary credit (e.g. in case of a temporary production curtailment). Here, a temporary credit can be granted if emission increases and decreases are equal in duration.

Fourth, all reductions must be quantifiable.[118] In order to meet this requirement, the state must establish a reliable basis for measuring the amount and rate of the reduction and describing its characteristics. However, EPA does not require monitoring. The reduction can also be calculated on the basis of emission factors, production or process inputs. It is remarkable that the Policy Statement does not prescribe a measurement or calculation method that expresses the emission reduction in absolute terms, i.e. in total loadings or loadings per time unit based on the assumption of limited time units available for production.

b) Use of Emission Reduction Credits

While the previous section described the requirements for creating an ERC, this section analyses the conditions under which an existing ERC can be used in an offset, bubble or netting transaction.

According to the Policy Statement, there are five substantive principles governing the use of ERCs, namely

-- trades must involve the same criteria pollutant,
-- compliance with ambient tests,
-- no net increases of emissions in nonattainment areas,
-- no increase of hazardous pollutants,
-- no use to meet technology-based requirements.

As an additional principle, one should mention the regional limitation of emission trading. As a practical matter, emission trades are limited to AQMAs or at least AQCRs, interregional trades do not occur. It is true that there is no legal limitation and sources could prove the ambient equivalence of an emission trade without geographical restrictions. However, this is very rare in practice. On the other hand, long-distance impacts of emission trades beyond AQCRs are normally not considered in determining ambient equivalence. Therefore, the principle of regionalisation could be considered as implied in the applicable ambient requirements.

According to the Policy Statement, these principles apply to all emission trades. However, in respect of netting, certain qualifications must be made.

First, emissions trades, i.e. offsets, bubbles, or netting transactions, must involve the same criteria pollutant.[119] This requirement follows from the concept of the Clean Air Act which addresses air pollution not on a global basis but rather pollutant-by-pollutant. Since the NAAQSs must be met with respect to any criteria pollutant and separate SIPs must be developed, the emissions trading policy also must distinguish between the different criteria pollutants. However, in California interpollutant trades, e.g. between TSP and SO_2 and HC and NO_x were permitted and the recent new source review regulation of the South Coast Air Quality Management District (Los Angeles) retains this possibility.[120)] The purpose of these rules is to reduce the ambient concentration of sulphates and ozone by tackling their precursors.

On the other hand, the generic rules of some states contain restrictions that are designed to cope with the problem that pollution involving the same criteria pollutants is not necessarily associated with the same health and environmental impacts. For example, they require that the pollutants must be of the same quality or have the same health or welfare significance, or they contain restrictions as to particle size (for TSP) or reactivity (for VOC).

Second, all uses of ERCs must satisfy ambient tests[121)]. This principle, although pronounced in a general fashion, only is applicable to offsets and bubbles. Netting trades are treated differently. The potential ambient impacts of "netting out" of preconstruction review normally are insignificant because netting must take place within the same plant by substituting emission decreases at a particular source for increases at another source within the same plant. However, where stack heights are different, a netting trade may have an adverse effect on air quality. The existing rules only provide that the increases and decreases that are "netted" must have approximately the same qualitative significance for public health and welfare[122)], but, persuant to the CMA settlement, EPA is considering even to drop this liberal restraint on netting[123)]. It is true that the requirement of achieving "reasonable further progress" may make a SIP revision necessary if netting sources are assumed as future reductions in the SIP.

The modelling rules of EPA with respect to offsets and bubbles make stack height a crucial element for determining whether modelling is necessary or not. Therefore, it is not consequential that netting trades should be entirely exempted from ambient tests. The reason for this exemption seems to be that otherwise the very objective of allowing netting trades, namely to relieve the enterprises from the costly preconstruction review procedure, would be frustrated.

The principle that the use of ERCs must satisfy ambient tests means that use of ERCs may not create a new violation of an ambient standard or prevent the planned removal of such a violation in a nonattainment area. In a PSD area, the use of ERCs may not violate an increment or an ambient standard. This requirement follows from the mandate of the Clean Air Act to attain and maintain the NAAQSs and not to exceed the increments for the prevention of significant deterioration of the existing air quality.

The policy of the EPA with respect to ambient impacts of emission reduction trades is different according to the dispersion characteristics of the pollutants involved. Other aspects such as time-phasing are not considered; in particular, the rules on ambient impact do not reflect the structure of the NAAQSs.[124)]

With respect to photochemical oxidants and nitrogen oxides trades, EPA does not require any ambient tests because it is of the opinion that these pollutants are dispersed across broad geographic areas and local impacts need not be considered. Therefore, "pound per pound" trades may be treated as equal in ambient effect.[125)] However, some states or regions that have adopted generic or banking rules, do not follow this view. They have established a scheme of geographic discounting that requires more than even reductions of emissions according to the distance between the two sources involved.

In the case of particulates, sulfur oxide and carbon monoxide, the dispersion behavior of these pollutants requires in the opinion of EPA ambient tests.[126] Distance between the sources, plume parameters (especially stack height), pollutant characteristics, meteorology, and topography affect the ambient impact of emission reduction trades involving these pollutants. The general principle is that off-set transactions must demonstrate "ambient progress" and that bubble transactions must demonstrate "ambient equivalence", i.e. maintaining the status quo of existing ambient air quality. However, in the latter case an improvement of air quality may follow from the fact that bubbles often are used to meet emission limitations that have been stiffened due to a SIP revision.

Since determinations as to attainment of the NAAQSs as well as to observation of PSD increment requirements are made in relation to AQCRs and AQMAs, it follows that interregional emission trades are not permitted. There is no express language in the Policy Statement, though, that trades between AQMAs are not allowed, either. Geographic discounting of ERCs and monitoring and modelling the dispersion of emissions would seem to be sufficient to ensure the geographic equivalence of inter-district emission reductions and increases.

In order to facilitate the demonstration of ambient progress or ambient equivalence, EPA has developed a three-tiered system of modelling that links the degree of required modelling to the likely ambient impact of the proposed trade.

-- No modelling is required if there is no net increase of emissions, the relevant sources are located in the same immediate vicinity, and no increase occurs at the source with the lower effective plume height;

-- only limited modelling (screening) involving the emission sources participating in the trade is required if there is no net increase of emissions and emissions after the trade will not cause a significant ambient impact; the term "insignificant" impact is expressed in quantitative values derived from PSD regulations;

-- full dispersion modelling and consideration of all sources in the area of impact is required if there either is a net increase of emissions or a significant ambient impact.

Third, in nonattainment areas - as opposed to PSD areas - emissions trades may in principle not result in a net increase of baseline emissions.[127) This requirement follows from the mandate of the Clean Air Act that nonattainment areas demonstrate reasonable further progress. There are some limited exceptions to the principle. Thus, a net increase of emissions is permitted where generic rules exist and the SIP has created a growth margin, or where the state, in order to make the emissions trade possible, revises its SIP so as to create a compensation for the increased emissions at another location, which is consistent with reasonable further progress. Furthermore, insignificant net increases of emissions are permitted in netting transactions. It must be noted that netting in nonattainment areas had been declared by the US Court of Appeal for the District of Columbia[128) as inconsistent with the Clean Air Act; however this decision has been reversed by the US Supreme Court (see below p.).

Fourth, emission trades may not increase emissions of hazardous pollutants[129). This principle is important because the group of VOC for which a NAAQS exists comprises compounds that are hazardous, such as benzene; furthermore, hazardous pollutants may be produced as necessary components of other criteria pollutant streams.

The principle has two aspects: First, where a group of criteria pollutants has hazardous and non-hazardous members, an emissions trade may not increase hazardous emissions. EPA allows emission trades between any pollutants belonging to the group of VOC if the hazardous pollutant emissions are decreased ("traded down") in exchange for an increase of non-hazardous pollutant emissions, but not vice versa. The same may be true of TSP. The principle does not modify the rule that emission trades must involve the same criteria pollutants. However, in California trades between different criteria pollutants are allowed in order to reduce hazardous pollutants[130).

Second, to a limited extent the bubble policy is applicable to other hazardous pollutants. Bubbles are not allowed with respect to hazardous pollutants for which NESHAP are in force. However, with respect to the 37 pollutants that are considered as hazardous but not yet subject to specific regulations, bubble trades can be made provided there is an equivalent increase and decrease of the same pollutant at reasonably close sources.

The Policy Statement expressly declares that the prohibition against hazardous pollutants trades is not meant to exclude trades in "minute amounts" of such pollutants,[131) without giving a definition of this term. It must be noted that existing PSD regulations allow netting trades associated with <u>de minimis</u> increases of hazardous pollutants for which NESHAP are in force (10 percent of the emission standard)[132).

<u>Fifth</u>, emissions trades can in principle <u>not be used to meet technology-based requirements</u>.[133) This is a principle which is subject to a number of qualifications. New sources cannot use ERCs from existing sources to meet technology-based requirements, such as NSPS, LAER control technology in nonattainment areas, or BACT in PSD areas.

However, expanding or modernizing sources can use internal emission reductions from within the same plant to "net out" of preconstruction review. According to the Policy Statement, the avoidance of preconstruction review means, among others, that such sources are not subject to technology-based requirements for new sources, such as LAER in nonattainment areas and BACT in PSD areas,[134] but some states disallow netting out of BACT. Finally, existing sources can meet technology-based requirements, such as RACT in nonattainment areas, by using internal or external emission reductions.[135]

Besides substantive principles governing the use of ERCs in offset, bubbles and netting trades, the Policy Statement also sets forth some procedural requirements which amount to a certain liberalization as compared to the previous policy. These principles are:

-- bubbles can be used to achieve compliance,

-- extensions of compliance deadlines are also possible as part of a bubble trade

-- a bubble cannot be approved for an individual emission source which is the subject of a pending enforcement action or outstanding enforcement order unless EPA approves the proposal and the compliance schedule it contains[136].

The previous bubble policy required that sources be subject to binding compliance schedules based on the original SIP emission limits before they could apply to use an ERC to meet these requirements. EPA now allows the use of ERCs to achieve compliance by agreeing to emission limits as part of a bubble transaction. This is intended to relieve the firms from the burden of having to purchase conventional control technology which they might not need once the bubble transaction has been approved and give them flexibility to determine for themselves the most effective and quickest way of achieving compliance.

The extension of compliance deadlines is based on similar considerations. Compliance deadlines may be extended by the states as part of bubble trades in respect of VOCs or CO sources, provided the deadlines for attainment of the NAAQSs have been extended until 1987 and the bubble trade is consistent with reasonable further progress.

c) Banking of Emission Reduction Credits

The Policy Statement also contains principles applicable to the development of state rules for the banking of ERCs, especially concerning the ownership, protection and storage of ERCs[137]. Furthermore, EPA has recently published draft model state banking rules that are designed to assist states in devising their banking rules[138]. These principles or rules apply to formal banks, i.e. separate subsystems of state or regional agencies that accept and evaluate requests to certify ERCs, serve as a clearinghouse for credits on deposit, account for transfers and withdrawals or even encourage the creation of credits and transactions in them. Many states have established informal banks which are a part of the permitting procedures for individual polluters, especially in respect of netting and internal offset transactions. For example, the state recognized the ERC in a letter or in the permit document and the firm could use it at some later date. The Policy Statement does not seem to directly apply to these informal banks. However, since informal banking raises some of the problems involved in formal banking, it cannot be ruled out that some of the principles set forth in the Policy Statement are of a more general applicability.

The introduction of formal banking is an option for the states. Many states that have already adopted some forms of emissions trading have no banking rules, and some of them do not consider adopting such rules in the future[139]. If states opt for banking of ERCs, the Policy Statement requires them to designate an administering agency for the bank, accept only such reductions that qualify as ERCs under the principles established for the creation of ERCs, define procedures for banking of credits (e.g. define the kind of reductions that can be credited and banked and the accompanying information required), establish ownership rights regarding the ERCs, establish an ERC registry and set forth rules concerning possible adjustment of ERCs based on enforcement and ambient attainment considerations.

The states that already have adopted generic or banking rules mostly are more restrictive than the Policy Statement. For example, many rules allow either bubbles or offsets only - netting is almost invariably allowed -, they often exclude transfers to third parties, they exclude banking in the case where an ERC has been created by a shutdown or production curtailment or limit the duration of the ERC in this case, they provide for geographic discounting according to the distance of the sources involved even in VOC or NO_x trades (where according to EPA pound-per-pound trades are possible), etc. It remains to be seen to what extent the new principles and rules will influence future state practice.

A problem that has been addressed extensively in the Policy Statement is the <u>protection of ERCs</u>[140]. However, this problem has more aspects than addressed in the Statement. First, the banking rules must determine the <u>duration of banked ERCs</u>. The Policy Statement does not contain an enunciation of EPA policy on this matter. It appears that this is due to EPA's view that rules on duration of ERCs are designed to prevent the hoarding of ERCs and are therefore not based on environmental but rather on economic considerations. However, this is true of quite a number of questions that have been addressed in the Policy Statement. There are some federal rules whose continued applicability is somewhat doubtful. The Offset Interpretive Ruling contained a one-year time limitation for ERCs created by shutdowns[141] but states have generally not followed this guideline in devising their own offset policy under the 1977 Amendments. With respect to netting, the applicable rules provide that the requirement of "contemporaneous" increases and decreases of emissions may be defined by the states; any reasonable time period is acceptable, the upper limit being 5 years[142]. The existing state generic and banking rules contain provisions on the duration of banked (unused) ERCs. Normally, they set time-limits between 7 and 15 years. Some rules do not contain express provisions, others set much stricter requirements for ERCs created by shutdowns.

Second, the consequence of violations of the alternative emission limits imposed on the originator of an ERC as part of the emission trade must be determined. The Policy Statement favors an absolute protection of an ERC already used[143]. In other words, the ERC shall not be "devaluated" or confiscated; rather, enforcement action is to be taken against the originator. This is motivated by the goal to avoid law-suits between the parties to an emissions trade. The question whether, as a consequence of such a violation, an ERC that is banked but not yet used may be adjusted has not been addressed.

Finally, protection of ERCs against adjustment based on ambient considerations poses serious problems. Additional reductions of emissions may become necessary because the area does not attain the NAAQSs, new RACT requirements are introduced to attain ambient standards, or the area violates an increment for the prevention of significant deterioration. According to the Policy Statement, the general principle for coping with this situation is that the existence of banked (unused) ERC must not interfere with the state's ability to obtain the additional reductions. However, EPA tries to avoid that banked ERCs are confiscated by the state instead of reducing emissions from operating sources.[144] In California, the relevant rules provide that RACT may be redefined especially for banked ERCs at the time when the use of an ERC is being permitted (South Coast Air Quality Management District) or the offset ratios may be readjusted periodically (after a period of absolute protection of 3 years; Bay Area Air Quality Management District). EPA seems to fear that such rules would deter industry from accepting ERC banking; it affords the states three options to avoid confiscation of ERCs or at least unequal treatment of operating sources and ERCs. These options are:[145]

-- absolute protection of all ERCs against any adjustment,

-- moratorium on the use of ERCs or on future ERC deposits until ambient objectives are reached,

-- equal reduction of ERCs corresponding to emission reductions required from operating sources (either through reduction of the amounts of ERCs or increase in allowance rates).

Under the first option, the necessary emission reductions would be imposed on all operating sources. Sources with banked ERCs would, however, have an advantage because they could meet these requirements by using their ERCs or by purchasing ERCs elsewhere. An alternative to this option is an absolute protection for a limited time with the possibility of readjustment after expiration of the protected period.

The moratorium would force the affected firms to suspend the use or deposit of ERCs until the (revised) SIP has secured sufficient emission reductions with operating sources to ensure reasonable further progress or to cure an increment violation. This option, too, amounts to a preferential treatment of ERCs, although it penalises those using the banking system in comparison to those that have already used the ERCs and it may hamper business planning due to the uncertainty associated with it.

The third option would impose on ERCs the same amount of required emission reductions as on operating sources having the same emissions and belonging to the same category of equipment as represented by the ERC . This amounts to a nominal devaluation of banked ERCs which, however, may be compensated by increased demand for these ERCs. Nearly all generic and banking rules (except those in California) follow this system of equal reduction for operating sources and ERCs. This option raises the problem that ERCs may become non-homogenous commodities due to different source-specific discounting needs; however, this is unavoidable as long as the applicable SIP does not require over-the-board (equal) emission reductions from all sources but, rather, differentiates according to categories of sources.

4. Legal and Administrative Framework Conditions of Emissions Trades

EPA encouragement and state adoption of emission trading systems is a necessary step for transactions in ERCs. However, it is not a sufficient condition.[146)] The extent to which ERCs are created, banked, and transferred, depends on market forces and cost considerations. The cost of alternative control options is a decisive factor. Besides, legal and administrative framework conditions play an important role. The design of the emissions trading system, the existing options for planning the contractual, tax and financial consequences of transactions in ERCs and the duration of administrative procedures involving emissions trades all may either foster or impede transactions in ERCs, depending on the costs to be incurred by the relevant firms and the degree of insecurity associated with them. These aspects of emissions trading have just begun to emerge, and it is therefore difficult to make any more than preliminary assessments.

a) Protection of ERCs against Confiscation

Since ERCs certify a right to certain pollution units that may be used only in the permit procedure and hence only in the existing regulatory framework, it may become necessary to modify them for ambient air quality purposes. The SIP may have to be revised to achieve further reduction of emissions in order to attain the NAAQSs. Unused ERCs may be seen as a convenient source of reductions. This may be done by adjusting their "value" to the SIP requirements, especially by decreasing the number of credit units of emissions or by modifying the offset ratios or by imposing a moratorium on the use of banked credits. This has a confiscatory effect on banked ERCs. It is the policy of EPA to encourage states to abstain from confiscation of ERCs to the extent possible and rather grant them absolute protection or at least treat operating sources and ERCs equally. However, state rules show a great variety of approaches and the question is whether constitutional considerations afford owners of ERCs protection against confiscation and require a particular design of state banking systems.

It is generally agreed in the American discussion that there is a fundamental right of the state to adjust ERCs to new SIP requirements as an exercise of the police power. Constitutional doctrine permits the confiscatory effects of government regulation when necessary to protect public health or welfare from harm not anticipated at the time when the credit was granted.[148)] However, under the principles developed by the courts in interpreting the Fifth Amendment which prohibits a taking of property for public use without due process and just compensation, there may be situations where compensation must be paid.[149)]

Constitutional protection is not excluded by the fact that ERCs are not private property in the strict sense. The ERC certifies a (future) right to pollute in amounts indicated in the certificate which is reserved to the holders of the ERC. However, this is no absolute right to pollute. Rather, the ERC confers upon the owner a right to a future permit; it can only be used in the permitting process for fulfilling the applicable SIP requirements and it may be subject to a variety of limitations on its use and even transfer. Therefore, an ERC is not private property but, rather, a public right created by the state and accorded a citizen subject to limitations relating to its scope, terms of use, duration and transferability.[150)] Analogues that have been referred to in the American discussion are government licenses, such as broadcast licenses under the Federal Communications Act of 1934 and crop acreage allotments (quotas) which were first introduced by the Agriculture Adjustment Act of 1938. These licenses are subject to close regulation; however, this does not exclude that they enjoy a certain degree of constitutional protection.

In determining whether state regulation is justified by the police power or compensation must be paid, courts balance the interest of the state in effective regulation and the loss incurred by the owner. While the courts would generally defer to the public interest in regulation, they may afford the owner of an ERC a claim to compensation, especially where the emission reduction was created by investment or an ERC was bought from the originator. The test is "justice and fairness"; in applying this test, the courts will take into account factors such as economic impact of regulation, especially degree of invasion of property, reasonable investment-backed expectations of the owner, and the character of the governmental action.[151]

The analogues to broadcasting licenses and crop acreage allotments as well as general case law suggest that there is little protection where the creation of an ERC occurs incidentally, e.g. as the result of a plant closure that would have occurred anyway.[152] However, if the creation or acquisition of a ERC is based on investment and the originator or purchaser is led to expect a certain use of the value of his "property", compensation may be necessary.[153] Especially a total destruction of an ERC would be vulnerable under these circumstances, while an ERC can be more easily devaluated or a moratorium be imposed on its use.[154] Also, a relevant factor is that the right has been created by the state and that the costs incurred by the possibility of adjustment are associated by a benefit conferred on the holder;[155] the whole credit for the emission reduction would be lost in the absence of banking rules unless used contemporaneously and, furthermore, the holder can achieve substantial cost savings.

This line of argument may even be too cautious because it has been held that the exercise of the statutory authority to revoke broadcast licenses does not constitute an unconstitutional taking.[156] A fortiori, this argument should be valid for the adjustment of ERCs because here the purpose of government intervention is not mere economic but rather health-related regulation.[157] In any case, a proper design of the banking system that clearly indicates the duration of the credit, the possibility and extent of adjustments to new SIP requirements and the transferability of ERCs can normally avoid challenges based on the "investment-backed expectations" rationale.[158]

Another line of constitutional control over adjustment of ERCs to new SIP requirements is equal protection.[159] To the extent the state imposes on unused ERCs greater burdens than on operating sources, a violation of equal protection may be found. This, too, can be avoided by the design of a banking system. As long as the devaluation of banked ERCs occurs at roughly the same ratio as the reduction of emissions from operating sources, compensation need not be paid. Conversely, however, it is doubtful whether EPA's proposal to grant banked ERCs a preferential treatment when SIP revisions are necessary, is consistent with equal protection. It may well be that, if further reductions of emissions are needed, unused ERCs must also be diminished to some extent.

Finally, due process requires that the holder of an ERC must be notified of the proposed adjustment and be given an opportunity to comment on it.[160)] This too, can be taken care of by the design of banking rules.

b) Contractual Issues

The creation of a market for the exchange of external ERCs requires institutional arrangements that enable the parties to define what they are to expect of their transaction and to plan its financial consequences. The contractual aspects of emission trades have just begun to develop, and it is safe to say that the law is not yet well settled.

Exchange of ERCs can take the form of a sale or a lease between the originator of the emission reduction and the potential user. In both cases, the validity of the contract and the ability of the parties to perform it, largely depend on the regulatory validity of the emissions trading policy, the design of banking rules and the legal nature of ERCs as a (transferable) interest.[161)]

A crucial problem is the contractual distribution of risks where the state, for the purpose of SIP revision, reduces the ERC after the purchase or lease agreement has been concluded. The price paid for the credit may or may not reflect the assumptions of the parties as to the risk associated with potential state intervention and the question is whether the seller or lessor has guaranteed the "legal value" of the ERC.

Another crucial question is the distribution of risk in the case where the technology which is intended to create and maintain the emission reduction does not yield the expected results. As long as the applicable banking rules provide that the purchaser's or lessee's right is not affected by failure of technology, i.e. the originator rather than the user of ERCs would violate his (alternative) emissions limitations, there is no need to take recourse to the rules of sales and lease law that govern breach of contract. The Policy Statement takes the position that to avoid third-party lawsuits and encourage the purchase of ERCs, the relevant state banking rules should provide that, once an ERC has been used by another source, any violation of the conditions under which it was created should result in enforcement against the originator rather than the user of the ERC. It is true that litigation between the parties of an emission transaction could lead to delays in enforcement of controls and also to insecurities in the market for ERCs. However, as a matter of policy, the contrary rule would also have some merits.[162] Enforcement against the buyer or lessee could encourage him to be vigilant and force him to demonstrate contingency plans for the case of technology failure in the permit proceedings. Also, the originator may not be able to further reduce his emissions in order to compensate for increased emissions at the user's source.

In any case, these considerations may cause the parties to negotiate a different arrangement and distribute the risk of failure of technology differently from the banking rules; they may grant the lessor and, less likely, the seller, a right to cancel the agreement if such a situation arises. This may happen where it was the user who has "bribed" the originator to achieve an emission reduction in favor of the former. Such a contractual distribution of risk would only make sense if the applicable banking rules provided that the originator of an ERC has an option to resort to his previous emission limits (before creation of the ERC) and have his permit modified accordingly if the exchange of the ERC has been cancelled. The interplay of air pollution regulation and contract law here poses problems that have not yet been addressed.

Insofar as the applicable banking rules do not protect the purchaser or lessee against devaluation of ERCs and technology failure, the risk distribution would depend on the characterization of the ERC under various bodies of federal and state law. For example, the complex provisions of Art. 2 Uniform Commercial Code (UCC) would apply if a sale, and less likely, a lease of ERCs would be a transaction in "goods". The notion of "goods" generally comprises tangible personal property. Art. 2 UCC is in principle not applicable to the sale of rights, such as contractual rights and (transferable) public rights. It has been held that the transfer of a broadcast license is no "sale of goods" in the meaning of Art. 2 UCC.[163)] Given the similarity of ERCs and broadcasting licenses, the sale of ERCs would seem not to be covered by Art. 2 UCC. However, the courts have sometimes applied specific rules contained in Art. 2 UCC to objects not encompassed by this article.[164)] Probably, the general rules of commercial law on the assignment of (contractual and other) rights are applicable. Under these rules, the seller is under an implied warranty as to his title (his right to sell) and the legal enforceability of the right.[165)] There is no warranty that the obligor is solvent or that he will perform his obligation.

What these limited warranties mean in the context of a sale of an ERC, is unclear. One could argue that the implied warranty also covers the extent to which the purchaser can use an ERC in his own permit proceedings. There are not yet any court decisions that answer the question whether and how the general rules on assignment of rights or Art. 2 UCC apply. Therefore, ERC transactions are associated with a considerable amount of legal uncertainty, which, however, can be mitigated by proper contract planning.

It is also possible that an ERC is created by a service contract.[166] In this case, the parties may provide that the user of the ERC installs and operates control equipment in the plant of the originator of the ERC. As consideration, the user is allowed to use the credits so created as long as he is able to procure the necessary reductions. If this is not (or no longer) possible, this will be a reason to cancel the service contract. The contractor works at his own risk. Again, a coordination of air pollution control and contract law would be necessary in order to avoid a frustration of the contractual risk distribution. Of course, a service contract of this kind only makes sense where no further trade is anticipated. There is less flexibility, but on the other hand, more legal certainty about the mutual rights and duties of the parties.[167]

c) Tax Considerations

The tax treatment of the creation, financing, banking, use and disposition (especially sale and acquisition) of ERCs is a crucial issue of the whole emissions trading policy. Taxation is a major incentive or, inversely, disincentive for business decisions on investment and transactions. If the tax law discriminates against the emissions trading policy, its acceptance by the business community will be seriously hampered. Uncertainty over the taw treatment of ERCs will also have negative effect. An EPA-commissioned study by Baker and Winslow[168)] contains an exhaustive analysis of the tax treatment of ERCs; its principal arguments and conclusions will be presented in the following text.

With respect to the creation of ERCs, there are three major tax issues:

-- the availability of the normal 10 percent investment tax credits and accelerated cost recovery or elective rapid amortization for the cost of pollution control equipment;

-- the availability of a loss deduction when a firm creates an ERC through plant shutdown or production curtailment;

-- the tax basis of pollution control equipment acquired to create an ERC.

Under the Internal Revenue Code (IRC), capital expenditures incurred to acquire tangible business assets cannot be deducted from the total earning as cost; rather, these expenditures must be capitalized and the firm can then claim depreciation determined according to the useful life of the asset or accelerated cost recovery deductions determined according to the average midpoint useful life (or a range of 20 percent below or above it).[169)] For tangible business property placed in service after December 31, 1980 the Accelerated Cost Recovery System has been introduced. Under this system, the cost of these assets can also be recovered over a fixed period which generally is five years, or ten or fifteen years for public utility property. As an additional incentive for capital formation, the firm is entitled to a credit on its tax liability (tax credit) for the year the property is placed in service. The maximum credit is equal to ten percent of the cost of the qualified asset; there are further limitations in relation to the amount of tax liability.

These tax advantages are also available for pollution control equipment acquired in order to create an ERC.[170)] However, it is more doubtful whether also the special 60-month rapid amortization for pollution control equipment,[171)] which may be elected for investment in existing plants (pre-1976) in lieu of other depreciation or accelerated cost recovery methods, will always be available in case of acquisition of pollution control equipment to create an ERC. Certification of assets as a "pollution control facility" shall be refused where "it appears that by reason of profits derived through the recovery of wastes or otherwise in the operation of such property, its costs will be recovered over its actual useful life".[172)] As Baker and Winslow[173)] point out, one could interpret the term "otherwise" as to include profits derived from the sale of ERCs so created; but such a position is not likely to be adopted since the authority for determining whether profits will be "otherwise" derived from the facility is vested in EPA and the present EPA guidelines do not contain an indication that EPA will construe this term broadly.[174)] Also, the prerequisite contained in Sec. 169 (d) (1) (C) IRC that the pollution control facility may not "reduce ( ) the total operating costs of the plant" does not seem to be applicable where an ERC is sold at a profit because the day-to-day operating costs of the firm are not affected by the transaction.[175]

Where a firm creates an ERC through a <u>shutdown or pro-</u>

<u>duction curtailment</u>, the question arises whether the firm can claim a loss deduction under Sec. 165 IRC. This deduction does not require that the firm entirely terminates business operations or does not replace the abandoned property.[176] However, a loss deduction can only be claimed to the extent that the firm did not receive a compensation for the loss. It is possible that the Internal Revenue Service (IRS) would attempt to disallow a loss deduction where an ERC is created on the grounds that the ERC is the equivalent of compensation for the loss. Baker and Winslow[177] conclude that such a position is not tenable because the Emissions Trading Policy is not designed to compensate the owner of the firm for the loss incurred by a plant closure or production curtailment. This certainly is correct. However, the more important question is whether the gain achieved through the sale of the ERC is to be considered a compensation. The courts require that the benefit is directly compensatory, is in the nature of insurance and is intended to replace the loss in order to qualify as compensation. The US Court of Claims states in <u>Forward</u> <u>Communication</u> <u>Corp</u>. <u>v</u>. <u>U.S</u>.[178]: "(T)he statute does not bar a deduction for a loss actually incurred merely because the taxpayer is able to effect an offsetting gain on a different although contemporaneous transaction."

The rationale underlying this and related decisions[179] is also applicable to ERCs. Although the owner of the firm acquires a marketable commodity in the form of an ERC, the loss sustained from the plant closure or production curtailment would seem to be deductable because the benefit is or will in the future be gained on a different transaction and is not intended to replace the loss. This even is true where the shutdown or production curtailment is only effected in order to create the ERC.

Finally in this context, the <u>tax basis</u> assigned to pollution control equipment produced, acquired and installed to reduce emissions and create an ERC will be the cost incurred by the firm in producing, acquiring and installing it. Theoretically, it would be possible to allocate these costs between the equipment and the ERC. However, the ERC is not bought from the seller of the equipment and is not directly related to the production and installation of such equipment but, rather, is created by the independent actions of the buyer. The installation of new control euqipment only permits the relevant party to severe a preexisting "right" to pollute and use it in the future or sell it to other firms. Therefore, an allocation of production costs cannot be allowed or required.[180] By the same token, transaction costs associated with the creation of ERCs do not affect the tax basis of the pollution control equipment.

The financing of emission reductions in order to create ERCs also poses some difficult tax problems, especially in respect of

-- use of tax-exempt (low interest) industrial development bonds,

-- use of government subsidies, and

-- lease of pollution control equipment.

Sec. 103 (b) IRC provides that tax-exempt industrial development bonds may be used for financing pollution control equipment, if certain limitative conditions are met (generally, only end-of-pipe control equipment qualifies). It is doubtful whether this method of inexpensive financing can also be claimed for the creation of ERCs. The general position of the IRS is that the qualifying costs of a pollution control facility should be reduced to the extent that an "economic benefit" is derived from the facility. The Treasury Regulations provide that the qualifying expenditures must have been made only for the purpose of controlling pollution and may not have any other significant purpose.[181)] In case of a dual purpose, only the incremental costs associated with pollution control qualify. The creation of an ERC could be considered by the IRS as an economic benefit equivalent to the benefits derived from the operation of the facility. Baker and Winslow,[182)] however, point out that the benefits derived from the creation of an ERC are not derived from the operation or "function"of the facility but rather from the state or local agency policy in implementing the Clean Air Act. They find, however limited, support in a Ruling of the IRS which allowed the use of tax exempt bonds where cost savings associated with the use of control equipment were not the direct result of its operation.[183)] However, the question still is unsettled and this uncertainty may seriously hamper the creation of ERCs through installation of new control technology.

Where a firm uses government subsidies for the installation of pollution control equipment and the creation of ERCs, the tax basis of the acquired equipment will be reduced by the amount of the subsidy if the subsidy qulifies as a tax-free capital contribution.[184)] Under the criteria developed by the courts,[185)] government grants for pollution control investement generally qualify as tax exempt because their function is to become a part of the working capital of the firm and they do not serve as a compensation for a specific service provided to the grantor; the expected benefit to the community at large is irrelevant. Thus, the IRS ruled that a government grant to reduce pollution was tax-exempt.[186)] The rationale underlying the court decisions and the IRS ruling also apply where an ERC is created because the grant is not motivated to produce any direct benefit to the grantor.[187]

With respect to the lease of pollution control equipment for creating ERCs, the normal rules are applicable. The transaction will be treated as a sale if all the economic benefits and burdens of ownership are shifted to the lessee. Generally, recognition of a lease transaction requires that the equipment can still be used commercially by the lessor or any other person at the end of the lease time. However, the "safe harbor" provisions of Sec. 201 of the Economic Recovery Act of 1981 present significant options for firms to make arrangements beyond general law that ensure that the transaction will be treated as a lease.[188)]

Apart from the tax treatment of capital investment made for creating emission reductions that qualify as an ERC, the tax treatment of banked and used ERCs poses difficult and complex problems that have as yet not been entirely solved. The main issue is the amortization of ERCs.

The ERC is to be considered as an intangible capital asset. This question has not yet been decided. However, the IRS has ruled that cotton acreage allotments which accord a farmer the right to grow a specified crop of his land and are, therefore, grossly comparable to the limited "right to pollute" reflected in an ERC, constitute an intangible capital asset (in the meaning of Sec. 1221 IRC); also, airline route certificates are considered as intangible capital assets.[189)] ERCs should be treated in the same way.[190)] Sec. 167 IRC allows a depreciation or amortization of intangible capital assets only where the useful life of the asset can be determined and it has been placed in service, and only to the extent its anticipated salvage value is exceeded.

The requirement of a determination of the useful life of the ERC poses the most serious problems. The applicable regulations require that the useful life, i.e. the period over which the asset may reasonably be expected to be useful to the taxpayer in his business, can be estimated with reasonable certainty.[191] Where an ERC is banked, an amortization will not be allowed unless the applicable banking rules limit the duration of the ERC.[192] Even if banking rules establish an expiration date for the ERC, it could be argued that the useful life of an ERC is not determined by the period during which it can be banked but rather its potential use to meet regulatory requirements.[193] The question whether ERCs can be amortized would then depend on whether or not they have an ascertainable useful life after being used to fulfil permit requirements. The majority of precedents seem to suggest that the useful life of ERCs used in this way is not determinable. It has repeatedly been held that permits that are renewed regularly are not amortizable.[194] There is, however, a possibility to draw analogies from the tax treatment of pipeline easements whose amortization has been allowed by a court decision based on the useful life of the pipeline.[195] However, the rationale of this decision is limited to the case that replacement or reconstruction of the pipeline on the right-of-way is not contemplated or regularly practiced by the taxpayer.[196] Hence, while one could argue that the useful life of a used ERC is the useful life of the facility or source, the fact that it can also be used when the source modernizes or is reconstructed would suggest that the courts ultimately will conclude that once an ERC is incorporated in a permit, its useful life is as indeterminate as that of the permit.[197] The result is that the costs to create or purchase an ERC cannot be amortized.

With respect to banked ERCs, it is also doubtful whether they can be considered to be placed in service.[198] An asset is placed in service when it is available for its specifically assigned function in the business or in the production of income. This requirement would not seem to pose a problem to a firm that has banked or purchased an ERC for its own future use and can show that it does not intend to hold the ERC for sale. The notion "placed in service" does not require actual use; rather, availability for use is sufficient if later use is contemplated.[199) However, where an ERC is banked or purchased for future sale, it is not income producing and hence not amortizable.[200)

Finally, the salvage value of ERCs may be so high that, as a practical matter, amortization is not possible. Salvage value is the value of the asset which is estimated (at the time of acquisition) to be realizable by disposition of the object when it is no longer useful to the taxpayer.[201) Amortization is not possible to the extent of the estimated salvage value of the intangible asset. Where the applicable state rules allow plant closures and production curtailments as a method for creating ERCs, it may be argued that the value of the ERC can be realized by creating a new ERC. Under this hypothesis, the ERC may have a salvage value that limits or even excludes amortization.[202)

The transfer of ERCs also raises tax problems. If the originator of an ERC sells it for profit, the profit may be considered ordinary income subject to normal taxation or long-term capital gain subject to more favorable taxation, depending on whether or not the ERC is a capital asset. Intangible rights granted by the state under regulatory programs are generally held to be capital assets,[203) unless they are primarily held for sale to customers. However, if an ERC qualifies for amortization during its banking period, the ERC technically would not be a capital asset.[204) But if an amortizable ERC is held for a period of more than one year it probably would constitute a "Section 1231 asset" qualifying for favorable long-term capital gain treatment.[205] Since ERCs normally would not be amortizable, the gains made in selling them would in any case be considered as capital gains, and qualify for favorable long-term capital gains if sold after a holding period of one year.

The tax treatment of leasing arrangements for the use of ERCs follows the general principles. However, the "safe harbor" provisions of Sec. 201 Economic Recovery Act of 1981 are applicable only to tangible, not intangible capital assets. Therefore, the contractants must make sure that the lessee does not bear all the risks and has all the advantages of ownership. If this is ensured, long-term leasing arrangements provide significant tax advantages. Since a purchased ERC cannot be amortized, these tax advantages exceed those derived from the lease of tangible capital goods.

Complicated tax problems arise where the parties choose, in lieu of a sale or lease, a contractual arrangement whereby the user of an ERC would act as an independent contractor to operate pollution control equipment in the plant of the creator of the ERC in exchange for the permission to use the ERC (service agreement). Some of these questions have been clarified in two rulings of the IRS concerning the SOHIO offset transaction in California.[206]

In conclusion, one can state that there are two major tax issues relating to ERCs that cannot be resolved with sufficient certainty by application of the IRC, treasury regulations, IRS rulings and court holdings, namely the availability of industrial bond financing for creating ERCs and the amortization of ERCs. The analysis suggests that important advantages can be derived from leasing ERCs. As far as can be seen, the existing banking rules do not exclude leases as a means of transferring ERCs although they normally do not specifically mention them. However, it is doubtful whether originators of ERCs will be willing to make leasing arrangements rather than sell the ERCs. For a lease may have significant disadvantages with respect to the risk of confiscation of ERCs, failure of control technology etc. In any case, the insecure tax treatment of ERCs may have contributed to the limited use of banks established in several areas throughout the US.

d) Administrative procedures

The cost incurred by industry in administrative procedures involving emissions trades may also be an impediment to acceptance of the new policy by the business community.

The implementation of the Clean Air Act's regulatory program including the emissions trading policy is characterized by a complex interplay of federal and state agencies, although the Clean Air Act strengthened the federal role in the control of air pollution. The NAAQSs are determined by the administrator of the EPA. The states have to devise implementations plans in order to ensure the attainment of the NAAQSs. The SIPs require approval by the EPA, and if a state fails to adopt an adequate SIP, the EPA can substitute an implementation plan of its own for that of the state. Both at the state and the federal levels public comment and hearing requirements are to ensure that conflicting views on the contents of the SIP are considered by the competent agency. All this renders the whole process of adopting and approving SIPs rather cumbersome. The same procedure applies in case of SIP revision. The new source review program which must be a part of the revised SIPs in nonattainment areas is administered by the states with little EPA supervision. In PSD areas, new source preconstruction review also is the responsibility of the states; however, there is stronger EPA involvement in the permit procedure, although this responsibility can be, and to a certain extent has been, delegated to the states. In both cases, not only the substantive prerequisites for granting a construction permit but also the applicable procedures, especially the hearing requirements, are obstacles to firms wishing to locate or expand in a nonattainment or PSD area. The Clean Air Act of 1970 also provides for greatly strengthened federal enforcement authority.

The emissions trading policy is integrated into this complex regulatory framework. Its main objective is not to decrease the administrative burdens of the EPA and the state agencies but, rather, afford the affected firms less costly ways to meet SIP requirements or avoid substantive and procedural new source review requirements. However, increased administrative costs of the competent agencies caused by the complexity of applicable procedures normally also aremirrored by increased administrative costs of the firms involved.

Only the netting policy clearly leads to saving administrative costs. When a modernizing or expanding plant can "net out" of preconstruction review it avoids undergoing the lengthy and cumbersome new source review procedure. The competent agency must only check and the operator demonstrate that the source fulfils the netting requirements. This task is facilitated by the absence of ambient tests. Normally, there would also be no need to revise the SIP. Apart from netting, in principle any emissions trade requires an amendment of the applicable SIP. Since the creation and use of an ERC implies that the emission limitations laid down in or under the SIP for the relevant sources are no longer valid and the transaction may have ambient impacts, the transaction must be reflected in the

SIP and hence the SIP be revised. To this extent, the emissions trading policy increases the workload of the competent agencies and the firms involved.

In respect of offset trades, it must be noted that offsets are a necessary part of SIP revisions under the 1977 Amendments (unless a state opted instead for a growth allowance policy). Almost all states incorporated offset programs in their SIPs, often in the form of generic offset rules that formally were a part of the state air pollution control regulations. About 1.900 offset transactions are reported to have taken place.

In order to avoid the cumbersome procedure of individual SIP revision, especially for bubbles, EPA has since 1979[207)] afforded the states opportunities to develop generic rules under which certain classes of emissions trades are exempt from individual SIP revisions. Alternative emissions limits approved under generic rules are considered by EPA to be federally enforceable in the same manner as SIP requirements. The first generic rule approved by EPA was a generic VOC bubble of New Jersey.[208)] The Policy Paper of 1982 gives the states guidance for determining under which prerequisites a generic rule will be approved by EPA. Moreover, EPA is preparing model rules that are designed to facilitate the task of state and regional officials in drafting individually such rules. A draft of these rules has been circulated for comment.[209)]

Generally, a generic rule is approvable if it ensures that applicable baseline emissions will not increase, emissions trades will be evaluated in a replicable procedure and transactions do not interfere with ambient attainment and maintenance.[210)] Industry urges a liberalization of these principles in that at least <u>de minimis</u> net increases of the baseline emissions should be permitted.[211)]

Moreover, the EPA describes a variety of possible elements of generic rules that satisfy these general principles. No SIP revisions will be required for:

-- emission shifts totalling less than 100 tons per year;

-- VOC and NO_x trades if no net increase in applicable baseline emissions occurs;

-- SO_2, CO or particulates trades if level I of the modelling screen is applicable, i.e. the sources are located in the same immediate vicinity (250 meters)[212) there is no net increase of emissions and emissions decrease at the source with the lower plume height;

-- SO_2, CO or particulates trades if specific emission limitation for groupings of sources are established or criteria for simplified level II modelling are developed.

As of April 1983, EPA had approved generic rules of New Jersey, Massachusetts, Connecticut, North Carolina, Oregon, South Carolina and Pennsylvania[213)]. Most of these rules are limited to VOC bubbles; the Oregon and South Carolina rule encompasses all kinds of trades in VOC, TSP and SO_2 including banking. Moreover, EPA has proposed to approve 3 other generic bubble rules (Rhode Island, Maine, and Kentucky). Kentucky's rule is the most comprehensive, covering VOC, SO_2, TSP, NO_x, CO, and Pb. None of the rules concerns offsets because offsets are a part of revised SIPs and there is less need for generic rules. Seventeen more states are developing or considering the establishment of generic rules, half of them limited to VOC, the other half also covering TSP, SO_2, and sometimes NO_x and CO.

If a generic rule has been approved, individual trades approved by the state under the rule need no longer be submitted as individual SIP revisions. This reduces overlapping state and federal review and saves administrative and business costs. Trades which are not covered by generic rules can still be implemented as individual SIP revisions. Thus, the emission trading system becomes more predictable without losing its flexibility. However, it remains to be seen to what extent states that have adopted generic rules will be prepared to process applications for emission trades involving individual SIP revisions.

5. Reorientation of the American Emissions Trading Policy?

The EPA's Policy Statement of April 1982 is not yet final. Pursuant to existing procedures EPA, when publishing the Policy Statement,had requested comments by interested persons and organizations. In the light of numerous critical comments received from environmental organizations and state authorities as well as the decision of the Court of Appeal in NRDC v. Gorsuch, EPA in a statement of August 1983 declared that it was considering revision of the bubble policy in particular with respect to the use of plant shutdowns for creating ERCs [214].EPA suggested a number of alternatives and requested further comments by the interested public on these alternatives. The final Policy Statement will be formulated when these comments have been received and discussed within EPA. The envisaged reorientation of the emissions trading policy only concerns the bubble policy. The offset policy which already is set forth in the CAA remains unchanged. With respect to the netting policy, EPA wanted to wait for the pending decision of the Supreme Court; as things have turned out, changes are not legally necessary so far.

One of the questions posed by EPA in the August 1983 Statement concerns the avoidance of double counting of shutdowns in nonattainment areas (having or lacking an approved SIP) [215]. EPA now recognizes that in cases where the SIP is based on summary assumptions on the emission increases related to economic growth, it is difficult to distinguish between emission reductions caused by shutdowns and emission increases caused by new facilities. This could have the result that credits for shutdowns in the relevant AQCRs could be impermissible.

The Policy Statement of August 1983 focusses on the permissibility of credits for shutdowns in nonattainment areas that do not have an approved SIP and cannot demonstrate compliance with the NAAQSs[216]. EPA defends its previous position that credits for shutdowns in principle are permissible as a means of useful partial solutions for improving the ambient air quality. In its view, the credit of shutdowns serves to overcome the information gap between administration and industry and creates incentives for timely attainment of the SIP requirements; the prerequisite also applicable in the case of shutdowns that the emission reduction must be beyond the (negotiated) RACT level ensures a sufficient contribution for the improvement of air quality. However, EPA concedes that, inspite of these prerequisites, a particular AQCR may not be able to comply with the requirements of "reasonable further progress" and maintenance of NAAQSs "as expeditiously as possible". Therefore, it is considering a reorientation of the bubble policy which links this policy more with the paramount objectives of improving air quality. In particular, 6 alternatives for the bubble policy in nonattainment areas that have no approved SIP are being discussed[217].

(1) In nonattainment areas lacking demonstration of attainment (including areas that have been granted an extension until 1982 for the establishment of revised SIPs) shutdowns can be credited only insofar as the emissions reduction exceeds the negotiated RACT level. This alternative would exclude the use of actual emissions as baseline for granting credits for shutdowns. It has only a limited importance since after expiration of the 1982 deadline most sources would be subject to the RACT requirement anyway.

(2) In nonattainment areas lacking demonstration of attainment (including areas that have been granted an extension until 1982 for the establishment of revised SIPs) all bubble transactions can only be effectuated insofar as the emission reduction exceeds the negotiated RACT level. This alternative is to make sure that bubble transactions are only permitted where the RACT standards are complied with as a minimum requirement.

(3) In nonattainment areas lacking demonstration of attainment, credits for shutdowns are only granted where the relevant transaction produces a substantial improvement of air quality; as a threshold, EPA is considering a net reduction of emissions by 20 percent. This solution would secure speedy progress toward attainment and at the same time establish a safety margin against uncertainties associated with the assumptions underlying the SIP.

(4) The requirement of a substantial improvement of air quality could be extended to all bubble transactions in nonattainment areas lacking demonstration of attainment, in order to ensure a direct and immediate contribution of each transaction to the improvement of air quality.

(5) In the case of shutdowns in these areas it could be required instead of an emissions reduction by a fixed rate, e.g. 20 percent, that the contribution of the shutdown to the improvement of air quality be proportional to the extent by which the SIP's design value exceeds the ambient standard at the time of the trade, while other bubbles would simply have to produce a net air quality improvement. EPA considers this alternative as politically doubtful because it requires from a single source an excessive contribution to the solution of a nonattainment problem that is largely to be attributed to other sources.

(6) Finally, credits for shutdowns in nonattainment areas lacking demonstration of attainment could be disallowed entirely. EPA concedes that such a policy could lead to a substantial improvement of air quality but might also sacrifice any incentive for early, environmentally-beneficial shutdowns of highly-polluting marginal facilities.

Apparently, a compromise has been reached within EPA[218). Each bubble in nonattainment areas having no approved SIP that demonstrates attainment must contribute to "reasonable further progress". This shall be ensured by the requirement of a RACT baseline for calculating the emission reduction credit, the requirement of a contribution to the improvement of air quality and a system of rebuttable presumptions whereby a shutdown (or production curtailment) would likely have occurred anyway.

The most interesting and novel aspect of this "new bubble policy" are the rebuttable presumptions. They focus on the time of the emission reduction and the relationship to "standard industry practice". Where an emission reduction by a shutdown is achieved far in advance of a bubble transaction or because of normal production change, there is a presumption that the emission reduction was not motivated by the emissions trading policy (in other words: was not motivated by the desire to create a credit) but would have occurred anyway. If the operator cannot rebut the presumption he will not be granted a credit. However, it suffices that the granting of a credit was a motive among others; it need not be the sole or paramount motive. The details must still be worked out; in particular, the reference to "standard industrial practice" seems to pose some problems.

It is still unclear when the final Policy Statement will be adopted. Until this date, EPA will orient its policy at the Policy Statement of 1982. This is also true of nonattainment areas for which the 1982 deadline for submission of revised

SIPs with demonstration of attainment has expired. So long as there is no final determination that these areas are not capable of attaining the ambient quality standards, they can effectuate bubbles transactions pursuant to the Policy Statement of 1982. Moreover, EPA is considering a flexible interim solution for these cases in the final Policy Statement.

The innovations just described are restrictions of the Emissions Trading Policy in the interest of environmental protection. On the other hand, there also is a certain trend towards extension and liberalization, namely in the field of NSPSs. Under the Policy Statement of 1982 bubble transactions for complying with technology-based NSPSs are impermissible. Now EPA is about to cautiously move off from this position[219]. EPA is considering to permit the first NSPS Bubble for coal-fired power plants. Instead of an emission standard for SO_2 of 1.2 pounds per million BTU heat input the two boilers of a new power plant in Illinois shall be subject to a standard of 0.6 and 1.8 pounds respectively. By different utilization of the two boilers an emission reduction of 1000 tons SO_2 per year is expected. EPA is considering to expressly provide for such NSPS bubbles in all future NSPSs.

Footnotes (Chapter B)

1) Public Law 91-604, 42 USC § 1857 et seq. (1970)
2) Public Law 95-95, 42 USC § 7401 et seq. (Supp. I 1977); cf. Quarles, p. 6 et seq.; Raffle, p. 1 et seq.
3) CAA § 109(a)-(c)
4) 40 C.F.R. § 50; 44 Fed. Reg. 8202 (1979)
5) CAA § 108(a)
6) Union Electric Co. v. EPA, 427 U.S. 246, 265/266 (1976)
7) CAA § 109(b)(2)
8) CAA § 110(a)(2)(A)(i)
9) CAA § 110(a)(2)(A)(ii)
10) CAA § 110
11) CAA § 110(a)(1)
12) CAA § 123
13) NCAQ, p. 3.4-2; Quarles, p. 16; Liroff, p. 5
14) CAA § 110(a)(2)(D)
15) CAA § 112
16) CAA § 111
17) CAA § 111(a)(3)
18) CAA § 111(a)(4)
19) CAA § 111(h)
20) Portland Cement Association v. Ruckelshaus, 486 F.2d 375 (D.C. Cir. 1979); see Currie, 128 U. Pa. L. Rev. 1389, at 1409 et seq. (1980)
21) CAA § 111(a)(1)(C); Essex Corp. v. Ruckelshaus, 486 F.2d 427 (D.C. Cir. 1979); Portland Cement, supra note 20; National Lime Association v. EPA, 627 F.2d 416 (D.C. Cir. 1980); Del Duca, 5 Harv. Envt'l L. Rev. 184, at 190, 192 et seq.; Currie, supra note 20, at 1420 et seq.
22) CAA § 111(a)(1)(C)
23) CAA § 111(b)(2)
24) NCAQ, p. 3.7-2, 3 and 7; NRDC, Statement on New Source Performance Bubble, p. 8
25) CAA § 110(a)(2)(D)
26) For the following text see NCAQ, p. 3.4-2; Quarles, p. 6 et seq.
27) 41 Fed. Reg. 55524 (1976)
28) CAA § 110(a)(2)(I)
29) NCAQ, p. 3.4-13

30) CAA §§ 110(a)(2)(A)(i), 172(a)(2),(b)(2)

31) CAA §§ 171(1), 172(2)(3)

32) CAA §§ 172(b)(6), 173

33) CAA §§ 172(b)(6), 302(j); CAA §§ 111(a)(4), 171(4)

34) 43 Fed. Reg. 26382, 26383, 26403, 26404 (1978)

35) Alabama Power Co. v. Costle, 636 F.2d 323 (D.C. Cir. 1979), superseding 606 F.2d 1068 (D.C. Cir. 1979)

36) CAA §§ 172(b)(6), 173(2)

37) CAA § 171(3); 43 Fed. Reg. 9453 (1978); see Lutz, 11 Envt'l Law 321, at 333 (1981)

38) NCAQ, p. 3.4-52; Dames, Moore, p. 2.5; Del Duca, supra note 21, at 202; Liroff, p. 21

39) CAA § 173(3)

40) CAA § 173(4)

41) CAA § 173(1)(A)

42) CAA §§ 172(b), 173(1)(B)

43) See Quarles, p. 17

44) CAA § 173(1)(A)

45) See Comment, 8 Ecol. L.Q 774, at 777 (1980)

46) CAA § 172(b)(3)

47) 40 C.F.R. § 51.1 (1980)

48) See Currie, 68 Calif. L. Rev. 48 (1980); Quarles, p. 7 et seq.; Kontnik, 74 Nw. L. Rev. 936 (1980)

49) NCAQ, p. 3.5-6

50) CAA §§ 162, 165

51) CAA § 163

52) Cf. Kontnik, supra note 48, at 948

53) CAA § 166

54) CAA § 165(a)(4); cf. Quarles, p. 10/11

55) Alabama Power, supra note 35; for the position of EPA see 45 Fed. Reg. 52676, 52677 (1980); cf. Kontnik, supra note 48, at 948 et seq.; Currie, supra note 48, at 55

56) CAA § 165(a)(1)

57) CAA § 169(1)

58) NCAQ, p. 3.5-41/42

59) Alabama Power, supra note 35

60) 40 C.F.R. § 52.21(b)(23)

61) Alabama Power, supra note 35

62) CAA § 165(a)(3); see Quarles, p. 7 et seq.

63) CAA § 169(4)

64) Alabama Power, supra note 35; 45 Fed. Reg. 52676, 52718 (1980)

65) CAA § 169(4); 45 Fed. Reg. 52676, 52714 (1980)

66) CAA § 165(a)(7)

67) Guidelines on Air Quality Modelling, April 1978; 43 F.Reg. 26, 398 (1978)

68) See NCAQ, p. 3.5-34 et seq.; Quarles, p. 9; Lutz, 11 Envt'l Law 321, at 355 (1981)

69) NCAQ, p. 3.5-46, 58, 78; Dames, Moore, p. 4.1-4.2; Del Duca, supra note 21, p. 210

70) CAA § 165(a)(3)

71) CAA § 165(a)(4); Quarles, p. 10/11; Currie, supra note 48, p. 66

72) CAA § 169(3)

73) CAA § 169(3); Currie, supra note 48, at 63

74) NCAQ, p. 3.5-42, 43, 56; Dames, Moore, p. 2.5; Currie, supra note 48, at 65

75) See Quarles, p. 10; Lutz, supra note 68, at 350

76) CAA § 169A(b)(2)(a)

77) Policy Statement, p. 15076 col. 2/3

78) Policy Statement, p. 15076 col. 3

79) See the EPA actions referred to in Appendix II; Liroff, p. 4 et seq., 23 et seq.; del Calvo y Gonzales, 5 Harv. Envt'l L. Rev. 377, at 399 et seq. (1981); Quarles, p. 16 et seq.; Levin, p. 68 et seq.; Comments, 9 Envt'l L. Rep. 10027 (1979); 10 Envt'l. L. Rep. 10014 (1980); 11 Envt'l L. Rep. 10119 (1981)

80) Policy Statement, p. 15077 col. 1

81) 41 Fed. Reg. 55524 (1976); 44 Fed. Reg. 3274 (1979); 45 Fed. Reg. 31304 and 52676 (1980)

82) 44 Fed. Reg. 3274, 3276 (1979)

83) Policy Statement, p. 15076 col. 3

84) Policy Statement, p. 15076 col. 3

85) 44 Fed. Reg. 71779 (1979)

86) Policy Statement, p. 15077 col. 1

87) 44 Fed. Reg. 3274, 3277 (1979); 45 Fed. Reg. 52676, 52696-98 (1980); 46 Fed. Reg. 50766, 50767-69 (1981)

88) Policy Statement, p. 15077 col. 1

89) Comment, 128 U. Pa. L. Rev. 937, at 943 (1980)

90) 44 Fed. Reg. 3274, 3280 (1979); for the previous EPA position see 41 Fed. Reg. 55524, 55529 (1976); cf. Comment, supra note 89, at 942 et seq.

91) See Ritts, Model Emissions Trading Rules

92) Same opinion UARG, Comments on Policy Statement, p. 5 et seq.; CMA, Comments on Policy Statement, p. 2 et seq.

93) CAA § 173(2); Policy Statement, p. 15083 col. 1; but see the criticism by del Calvo y Gonzales, supra note 79, at 424

94) 43 Fed. Reg. 26401 (1978)

95) Policy Statement, p. 15176 col. 3

96) Policy Statement, p. 15076 col. 3

97) Policy Statement, p. 15076 col. 3

98) ASARCO v. EPA, 578 F.2d 319 (D.C. Cir. 1978); Policy Statement, p. 15083 col. 1

99) New Source Performance Bubble Issues, OAQPS 1982; cf. UARG, Comments on Policy Statement, p. 8 et seq.; NRDC, Statement on New Source Performance Bubble Issues, 1982; Note, 32 Stanford L. Rev. 943, at 951 et seq. (1980); del Calvo y Gonzales, supra note 79, at 425 et seq.

100) 46 Fed. Reg. 50766-69 (1981); for the previous EPA position see 45 Fed. Reg. 52676, 52697 (1980)

101) Natural Resources Defense Council v. Gorsuch, 12 Envt'l L. Rep. 20942 (D.C. Cir. Aug. 17, 1982)

102) Policy Statement, p. 15077 col. 1, 15083 col. 1

103) There have been some conflicting views in EPA as to whether such authority exists; see Ritts, Summary of Comments on Policy Statement, p. 120

104) Policy Statement, p. 15077 col. 2

105) For the following text see Policy Statement, p. 15080 et seq.

106) Policy Statement, p. 15080 col. 1/2

107) Policy Statement, p. 15080 col. 2/3

108) Policy Statement, p. 15080 col. 1

109) 40 C.F.R. §§ 51.24(a)(3), 52.21(b)(3); 45 Fed. Reg. 52676, 52700 (1980)

110) Policy Statement, p. 15081 col. 1

111) 40 C.F.R. part 51 App. S § IV.C.3 (1981); 41 C.F.R. §§ 51.18(j)(vii)(c)(1); 52.24(b)(3)(ii); but see 44 Fed. Reg. 3274 (1979)

112) 40 C.F.R. 51 App. S § IV.C. 3 n. 9; 40 C.F.R. 51.18 (j)(vii)(c)(1); 51.24(b)(3)(b)(ii); 52.21(b)(3)(ii) (a)

113) Policy Statement, p. 15081 col. 1

114) Policy Statement, p. 15081 col. 1/2

115) Policy Statement, p. 15081 col. 2/3

116) CMA v. EPA, No. 79-1112, Settlement of 22 Febr. 1982

117) Policy Statement, p. 15081 col. 3

118) Policy Statement, p. 15082 col. 1

119) Policy Statement, p. 15982 col. 1

120) South Coast Quality Management District, New Source Review Regulations, Rule 1308 (d) (1982). The same is reported for Idaho; see Vivian, Hall, p. 3 et seq.

121) Policy Statement, p. 15082

122) 40 C.F.R. 52.21 (b) (3) (vi) (c)

123) See above note 116

124) Interview with Prof. Marc Roberts, Harvard University

125) Policy Statement, p. 15082 col. 1/2

126) Policy Statement, p. 15082 col. 2

127) Policy Statement, p. 15082 col. 3

128) NRDC, supra note 101

129) Policy Statement, p. 15082 col. 3/15083 col. 1

130) See supra note 120

131) Policy Statement, p. 15083 col. 1

132) 40 C.F.R. §§ 51.24(b)(23), (i)(8); 52.21(b)(23), (i)(8); 45 Fed. Reg. 52676, 52698, 52708/9 (1980)

133) Policy Statement, p. 15083 col. 1

134) Policy Statement, p. 15083 col. 1; but see the decision in NRDC, supra note 101

135) Policy Statement, p. 15076 col. 3 (not mentioned in the Technical Issues Document, Policy Statement, p. 15083 col. 1)

136) Policy Statement, p. 15083 col. 2/3

137) Policy Statement, p. 15083/84

138) See Ritts, Model Emission Trading Rules

139) Ritts, Summary of Comments on Policy Statement, p. 13 (Oklahoma), p. 99/100 (Illinois)

140) Policy Statement, p. 15084

141) Supra note 112

142) 40 C.F.R. § 52.21(b)(3)(ii)(a)

143) Policy Statement, p. 15084 col. 1

144) Policy Statement, p. 15084; cf. Tether, Legal Issues, p. 4 et seq., 16 et seq.

145) Policy Statement, p. 15084 col. 2/3

146) Kontnik, 8/82 Envt'l Analyst 3, at 5 (1982)

147) See Tether, Legal Issues; Comment, supra note 89, at 949 et seq.

148) Tether, Legal Issues, p. 2, 7 et seq.; Comment, supra note 89, at 949 et seq.

149) See suthors cited supra note 148

150) Cf. Comment, supra note 89, at 960 et seq.; Contra: Landau, 9 Envt'l Law 575, at 597-99 (1979)

151) See, e.g., Andrus v. Allard, 444 U.S. 51, 65 (1979); Kaiser Aetna v. U.S., 44 U.S. 164, 175 (1979); Tether, Legal Issues, p. 6; Haley, 54 Wash. L. Rev. 315 (1979)

152) Tether, Legal Issues, p. 2

153) Kaiser Aetna, supra note 151; Penn Central v. New York, 438 U.S. 104 (1978); Tether, Legal Issues, p. 9

154) Tether, Legal Issues, p. 8/9

155) Wickard v. Filburn, 317 U.S. 111, 131 (1942) (concerning crop acreage allotments); Tether, Legal Issues, p. 13

156) American Bond and Mortgage Co. v. U.S., 52 F.2d 318, 320 (7th Cir. 1931), cert. denied, 285 U.S. 538 (1932)

157) Tether, Legal Issues, p. 13, 14

158) Tether, Legal Issues, p. 11, 16 et seq.

159) Comment, supra note 89, at 951

160) Tether, Legal Issues, p. 10

161) See Kontnik, supra note 146

162) See Ritts, Summary of Comments on Policy Statement, p. 56

163) Forster v. Colorado Radio Corp., 381 F.2d 222 (10th Cir. 1967)

164) Cf. Kontnik, supra note 146, at 6

165) See 6 Am.Jur. 2d "Assignment", § 107; Williston-Jaeger Contracts, 3rd ed. vol. 3 (1960, Suppl. 1982), P. 316 et seq.

166) Kontnik, supra note 146, at 5

167) Kontnik, supra note 146, at 5

168) Baker, Winslow, Tax Considerations

169) Secs. 167 and 168 IRC

170) Baker, Winslow, p. 11

171) Sec. 169 IRC

172) Sec. 169 (e) IRC

173) P. 12

174) See Pollution Control Facilities, Guidelines for Certification, 36 Fed. Reg. 19132-19134 (Sept. 28, 1971)

175) Baker, Winslow, p. 13

176) Parmelee Transportation Co. v. U.S., 351 F. 2d 619 (Ct. Cl. 1965); Baker, Winslow, p. 15

177) P. 17/18

178) 608 F. 2d 485 (Ct. Cl. 1979)

179) See also Shanahan v. Commisioner, 63 T.C. 21 (1974); Freitas Dairy, Inc. v. U.S., 582 F. 2d 500 (9th Cir. 1978)

180) Baker, Winslow, p. 21

181) § 1.103-8(g)(2)(iii) and (iv)

182) P. 28/29

183) Use of cheaper fuel which necessitated the installation of additional control equipment; Letter Ruling 7932050, May 10, 1979

184) Sec. 362 (c)(2) IRC

185) See the references in Baker, Winslow, p. 32/33

186) Letter Ruling 8017095, January 30, 1980

187) Baker, Winslow, p. 33

188) See Baker, Winslow, p. 37/38

189) Rev. Rul. 66-58, 1966-1 C.B. 186; 67-113, 1967-1 C.B. 55

190) Baker, Winslow, p. 42

191) Treasury Regs. § 1.167(a)(3); see Rodeway Inns of America v. Commissioner, 63 T.C. 414 (1974)

192) Baker, Winslow, p. 42/43

193) Baker, Winslow, p. 43

194) Rev. Rul. 65-228, 1965-2 C.B. 43; Hoek v. Commissioner, 51 T.C. 195 (1968); Nachman v. Commissioner, 191 F. 2d 934 (5th Cir. 1951)

195) Northern Natural Gas Co. v. O'Malley, 277 F. 2d 128 (8th Cir. 1960)

196) Rev. Rul. 71-120, 1971-1 C.B. 79, mod. Rev. Rul. 71-448, 1971-2 C.B. 130, and Rev. Rul. 72-403, 1972-1 C.B. 102

197) Baker, Winslow, p. 46

198) Treasury Regs. § 1.167(a)-10(b)

199) Rev. Rul. 79-203, 1979-2 C.B. 94; Rev. Rul. 76-428, 1976-2 C.B. 47; Rev. Rul. 69-201, 1969-1 C.B. 60; Baker, Winslow, p. 44

200) See, Hirschel v. Commissioner, Tax Ct. Mem. 1981-189

201) Treasury Regs. § 1.167(a)-1(c)

202) Baker, Winslow, p. 47

203) Rev. Rul. 66-58, 1966-1 C. B. 186; Parmelee Transportation Co. v. U.S., 351 F.2d 619 (Ct. Cl. 1965)

204) Sec. 1221 (2) IRC; Rev. Rul. 58-133, 1958-1 C.B. 277

205) Baker, Winslow, p. 59/60

206) Rev. Rul. 79-264, 1979-2 C.B.; Letter Ruling 7950049; see Baker, Winslow, Appendix B

207) In 1979, EPA had still rejected the adoption of generic rules; 44 Fed. Reg. 71779, 71786 (1979)

208) 46 Fed. Reg. 20551 (1981); see Comment, 11 Envt'l L. Rep. 10119 (1981)

209) See Ritts, Model Emission Trading Rules

210) Policy Statement, p. 15024

211) See Ritts, Summary of Comments on Policy Statement, p. 121 et seq.

212) Industry demands a distance of 800 meters as in stack height regulations

213) For the status of generic rules see Appendix VI

214) New Emissions Trading Policy Statement of 25 Aug. 1983, 48 Fed. Reg. 39580 (1983)

215) New Policy Statement supra note 214, at 39581 col.1/2, at 39584 col. 2/3

216) New Policy Statement supra note 214, at 39581 et seq.

217) New Policy Statement supra note 214, at 39584 et seq.

218) Levin, Russel, Implementing "Alternatives" to Command-and-Control Regulation at the U.S. Environmental Protection Agency, Paper given at the British-American Conference on Comparative Administration and Law, Little Aston House, Oxfordshire, May 1984, p. 12 et seq.

219) Levin, Russel supra note 218, p. 16

C. Evaluation of the Advantages and Disadvantages of EPA's Emissions Trading Policy

I. Criteria for Evaluating EPA's Emissions Trading Policy

Any environmental quality problem can be managed by a variety of alternative strategies, but it appears that no single strategy is best for all situations. Only through a systematic evaluation of the many alternative strategies available for any given problem and an explicit trade-off of the many conflicting effect of any chosen strategy, is the desired environmental quality likely to be achieved in an effective, efficient, and equitable manner.

Before any judgements can be made about the merits or drawbacks of EPA's new approaches to air pollution control, it is necessary to establish some criteria on which to base our evaluation. Such criteria should be useful to the extent that they help assess the actual or expected advantages and disadvantages of the new policy relative to the existing command-and-control approach.

Although many criteria are possible[1)], the following list seems to us to encompass the most pertinent considerations for the evaluation of the new policy:

(a) Air Quality Improvement: How does emissions trading affect the attainment and maintenance of ambient air quality standards? What is the likelihood that the new strategy will improve air quality? How reliable are the new approaches in achieving the stated air quality goals as expeditiously as practicable? Are their air quality effects more or less certain and automatic than those of existing traditional regulation?

(b) Cost-Effectiveness: Does the new policy meet its stated goals at relatively low cost to society? Will the new policy increase or reduce the direct costs (i.e. all costs of control equipment and the associated operation and maintenance costs)? Will the new policy increase or reduce the indirect costs incurred in the process of complying with, and administering the requirements of the new policies (such as information, administrative, modeling, monitoring and enforcement costs)?

(c) Economic Development: Will the new policy allow for growth in industrial activity which tends to accentuate air pollution problems? Will it allow for easy entry of new sources of pollution and expansion of existing ones?

(d) Technological Advancement: Will the new policy enhance or undercut the general technology-forcing intent of the Clean Air Act? Does the new policy establish permanent incentives to promote cost-effective technological innovations or will it serve to freeze the existing state-of-the-art?

(e) Administrability: What is the degree of difficulty associated with the administration of emissions trading? Would it necessitate added administrative costs in terms of workload and budget for regulatory agencies and complying firms?

(f) Enforceability: Will the new policy make enforcement of the Clean Air Act's requirements more difficult? What resources will be necessary to enforce this policy? Does emissions trading encourage voluntary compliance? Will violators be easily identifiable? Will enforcement be credible?

(g) <u>Legal feasibility:</u> Is the emissions trading policy consistent with Clean Air Act requirements? Does adequate authority to implement the emissions trading policy exist? Would existing legislation have to be changed to enable implementation, or would entirely new legislation have to be passed?

These criteria are subject to further development and refinement, but they provide a first necessary framework for the analysis of any environmental policy. Policy evaluations of any sub-set of these criteria, therefore, should be regarded as incomplete.

The individual criteria are directed at conflicting goals which must be balanced to achieve effective air pollution control policy. For example, the new strategy may achieve higher marks for encouraging cost-effectiveness but may suffer on grounds of air quality grounds; it may provide strong incentives for innovations in air pollution control technology but may prove difficult to enforce.

Therefore, the final steop in evaluating the new poling would be to combine the ratings on the individual criteria. This process involves assigning relative weight to the individual criteria. However, it is difficult to identify a weighted or even an ordinal relationship between these criteria. However, it is difficult to identify a weighted or even an ordinal relationship between these criteria.

Aside from the difficulties in assigning relative weights to the individual criteria it must be recognizes that this process is the responsibility of decitions-makers, not of analysts of government policy. It is also useful to note that, as programs mature and priorities shift, the relative weight given to the cirteria can change, requiring modifications to the existing approach.

II. Methodological Issues in Applying the Evaluative Criteria

After having established the criteria which we feel should be applied in evaluating any environmental policy, EPA's regulatory reforms are evaluated according to the indicated criteria and relative to the existing policy of direct regulation.

To do so, we assume that the overall goals of the air pollution control policy in the United States, as embodied in the Clean Air Act and its amendments, have been set and, therefore, must be taken as given. We do not attempt to reexamine the setting of ambient air quality standards and other air pollution control goals as set forth in the U.S. legislation. It is our intent only to evaluate the emissions trading policy for achieving and maintaining air quality goals once those goals have been set. It should be emphasized, however, that much dissatisfaction over air pollution control in the United States may in fact be the result of unrealistic ambient air quality standards and arbitrary aspects of the current attainment and nonattainment designations (based on imprecise monitoring and modeling techniques) requiring different types of pollution control as much as the manner in which EPA and the regional air pollution control authorities have attempted to implement and enforce these standards[2).]

Applying the indicated criteria to evaluate the emissions trading policy is no simple task, because we are confronted with several methodological problems. Therefore, several important caveats should be observed when interpreting the results of our evaluation:

First, as for any innovation, it is necessary to evaluate how well the new policy has performed or how well it can be expected to perform relative to the existing regulatory regime. The actual or expected advantages and disadvantages of emissions trading must not be compared to an implied ideal command-and-control policy; neither must the present poorly-defined regulatory regime be compared to an ideal trading system characterized by full-fledged market trades to meet any regulatory requirement. The test must be the new policy's incremental effects, for better or worse, on the Clean Air Act as it actually operates, rather than its effects on a statute assumed to operate perfectly.

Second, it is not always possible to identify those impacts that can be solely or principally attributed to EPA's regulatory reforms. Since the new policy is only a supplement and not an alternative to current regulations, it is difficult if not impossible to identify those effects that only have occurred owing to emissions trading. Furthermore, because of the multiple factors which enter into any business decision, it is generally difficult if not impossible to isolate those motives for a decision to reduce emissions below required levels. Therefore, it is not always possible to determine whether certain emission reductions only have occurred owing to the emissions trading system or would have occurred anyway as a side-benefit of non-environmental decisions (such as projects undertaken for energy conservation or solvent recovery).

Third, the criteria are difficult to apply in a quantitative sense. For instance, it is not possible to quantitatively evaluate the cost-effectiveness of the new strategy. It is possible, however, to ask whether the new policy is likely to be more or less cost-effective than the existing policy. Therefore, we do not attempt to quantify the extent to which the emissions trading policy will meet any particular criterion.

Rather, we indicate where it appears that emissions trading is more or less successful in meeting a criterion than the existing policy.

Fourth, we are confronted with the problem that our analysis is aimed at a moving target since the emissions trading policy is in a great flux. The policy has evolved even as this report has been written. The Policy Statement replaces, streamlines, simplifies and consolidates a number of closely related regulatory reforms including the bubble, offset, netting, and emission reduction banking policy, and involves a lot of changes compared to the early versions of these strategies (see Appendix II).

For example, the Policy Statement replaces the original bubble policy (Dec. 11, 1979; 44 FR 71779) and includes the following major changes.

Specifically, it:

-- allows states to adopt generic trading rules for all criteria pollutants;

-- extends use of the bubble to areas lacking approved demonstrations of attainment;

-- reduces air quality modeling requirements for proposed trades;

-- extends use of the bubble as an alternative means of meeting RACT requirements;

-- allows broader use of emission reductions from shutdowns.

To give another example, EPA has changed the Emission Offset Interpretative Ruling (EOI) three times since the January 16, 1979 complete revised version. Based on the early versions of the regulatory reforms states had incorporated offset and banking provisions in their SIPs, many of which now may become obsolete and must be changed. In light of the Policy Statement many states are now implementing generic trading and banking rules and thus are moving the target for a policy evaluation. Therefore, we shall focus on the emissions trading policy statement and refer to former versions of the new strategy only where necessary and appropriate.

Furthermore, the present policy following the Policy Statement issued in 1982 must be regarded as an interim policy that will be followed by a request for further public comment (see Appendix IV), and will be replaced by a final revised policy which can and probably will address many potential problems identified in the following evaluation. Our evaluation is therefore preliminary. The problems we have identified are based more on fears than on adverse effects that have actually materialized; and steps that can be taken by the final revised policy may preclude such problems.

Fifth, we are confronted with the problem that our analysis is aimed at a variety of targets since there are a number of state and local versions aside from the EPA policy on emissions trading as articulated in the Policy Statement. As Appendices VII and VIII show, there is already considerable variation among states in some crucial features of the program. The Policy Statement only sets forth legal minima EPA considers necessary for emissions trades to satisfy CAA requirements. Therefore states are free to adopt generic rules which incorporate all or any combination of the proposed trading approaches or to let trades continue to be implemented as individual SIP revisions. Furthermore, states are free to stipulate additional criteria for assuring that certain loopholes are avoided and their attainment strategy will not be jeopardized.

Therefore, any policy evaluation that intends to be comprehensive would have to deal with the many provisions that state and local agencies have adopted in addition or in contrast to EPA's Policy

Statement. In practice, such a comprehensive evaluation would have to include to date (April 1983):

-- the provisions for offsets that almost all states have incorporated in their SIPs;

-- the seven generic bubble rules that EPA had approved; three other generic bubble rules that EPA had proposed with many others which are under development or consideration for a significant number of states or areas;

-- formal banking systems that five areas have in operation; at least 12 other areas had drafted or proposed full banking provisions.

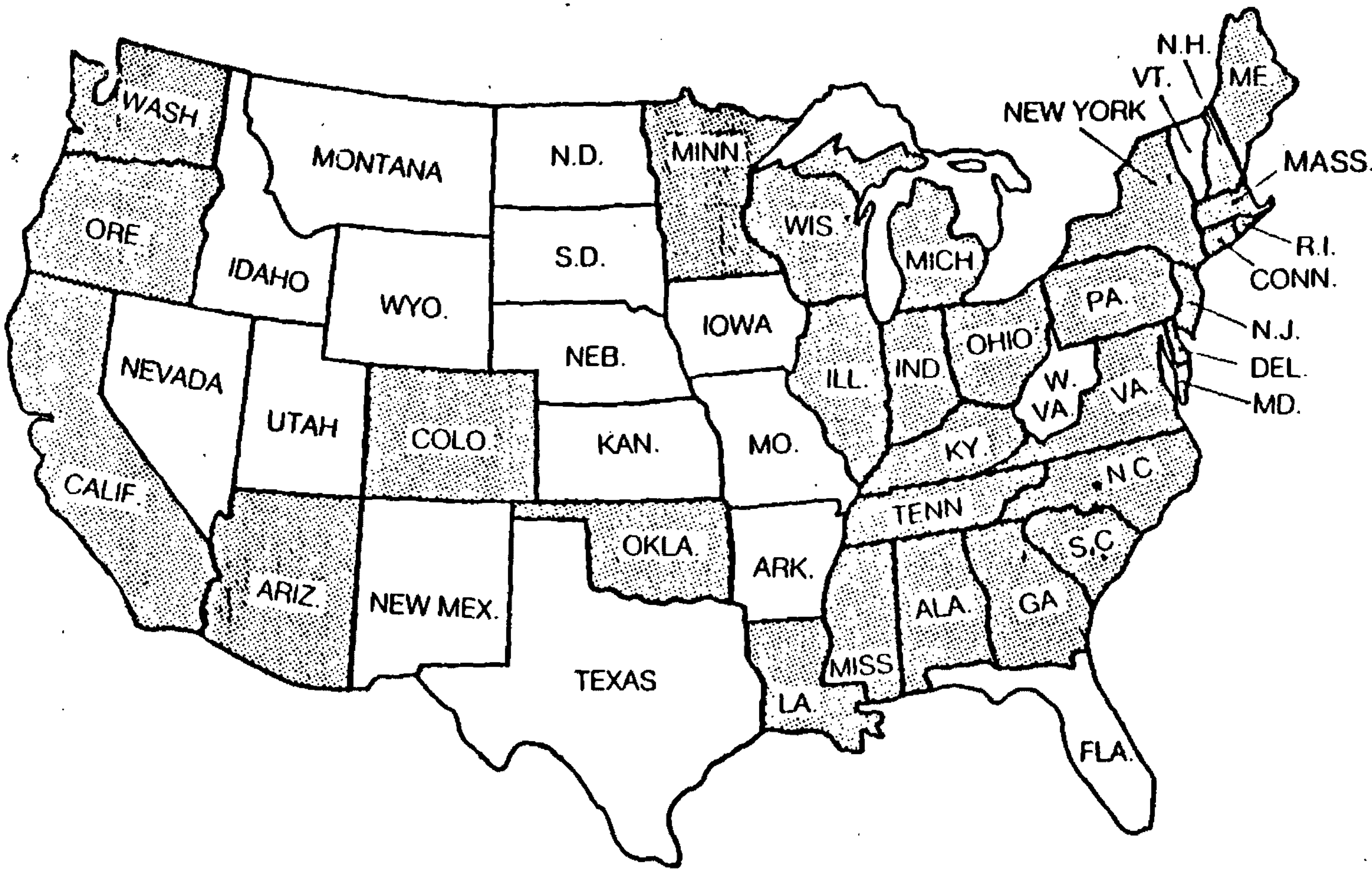
In light of the variety of policy versions that could serve as the basis for a comprehensive evaluation of emissions trading, we do not attempt to discuss all federal, state and local variations of the new approaches. Rather, we shall focus on the Policy Statement and, where necessary, point out some examples of state and local rules that incorporate additional or different provisions. Therefore, our evaluation is inevitably incomplete.

Sixth, the experience with emissions trading is limited. It is certainly too early to judge the new approaches by some of the criteria stated above. Our evaluation is based on experience to date and our insights come from individual cases that are not necessarily representative of the future use of emissions trading.

However, widespread adoption and successful implementation of emissions trading in the future will depend on a number of factors that are not yet predictable. Some uncertainties already clout the future of emissions trading. Court suits, modifications of national emission standards, a de facto deletion of air-quality standard deadlines, and relaxed enforcement are all examples of administrative changes which could

EXHIBIT 2

STATE/LOCAL EMISSIONS TRADING PROGRAMS



Source: U.S. Environmental Protection Agency

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materially affect the viability of the new approaches. Also, amendments to the Clean Air Act are currently being debated before Congress. Any significant changes to the basic structure of the Act would probably affect the workability of emissions trading.

Therefore, we can make no pretense of fully understanding all there is to know about how emissions trading will work out in the future. However, it is mature enough that some clear insights are beginning to emerge.

III. Advantages and Disadvantages of the Emissions Trading Policy

1. Air Quality Improvement

Under the traditional regulatory approach, U.S. air pollution control agencies have sought better air quality through rules which apply specific, uniform emission limits to every emission source within a regulated process. In theory, this approach, if properly and widely implemented, could achieve the stated air quality goals. Moreover, there are several situations in which a conventional regulatory approach has a clear advantage compared to any other strategy based on economic incentives[3)]:

First, where an emission is so dangerous that it is necessary to prohibit it altogether, direct controls are the only effective option available. There is obviously nothing to be gained by an approach that allows "pound-for-pound" trades or requires offset ratios marginally greater than 1:1 for trades involving toxic pollutants.

Second, direct controls may also be the only effective means to deal with a sudden dangerous air quality situation. Episodic pollution emergencies call for prompt and substantial changes in operation of emission sources, such as a temporary reduction or cessation of certain activities (e.g. restrictions of the use of incinerators, cars, and so on).

Third, where emissions are difficult to measure and monitor, because effective and reliable monitoring devices have not been invented or are prohibitively costly to install and operate, emissions trading will not be practical. Where the amount of emission reductions proposed for a trade is not quantifiable and even indirect methods of determining compliance are not reliable, direct controls involve less risks than trading transactions.

In short, there are several good reasons for the use of conventional direct controls in order to attain and maintain stated air quality goals and to improve air quality beyond marginal attainment and maintenance.

In practice, if air quality trends since enactment of the 1970 Clean Air Act are used to measure success or failure, then the traditional regulatory approach must be deemed a qualified success. For all available evidence shows that, in general, air quality in the United States has improved significantly despite new pollution from industrial growth. While much still remained to be done, the nation had made significant progress in cleaning up the air between 1970 and 1977, i.e. the period before market-oriented supplements to the regulatory system (such as the offset and bubble policy) came into effect (see Table 4).

But it must also be recognized that the Clean Air Act of 1970 had made mid-1975 the target and mid-1977 the deadline for federal, state, and local governments and for industry to meet the primary NAAQSs. However, that deadline was not met by many areas. Even today, there is a significant number of areas that have still not attained the NAAQS. The following Table 5 identifies the number of counties, or portions thereof, designated as nonattainment as of February 1, 1982. Thus, if strict, uniform compliance with the mid-1977 deadline is used to measure the success or failure of the traditional command-and-control approach, then it must be deemed a failure.

Without change, the command-and-control approach would induce only increased costs for both polluters and regulators in areas with continuing air pollution problems. To meet NAAQSs in the nonattainment areas, it would be necessary to squeeze more emission reductions from sources already regulated, probably at steeply increasing costs per unit of reduction. It

Table 4

National air pollutant emissions, by pollutant, 1970-1980
(million metric tons per year)

Year	Total suspended particulates	Percent of 1974	Sulfur oxides	Percent of 1974	Nitrogen oxides	Percent of 1974	Hydro-carbons	Percent of 1974	Carbon monoxide	Percent of 1974
1970	17.6	145	27.9	103	18.5	92	27.1	114	110.9	108
1971	16.4	136	26.5	98	19.0	95	26.4	111	110.5	108
1972	14.9	123	27.3	101	20.1	100	26.7	112	109.7	107
1973	13.9	115	28.4	105	20.4	101	26.2	110	107.4	105
1974	12.1	100	27.0	100	20.1	100	23.8	100	102.5	100
1975	10.1	83	25.6	95	19.6	98	22.8	96	98.1	96
1976	9.4	78	26.4	98	20.9	104	23.7	100	100.4	98
1977	8.5	70	26.4	98	21.3	106	23.8	100	97.8	95
1978	8.6	71	24.8	92	21.5	107	24.4	103	96.7	94
1979	8.5	70	25.3	94	21.5	107	23.4	98	92.6	90
1980	7.8	64	23.7	88	20.7	103	21.8	92	85.4	83
Change 1970-1980	-56 %		- 15 %		+12 %		-20 %		-23 %	

Source: U.S. Environmental Protection Agency, National Air Pollutant Emission Estimates, 1940-1980 (draft, November 1981).

Table 5

NONATTAINMENT AREAS IN ALL OR PART
OF THE COUNTIES IN THE U.S.

	Total Number Counties or County Equivalents with Nonattainment Areas - 2/1/82
Carbon Monoxide	156
Nitrogen Dioxide	11
Ozone	486
Sulfur Dioxide	88
Total Suspended Particulates	378
Total Areas	1,119

Source: EPA, Maps Depicting Nonattainment Areas Pursuant to Section 107 of the Clean Air Act - 1982, EPA-450/2-82-012, February 1982.

would also be necessary to seek emission reductions from small, previously unregulated sources - resulting in a more complex and expensive regulatory process.

EPA's emissions trading policy, on the other hand has been developed "to encourage use of emissions trades to achieve more flexible, rapid and efficient attainment of national ambient air quality standards"[4]. EPA "supports its accelerated use by states and industry to meet the goals of the Clean Air Act more quickly and inexpensively"[5].

According to the Policy Statement, all trades must be consistent with ambient attainment and maintenance requirements of the Clean Air Act. To assure that emissions trades do not contravene relevant requirements of the CAA, general principles are set out that will be used by EPA to evaluate individual trades[6]:

First, only reductions which are surplus, enforceable, permanent, and quantifiable can qualify as ERCs and be banked or used in a trade.

Second, all trades must satisfy applicable ambient tests and demonstrate "ambient equivalence".

Third, trades must involve emission increases and decreases of the same criteria pollutant.

Fourth, trades cannot be used to meet NESHAPs requirements or increase emissions beyond the levels they prescribe.

Fifth, emission reductions from existing sources cannot be used to meet technology-based requirements applicable to new sources locating in either attainment or nonattainment areas.

These restrictions, if properly implemented, could ensure that all trades will be consistent with air quality objectives under the Clean Air Act.

Moreover, some of the alternatives ot the emissions trading program promise even better environmental results than would have been achieved under traditional compliance requirements. While bubble and netting transactions in principle will not result in a net gain in controlling air pollution, air quality will improve as offsets occur. Offsets in nonattainment areas are only allowed provided that the new or expanding source can demonstrate that the emission reductions from existing sources in the area are greater than the emissions that will come from the new or expanding source. Air quality will improve because of the higher than 1:1 offset ratio required under this policy.

Similarly, the creation and banking of emission reduction credits will lead to cleaner air, at least temporarily. Emission reductions that can properly regarded as "surplus" and that are banked will result in extra improvement in air quality as long as they remain deposited in the bank.

As a matter of fact, initial experience with emissions trading demonstrates that many trades have resulted in significantly more reductions and/or faster compliance than would have been if firms had complied with traditional regulatory requirements (see Appendix X).

Nonetheless, emissions trading raises several problems that may have an adverse effect on air quality. Problems for the maintenance, attainment, and improvement of air quality may occur in the following contexts:

a) Netting may lead to significant net increases in emissions

Netting excuses plants expanding or modernizing in PSD areas from new source review requirement so long as the "net" increase in plant-wide emissions is "insignificant" (i.e. net emissions must not exceed 100 TPY for CO; 40 TPY for NO_x, SO_2, VOC_s, and 25 TPY for TSP). Therefore, each individual netting transaction, by definition, will carry the risk of a slight degradation of air quality due to the fact that insignificant net increases in emissions are de facto considered to be equivalent in ambient effect. Moreover, where insignificant net emission increases due to netting transactions occur simultaneously at different plants or take place successively at the same plant(s) in the same PSD area a significant increase in emissions is to be expected. Unless such de minimis transactions are considered on a cumulative basis over a reasonable period of time, sources could be routinely expanded or modernized yearly, adding emissions up to the significance level[7].

b) Equal intrapollutant trade-offs may nonetheless degrade air quality

The Clean Air Act requires states to develop separate plans to attain and maintain the NAAQSs for each criteria pollutant. Thus all individual bubble, netting or offset cases must insolve the same pollutant, i.e. trades across pollutant categories are impermissible[8].For example, only reductions of particulates can be substituted for increases of particucates, reductions of SO_2 for increases in SO_2 etc. Similarly, increases in pollutants posing severe health hazards cannot be traded against corresponding decreases in less harmful pollutants, even if within the same category. However, decreases in hazardous pollutant emissions may be "traded down" against increases of non-hazardous pollutants within the same category.

There are well-founded fears that equal trade-offs among the same pollutants may nonetheless degrade environmental quality because of the <u>different physical and biochemical characteristics</u> of the traded emissions or the undetected presence of accompanying non-criteria pollutants.

For example, particulates emitted from a stack might have a different size and chemical composition than fugitive dust from roads or storage piles within a plant site and therefore might have a totally different and more harmful impact on ambient air quality. This may become a major issue in trades of fugitive dust emissions against emissions of particulates from industrial processes even if ambient "equivalence" is demonstrated through actual monitoring readings rather than through air quality modeling.

Similarly, in some cases the failure of the Policy Statement to differentiate between <u>VOCs of different reactivities</u> can lead to increases in emissions of highly photochemically reactive compounds (numerically balanced by reductions of negligibly reactive compounds) which could lead to increases in ambient ozone formation[9].

Moreover, the Policy Statement does not prohibit trades involving <u>emissions of suspected hazardous pollutants</u>, unless those pollutants have been officially designated as "hazardous" under section 112 of the CAA. However, once a pollutant has been "listed" or "proposed" as hazardous, the requirements for trades involving such pollutants should not be less stringent than those for a fully-designated hazardous pollutant until and unless a subsequent decision is made not do designate it as hazardous[10].

Even if "pound for pound" trades will not increase total emissions in an area, these transactions will generally redistribute the total amount of emissions. And a redistribution of pollutants within a given area may increase the total ambient effects of pollutants when considering <u>synergies of various combinations of pollutants</u>. On the other hand, some trades which are not equal in ambient effect, nonetheless may have beneficial air quality and public health benefits.

c) <u>Restrictions on interpollutant trades may undermine attainment strategy</u>

By the Policy Statement's <u>restriction on interpollutant trades</u> between certain precursors of ozone the problem of ozone formation may be exacerbated in some areas. In various areas in which the precursors contribute to the formation of ozone for which a violation of the NAAQS exists, decreases in a precursor generated by an interpollutant trade could reduce ozone concentrations and thus bring these areas closer to attainment[11)].

Furthermore, allowing interpollutant trades including NO_x and SO_2 might be a useful mechanism for reducing acid deposition[12)].

Finally, the Policy Statement would supersede regulations in some AQCRs allowing interpollutant trades in order to reduce hazardous pollutants[13)].

d) <u>Ambient equivalence of "pound-for-pound" trades is sometimes questionable</u>

Equal emissions from different emission points may well have significantly different effects on ambient air quality, if the impact areas of the emission points involved in a transaction are not the same. Therefore not only the amount of emissions at the different sources but also the impact that traded emissions will have on ambient air quality must be taken into consideration. Since bubbles, offsets, netting and emissions trading shift emissions to more cost-effective pollution control locations, they will by definition generate some increase in ambient concentrations somewhere, unless the emission plumes from the sources involved in the transaction precisely overlap.

According to the Policy Statement, trades involving <u>VOCs</u> and NO_x are exempt from ambient tests owing to their 'mixing bowl' characteristics, i.e. ambient impacts of such trades generally occur across broad geographic areas. Within such areas one ton of decreased emissions will be regarded as equivalent in ambient effect to one ton of increased emissions, since source separation, plume height, topography, and related factors ordinarily will make little difference. As there is only little information available about the atmospheric behaviour of these <u>reactive</u> pollutants, "pound for pound" trades may be treated as equal in ambient effect. It may be true that the precise location of increases and decreases of <u>VOCs</u> will make little difference on ambient air quality, but the relative location of those increases and decreases makes a difference (e.g. coastal increases of VOC in southern California can have more of an adverse air quality impact on ozone formation in the downwind portions of the air basin than identical increases located in the downwind areas). Therefore some states have stipulated additional criteria for assuring the ambient equivalence of trades involving VOCs. For example, the Commonwealth of Pennsylvania has a restriction on the distance between sources of VOC involved in a bubble transaction, i.e. the sources involved must be within a maximum 40 miles of one another. In Massachusetts facilities located at different sites can bubble provided for each 10 miles of straight line distance between facilities, an additional 5 % reduction of VOCs beyond RACT is realized.

It must be recognized, that also trades of NO_x emissions involve the potential for localized site-specific ambient standard violations[14]. As a matter of fact, the Policy Statement ignores the pronounced differential impacts of NO_x emissions and thus imperils the achievement or maintenance of the NAAQS for NO_2. The dispersion characteristics of NO_x emissions that are converted into NO_2 after being released from the stack are similar to those of SO_2 and TSP, i.e. the ambient concentration of NO_2 at any location depends on the location and stack parameters of NO_x sources as well as meteorological parameters. Hence, "pound for pound" trades could deteriorate air quality at some points and lead to violations of NAAQs for NO_2 if the ambient impact of NO_2 from the source increasing its NO_x emission is greater than that of the source decreasing it. The result of such a transaction would merely be to trade one population's exposure for anothers.

For trades involving non-reactive pollutants, such as SO_2, TSP, or CO, whose ambient effect may vary with where the emission increases or reductions occur, ambient considerations are crucial. In addition to distance between sources, plume parameters (e.g. stack height, temperature and velocity of stack gases), pollutant characteristics, meteorology and topography will also affect the ambient impact of such a trade. In general, the area whose air quality is being improved by the added controls on one source will not coinci(de) (or perhaps only coincide partially) with the area whose air quality is being deteriorated by the other source involved in the transaction. Therefore, "hot spots", i.e. subareas of AQCRs in which the ambient air exceeds the ambient standards, can occur even if dispersion modeling predicts ambient equivalence of a transaction.

In some cases, the decision not to require modeling and the assumption that trades resulting in no or insignificant increase in emissions are equal in ambient effect may have an adverse impact on ambient air quality. For example, under Level I of the three-tiered modeling screen no modeling is required, if the proposed TSP, SO_2, or CO trade does not result in a net increase in applicable baseline emissions, the relevant emission sources are located in the same immediate vicinity, and no increase in emissions occurs at the source with the lower effective plume height. In such cases "pound-for-pound" trades are treated as equal in ambient effect, as it is assumed that modeling would not result in different predictions. Similarly, "netting" transactions are treated as equal in ambient effect and exempted from modeling requirements, so long as any net increase in plantwide emissions is insignificant, and no increase in emissions occurs at the source with the lower effective plume height.

Unfortunately, it cannot be assumed that the specific emission sources involved in such trades will always have similar effective stack height and consequently equivalent plume parameters. Therefore, transactions involving emission sources of different stack heights and non-reactive pollutants cannot ensure that their ambient effect is equivalent to the impact of the original SIP limits. Moreover, such trans-actions offer the potential for sources to use increased stack height or dispersion techniques to cure localized ambient standard violations by long-distance transport of pollutants.

In general, no modeling is needed if the proposed trade does not result in a net increase in applicable baseline emissions. Whether a net increase in emissions has occurred, thus triggering the requirement for modeling, will depend on which level of emissions was used as the basis for the design of the SIP. Where actual emissions were used, no increase in actuals are permitted in Level I and II. If allowables were used, increases in actuals up to the point of allowables are permitted without triggering a requirement for modeling. In such a case, any increase in actual emissions following the trade will inevitably lead to some geographic variations in ambient conditions and a local degradation of air quality, especially when non-reactive pollutants are traded.

These problems are exacerbated, because of <u>difficulties in emission monitoring</u> and <u>uncertain and inadequate results of emission-impact modeling</u>[15]. First, <u>monitoring techniques</u> for stack emissions are complex and unprecise and may lead to discrepancies between monitoring results and actual ambient concentrations. For non-point emissions such as wind blown dust and most other particulates, monitoring techniques are almost speculative.

Second, <u>modeling results</u> are often of equal ambiguity. For example,"most experts agree that modeling results may at best be presumed to have a range of accuracy running from minus 50 percent to plus 100 percent" and "it is not uncommon to hear expert opinions that particulate modeling results are inaccurate to a far greater degree"[16]. Hence, the difficulties in tracking exactly the air quality effects will inevitably increase the probability that some pollution will go undetected, and ambient air quality will be degraded.

Third, when using traditional ambient air quality evaluation techniques, such as the modeling screen contained in the Technical Issues Document, the <u>long-range transport of pollutants</u> involved in a trade will not be taken into consideration. In general, these modeling techniques are based on the conception of air quality as a local problem, whereas air pollution, to a large extent, creates interstate pollution problems due to the long-distance transport of pollutants. For example, the long-distance transport problem, which leads to secondary aerosols, regional haze, and acid rain is associated with emission and transport of sulfur oxides, particulate matter, and nitrogen oxides across several states. Hence, even if trade applications can demonstrate ambient equivalence and ambient progress respectively (when offset transactions are involved) for the AQCR where the trading partners are located, these trades may nonetheless degrade air quality in other regions due to the long-range transport of the pollutants traded. Violations of ambient air quality standards in one AQCR can thus be caused by trades among sources in another AQCR over which the first has no control. Although EPA is empowered to disapprove a state's implementation plan if its emissions contribute to the violation of NAAQSs elsewhere, proving culpability in interstate pollution problems is difficult[17]. In part because of the difficulty of concluding that a single source in one state prevents another state from meeting an ambient standard, EPA has not yet acted on a single of those petitions filed to require emission reductions from a source in another state that violates ambient standards by long-distance transport of pollutants[18].

e) <u>Different time phasing of emissions increases and decreases may lead to short-term violations of NAAQSs</u>

Another threat to air quality lies in the possibility that emission increases at one source and emission decreases at the other source(s) involved in a trade may not <u>coincide over time.</u>

The Policy Statement requires that all emission reduction credits must be based on a permanent reduction in the permitted level of pollution emitted by a source. As an alternative, states may allow trades whose emission increases and emission decreases are equal in duration rather than strictly permanent.

However, this principle of "temporal equivalence" may be violated if <u>emission reductions from shutdowns</u> would be granted a permanent credit. According to the Policy Statement, a state may grant permanent credits for emission reductions regardless of how long the source which is reducing its emissions would have been operating at the original emission level. Emissions from a discontinued source may be treated as if the source were continuing to operate. This option allows firms to balance the emission increases from a relatively modern plant, having a lifespan of 20 years or more, with the reductions from a plant already at or near the end of its life. For example, a plant that reduces emissions by 500 TPY, but will operate for just five more years, nonetheless will generate a credit of 500 TPY that may last twenty years or more. Thus crediting reductions from shutdowns would generate an increase in actual emissions in later periods. It also carries the risk that the emissions of <u>old</u> high-polluting sources are replaced with emissions of existing <u>modern</u> high-polluting sources.

Even if emission increases and emission decreases are equal in terms of permit duration, a <u>different time phasing</u> of the traded emissions may lead to a temporary violation of ambient air quality standards. When periods of higher emissions can be balanced against periods of lower pollution, the resulting temporal distribution of emissions could cause short-term pollution <u>episodes</u>, in which the ambient air exceeds short-term ambient standards. For example, if peak hydrocarbon emissions from a new facility are in the fall, whereas the reduced peak hydrocarbon evaporation from highway surfaces would have been in spring or summer.

Similarly,if one generating station will burn high-sulfur oil during peak load and will not operate for the rest of the time, while a second generating station used for base load supply burns low-sulfur coal without intermission. Or, if a reduction in nightshift operations (e.g. a reduction from 3 to 2 workshifts) will be offset by an increase in operations elswhere in the daytime.

In cases where yearly (average) emissions do not increase or even decrease as a result of a trade, nonetheless emissions on a monthly, daily, or hourly basis can get worse. Therefore, it must be recognized that emission increases and decreases that may be equal on a long-term basis (e.g. yearly basis) cannot always be mitigated on a day-to-day basis or on an hour-to-hour basis.

f) <u>Concern for the permanence of emission reduction credits</u>

In general, for an emission reduction to qualify as an ERC, it must be a permanent reduction in the level of pollution emitted by a source. Use of an ERC which is not permanent could adversely affect air quality by allowing increased emissions from both the source creating the ERC and the source where it is used. Concern for the permanence of ERCs is particularly relevant to reductions from fuel switches and sources which are subject to shifting demand.

In the case of utilities, in certain circumstances the use of ERCs generated by fuel switches is likely to create significant dangers of future Clean Air Act violations[19]. For example, under the emissions trading policy a utility may well create and sell ERCs by voluntarily switching from oil or coal to natural gas. Since the natural gas would burn cleaner, as a result SO_2 emissions would decrease. The problem is that in the future the less-polluting fuel to be used under the trade agreement may well be in short supply or a mandatory requirement to switch back to the more polluting fuel may be imposed on the source, but the necessary offsets for the increase in emissions from the fuel shift may not be immediately available. Then, in order to keep producing electricty, the utility would have to switch back to the higher-polluting fuel and thus would generate emissions at higher levels than allowed. Therefore, ambient air quality may be at least degraded until such time as emission offsets become available.

In the case of sources which are subject to shifting demand, it is particularly difficult, if not impossible, to insure permanence of emission reductions that are credited and used elsewhere[20]. As a matter of fact, emission reductions from certain existing facilities that cut back production or even shut down will be offset by equal or greater emission increases elsewhere when a relatively inelastic demand for goods and services is likely to shift to similar sources in the same area. Typical examples of such sources are dry cleaners, gas stations, and auto painting shops. If this expansion takes place in the same nonattainment area, then the production cutback or shutdown will represent a "paper" reduction, constituting little or no real reduction in net emissions. If the corresponding increases in emissions from another source or sources are not subject to permits and offset requirements, granting ERCs in such circumstances would inevitably result in a net increase in emissions.

Contributing to this problem is the fact that operating permits frequently do not limit total production and thus total emissions[21]. The limitations apply to emission rates, specifying a maximum level of emissions per unit of production, or per unit of resource input. To the extent that permits do not limit operating hours or production rates, their ability to restrict total emissions is limited. Because many sources operate below rated capacity, if demand for their product increases they can step up operations and therefore increase total emissions without requiring a permit modification and offsets.

g) <u>Crediting "surplus" reductions in areas with a pollution reduction "deficit" may jeopardize RFP</u>

In addition to these issues, the emissions trading policy raises several other problems that may have an adverse impact on ambient air quality. These problems relate especially to areas that have failed to identify and implement sufficient emission reductions to meet NAAQSs, namely

(a) areas that have never developed a SIP or obtained EPA's approval for a complete SIP,

(b) areas that have gained EPA's approval for SIPs despite the lack of a demonstration of attainment,

(c) areas whose demonstrations of attainment, even though approved, are in reality gross overpredictions, and

(d) areas which have adequate SIPs on paper, but are not observing them.

Even though these areas still have large pollution control "deficits" to make up, the Policy Statement allows sources located in these areas to treat some emission reductions as "surplus" and to grant credits for such reductions. In these areas, any such a reduction automatically would advance the date for meeting ambient standards, and would reduce pollution thereafter. Crediting such a reduction, however, would allow further delay in achieving already-overdue standards, and thus undermine one fundamental requirement of the Clean Air Act: the obligation to meet NAAQSs "as expeditiously as practicable", and no later than deadlines fixed in the Act. Moreover, crediting such reductions will result in foregoing long-term improvement of air quality beyond marginal attainment and maintenance.

Granting credits for reductions that cannot be properly considered "surplus" raises very complex issues. As a matter of fact, states have considerable latitude in meeting attainment requirements of the CAA, so long as the total amount of reductions required to satisfy the states' RFP demonstration will not be reduced for each year in question. The decision to impose stricter controls on other sources than those granted an ERC for use in a trading transaction is an option open to the discretion of the states in establishing the mix of emissions which may be allowed while still demonstrating RFP. In the Policy Statement, EPA even encourages the states to look everywhere else first, unless there is no other practical way to satisfy attainment requirements than to take back or discount ERCs once granted [22].

However, the concept of RFP is only vaguely defined. Any determination that an area is or is not demonstrating RFP may be highly arbitrary and controversial. Many of the SIPs fail to specify and commit to control measures needed to demonstrate RFP, i.e. emission reductions identified as required in the SIP strategy are in many cases unspecific regarding either source categories or the precise quantity of required emission reductions. Some SIPs heavily rely on emission reductions attributed to measures (e.g. a vehicle inspection and maintenance program) which have yet to receive legislative authorization. Often it is difficult, if not impossible, to completely isolate a substantive shortcoming in one area of a SIP from the rest of control measures in the SIP. Any determination that emission reductions in addition to those traded have already occurred, or that provisions for such additional reductions already exist, is highly arbitrary. In most of these cases, the existing uncertainties of demonstrating RFP are such that additional reductions will definitely be needed to offset the emission reductions used in trades.

However, finding, requiring, and implementing additional emission reductions is no simple task and guarantees no certain outcome. In theory, the sources wich have been granted ERCs for "surplus" reductions may face the requirement to produce further reductions in the future, if RFP does not materialize as projected. In practice, however, this concept of requiring future reductions, if necessary, is likely to prove unworkable[23)]. Once a firm has put on certain control equipment, it is bound to resist subsequent efforts to require it to do more. Even though the facility may have been warned that additional reductions may be necessary after the credit has been granted, great amounts of state resources will often be required to insist on that additional reduction. Or, worse, the additional reductions may be so costly, that they are never obtained. As further control frequently requires replacing or completely redesigning existing controls, it cannot simply be added. If firms later must replace control equipment to produce offsetting emissions, the cost of applying retrofit technology will be much higher than if emission reductions that would be legally required in the future were incorporated in the design of the initial equipment. Therefore, it may be inappropriate to grant credits for emission reductions before knowing if they are indeed "surplus".

The problem of granting credits for reductions that cannot be properly considered "surplus" may occur in several different contexts:

(a) Use of allowable emissions as the baseline for emission reduction credits

(b) Crediting reductions from shutdowns

(c) Crediting reductions from uninventoried sources

(d) Crediting reductions before they are incorporated in the emission inventory

(e) Crediting reductions before they are legally required

(f) Crediting reductions before they occur[24)].

ga) <u>Use of allowable emissions as the baseline for emission reduction credits</u>

Allowing an existing source <u>to use allowable emissions as the baseline</u> for calculating surplus reductions, where it is actually emitting substantially less than the amount permitted under the relevant SIP (due to lower production levels, more-than-required control, etc.), may result in air quality deterioration. Even if the SIP's demonstration of attainment is based on allowable emissions and, in theory, the use of allowables will not interfere with the attainment requirements of the CAA, these reductions are nonetheless "paper" reductions While these trades on paper might look even, in fact emissions would increase and thus undermine the obligation to meet NAAQSs "as expeditiously as practicable".

The Policy Statement prohibits such trades only if the actual emissions rather than the allowables were used in the SIP's demonstration of timely attainment, because then the difference between actual and allowable emissions was assumed to be needed to achieve attainment and cannot be used for trading. Nevertheless, a source can use an allowable emissions baseline in an area where actual emissions were used to develop the SIP, if it can demonstrate that the trade will not create a new ambient violation or interfere with the planned removal of an existing one, and if the state can show that the baseline is consistent with its demonstration of RFP toward attainment. However, when states have based SIP attainment demonstrations on actual emissions rather than capacity or allowable emissions, in practice it is difficult, if not impossible, to explain how the legality of granting a credit for "surplus" reductions could be assured absent some link between the two. Because there is no provision in the SIP which limits emissions to the level that was used in the planning process. Thus, even though the level of actual emissions may decrease to the point where NAAQSs are met, emissions could subsequently increase to the level allowable in existing permits, resulting in a violation of a NAAQS. In fact, reductions that affect only permitted or allowable emission levels but not actual emissions would not be an improvement in air quality. Crediting such "paper" reductions would postpone attainment and conflict with the state's obligation to meet the ambient standards "as expeditiously as practicable". Moreover, such credits would result in foregoing long-term improvement of air quality beyond the level of marginal attainment.

gb) Crediting Reductions from Shutdowns

The Policy Statement allows states to grant credits for emission reduction from shutdowns if the SIP has not already assumed a set quantity of reductions from shutdowns in its attainment strategy, because otherwise double-counting would occur (i.e. granting credit for the same emission reduction, once to the state for use in its SIP, and a second time to a source for use in a trade). Where SIPs assumed a net "turnover" reduction due to the fact that new sources are generally cleaner than existing sources which shut down, states may still grant sources credits without this kind of double-counting. There are several options:

(1) They may adjust the SIP to eliminate "turnover" credits.

(2) They may allow credits only after the total quantity of shutdown reductions assumed in the SIP has occurred.

(3) They may allow credit for a percentage of the total emission reductions realized from a shutdown, if they can show that such credit is consistent with the SIP's demonstration of attainment and RFP.

Allowing ERCs from shutdowns in one of these ways will pose problems in the following areas:
First, reductions from existing facilities which shut down may be followed by equal or greater emission increases elsewhere when a continued demand for goods and for services is likely to shift to similar sources in the same area. Therefore, allowing ERCs from shutdowns of sources serving a relatively inelastic demand would result in a net increase in emissions.

Second, a reexamination of "turnover" credits and a decision not to take credit for these reductions means that additional reductions, beyond those predicted, will be needed if the original predictions are to hold true. Crediting emission reductions from shutdowns therefore would allow further delay in achieving ambient standards and conflict with the state's obligation to meet NAAQSs "as expeditiously as practicable".

Third, it will be extremely difficult, if not impossible, to avoid double-counting when crediting emission reductions from shutdowns. In practice, it cannot be determined whether the SIP has already assumed credit for reductions from a particular shutdown in its attainment strategy, or whether it has not. In general, SIPs incorporate into their attainment strategy a net "turnover" reduction in emissions. In light of the methods generally used to project this net turnover reduction, reductions from shutdowns are not an explicit or "set" quantity but one which is implicit in the methods applied. Since these methods project a net growth rate of emissions based on the difference in emissions between new plant openings and existing plants that shut down, no gross rate is determined and no site-specific information is given. Hence, on the basis of these methods, it cannot be definitely determined that a particular shutdown has occurred in addition to those assumed in the SIP and has caused a surplus reduction of emissions. In this instance, to grant a credit to an individual shutdown would inevitably involve the risk of double-counting the emission reductions. Subsequent use of the ERCs would bring total emissions above the RFP demonstration level and would contravene the CAA.

Nevertheless, EPA has accepted numerous transactions which have employed shutdowns as a source of emission credits. In some areas credits for shutdowns even account for the vast majority of ERCs claimed to date.

gc) Crediting reductions from uninventoried sources

According to the Policy Statement, sources not included in an area's SIP emission inventory may create ERCs, so long as granting credits for reductions from these sources will not jeopardize the area's demonstration of attainment or reasonable further progress.

An examination of some of the early bubble and offset cases indicates that some trades involve small sources and non-point sources not previously subject to regulation, the emissions of which have thus not been inventoried, modeled, and included in evaluating and designing the state's attainment strategy. If emission reductions from such sources were partially credited and then used in a trade as a replacement for reductions that were required to reach attainment, the SIP's demonstration of attainment might be jeopardized. The result of such a trade would be that NAAQSs could not be met "as expeditiously as practicable" and that additional reductions, beyond those originally projected, would be needed.

Another threat of crediting reductions from uninventoried sources lies in the area of shifting demand - where new or existing facilities not subject to permits, offset requirements, or production constraints increase production (and emissions) to meet the demand generated by the production curtailment or shutdown of a similar uninventoried facility.

gd) <u>Crediting emission reductions before they are incorporated in the emission inventory</u>

Current emission inventories are often seriously inadequate. They suffer from being out of date and inaccurate. The problem of uninventoried sources appears to be large and important. Now, under the emissions trading policy firms will be granted ERCs for emission reductions made after the most recent emission inventory or monitoring data used in SIP developing. Thus, ERCs would be granted for "pre-existing" emission reductions (i.e. reductions made before monitoring data are collected for use in SIP planning) whenever states fail to update their emission inventories or monitoring data.

In other cases, <u>"windfall credits"</u> will originate from <u>emission reductions</u> obtained <u>as an incidental side-benefit</u> of projects undertaken for some other economic reason (i.e. burning less fuel saves cash, and incidentally units less pollutants or recovering the solvents saves costs in purchasing expensive solvents, while the recovered solvents are no longer emitted). Or, the control technology once installed and operated, will turn out to generate emissions which are below those specified in the permits. This situation may exist because pollution control equipment operates in a stepwise (and not incremental) manner or because of the difference in costs of more or less polluting inputs (i.e. it is difficult, if not impossible, to generate reductions precisely equal to the level required by regulation). When this happens, sources would be granted "windfall credits" for not releasing pollutants they would not have released anayway. In the absence of the banking and trading system these reductions would have been a 100 % benefit for air quality.

ge) Crediting emission reductions before they are legally required or before they occur

So far in most areas RACT standards have been set only for a small fraction of the source categories and individual sources. In other areas, what the state have assumed to be RACT appears to be inadequate, in relation to the ambient air quality in these areas, and in relation to EPA's Control Technique Guidelines and to standards in other areas.

Under the emissions trading policy a firm may gain an ERC for reducing the emissions of a source lacking SIP-defined RACT emission levels

(a) beyond a negotiated RACT baseline, or

(b) by using the actual emissions as a baseline.

Even though the states may take specific steps to satisfy the attainment requirements of the CAA, these provisions are giving some sources the opportunity to gain an ERC for a last-minute "voluntary" reduction of emissions that soon thereafter would partially have been required and implemented and which presumably should have been used to insure RFP.

The same problem may arise when a state allows a firm to make a conditional deposit of ERCs, if the firm commits to produce a specific emission reduction in the future. There is, indeed, a potential for abuse of this provision through the banking of future reductions in anticipation of pending new (or more stringent) regulations. Such "surplus" reductions once banked might thus be insulated from further regulatory tightening for a significant portion of time. There may be a rush to the bank whenever new technology requirement are anticipated because firms will want to gain credits for reductions which would soon be mandatory.

As a matter of fact, reductions in emissions have already occured by use of improved control technology and have been used to offset increased emissions elsewhere, even though rules that would have required the same technology were already existing in the regulations of other states and/or were pending in SIP revisions.

In general, the emissions trading policy will thus set the stage for a race between regulatory agencies to set adequate RACT standards or to update emission inventories and SIPs and firms to claim credits for emission reductions that will imminently be required by new (or more stringent) regulations or will be assumed in calculating the reductions needed to attain ambient standards.

As the Policy Statement proposes to grant a certain immunity from the effects of new regulations as well as from updating of inventories and monitoring data used in planning attainment strategies, crediting such reductions and later using these ERCs could undermine an area's attainment strategy. Air quality would not be improved as expeditiously as practicable, and additional reductions, beyond those already made and traded, would be needed. Moreover, crediting such reductions would result in foregoing continuous improvement of ambient air quality beyond the level of marginal attainment.

gf) Extension of compliance deadlines may jeopardize RFP

According to the Policy Statement, states may extend compliance deadlines for sources which propose a VOC or CO bubble, so long as they are located in areas that have received VOC or CO attainment extensions until 1987 and can demonstrate that these bubbles would be consistent with RFP.

Since any determination that emission reductions, in addition to those deferred as part of the bubble approval, have already occurred, or that provisions for such additional reductions already exist, is highly arbitrary and controversial, allowing extensions of compliance deadlines may jeopardize RFP demonstration.

Similarly, the opportunity to bubble into compliance even after enforcement actions are well underway may also delay compliance while the proposed bubble is investigated. As a result of such an extension of compliance deadlines, RFP toward attainment might be placed in jeopardy.

2. Cost-effectiveness

A central concern in designing environmental policies is to meet the stated goals at the least costs to society. Therefore, when evaluating the advantages and disadvantages of alternative air pollution control strategies, particular attention must be given to the costs of achieving the goals as set forth in the U.S. legislation. The least-cost mechanism to meet the stated goals should be encouraged.

When evaluating the cost-effectiveness of alternative pollution control strategies, important caveats should be observed. First, fair comparisions must include both private and public, direct and indirect costs. Both the regulators and the regulatees will bear costs associated with a specific air pollution control strategy that must be taken into account. Moreover, both direct and indirect costs must be included[25]. Direct costs are the costs of pollution control equipment and the associated operation and maintenance costs. Indirect costs include all costs which are not directly related to reducing emissions but which are incurred in the process of complying with and administering the requirements of a particular approach, i.e. all transaction costs, such as information, modeling, monitoring, administrative and enforcement costs.

It is important to recognize that these transaction costs can be, and usually are, significant; and that the ability to correctly evaluate alternative strategies in terms of cost-effectiveness heavily depends on the ability to discern whether each of these categories of transaction costs are greater or lesser among the alternatives in question.

Aside from such transaction costs, indirect costs also include costs resulting from delays and uncertainties that can be attributed to a particular approach. Even though direct costs and transaction costs of a particular strategy tend to be easier to calculate than indirect costs of a delayed investment and lost jobs, their omission from consideration would be a serious failure in the evaluation.

Second, fair comparisons of aggregate pollution control costs, both private and public, direct and indirect, caused by alternative strategies are only possible if the approaches bring about comparable environmental results. For the case under consideration, it can be assumed that emissions trading, if properly implemented, will produce equal or better ambient results than traditional regulation[26)].

Under the traditional command-and-control system regulatory activities are directed toward prescribing detailed specifications for control technology to be installed and operated, generally for each source of emissions within a plant. The main focus in setting source-specific emission limits (such as design standards, performance standards, or input standards) is on achievement of emission reductions at each source. Generally, the costs per unit of emission reduction for a given pollutant vary significantly between emission points within the same source category and across different source categories (i.e. different types of industry) emitting the same pollutant(s). These cost differences are the result of differences in age, design, size, and other factors affecting an individual plant's marginal costs of air pollution control. As a consequence individual sources in some industries may spend many times more to remove an additional ton of pollution than sources in other industries or even within the same industry.

In theory, "enlightened regulation"[26)] could take into account the different pollution control costs faced by different sources and reach cost-effective solutions by permitting less emission reductions from sources with higher control costs in exchange

Table 6

National Expenditures for Air Pollution Abatement and Control

(million of current dollars)

	Pollution Abatement			Regulation and Monitory		Research and Development			Total
	Personal Consumption	Business	Government	Federal	State and Local	Private	Federal	State and Local	
1972	1,536	4,153	119	48	95	411	104	17	6,482
1973	2,065	5,378	129	50	115	451	126	6	8,321
1974	2,667	6,840	158	52	131	492	100	7	10,446
1975	3,463	8,403	188	66	139	464	108	8	12,840
1976	3,994	9,029	256	69	135	543	131	6	14,162
1977	4,311	9,930	295	80	161	653	144	7	15,581
1978	4,649	10,993	283	93	183	777	146	8	17,132
1979	5,646	13,691	368	100	200	915	105	8	21,031
1980	6,808	16,302	473	122	207	845	130	5	24,890
1981	8,368	17,704	491	108	226	863	131	(+)	27,891
1982	8,684	16,592	536	110	230	713	138	(+)	27,003

+) Less than $ 500,000.

Source: U.S. Department of Commerce Bureau of Economic Analysis, "Pollution Abatement and Control Expenditures, 1972-1982 Survey of Current Business, February 1984: pp. 22-30.

for a greater emission reductions from sources with low pollution control costs. In the actual implementation of source-specific standards, U.S. regulators have been striving to achieve better economic results, primarily by taking into account differences in control costs among different categories and subcategories of sources. Indeed, federal and state regulators do recognize variations in control costs among industries and even among some firms in the same industry. For example, the CAA requires federal and state officials to take costs into account in setting source-specific standards such as BACT[27], NSP[28], and RACT[29].

Similarly, the current regulatory approach specifies stricter requirements for new sources than for old ones (see Table 7). This concept is based on the notion that it will be less expensive to incorporate pollution controls at the time of a plant's construction than it would be to retrofit controls on older existing ones at a later date.

Furthermore, in their SIPs to implement NAAQSs, states can take individual existing sources' relative economic ability to control emissions into account, so long as overall federally mandated ambient air quality standards will be attained. Therefore, SIPs generally first deal with major sources that are easy targets for regulations and enforcement and whose initial costs of control are relatively low due to "economies of scale" in reducing a large amount of emissions. Often stationary source control measures, together with transportation control measures, administrative and other measures needed to reach NAAQSs are ranked and implemented in order of cost-effectiveness. To give an example, in the San Francisco Bay Area 34 stationary source control measures were proposed by the Bay Area Air Quality Management District (BAAQMD) in its 1982 Air Quality Plan that could result in a daily decrease of about 70 tons of hydrocarbons. BAAQMD has

Table 7

General Structure of Clean Air Regulation for Stationary Sources

	Existing Sources	New Sources and Major Modifications	
Nonattainment Areas	RACT[a)]	LAER[b)] & Offsets	Higher Control Costs
Attainment Areas		BACT[c)] NSPS[d)]	Lower Control Costs
	Lower Control Costs	Higher Control Costs	

a) RACT = Reasonably Available Control Technology

b) LAER = Lowest Achievable Emission Rate

c) BACT = Best Available Control Technology

d) NSPS = New Source Performance Standards

e) In order of relative stringency, the technology requirements can be arranged as:

LAER $\geq$ BACT $\geq$ NSPS $\geq$ RACT

Source: See M.H. Kosters, Governments Regulation: Present Status and Need for Reform, in M.L. Wachter and S.M. Wachter (ed.), Toward a New U.S. Industrial Policy? (Philadelphia: University of Pennsylvania Press, 1981), p. 331.

ranked these measures to some degree in order of cost-effectiveness (see Table 8)[30] and expects no more than the first 22 will be needed to reach the NAAQS, of Motor Vehicle Inspection and Maintenance will be legally authorized and will be as effective as anticipated. The additional 12 proposals would be placed on a contingency list to be activated if they are needed later.

However, even where regulators take costs into consideration in setting source-specific standards or in developing attainment strategies, their efforts are not directed explicitly to achieve a cost-effective result, and it is not clear exactly what the result is in terms of cost-effectiveness[31].

For NSPS, for example, the CAA fails to specify whether EPA should focus on a firm's ability to pay for controls required by NSPS or whether more emphasis should be placed on the marginal cost-effectiveness of a standard. In practice, EPA often uses both the ability-to-pay and the marginal cost-effectiveness criteria in trying to determine quantitative cost-effectiveness[32].

With regard to new sources that have to meet more stringent standards than existing ones, it is not true that prior fitting of "best-available" control technology is inevitably less costly than retrofitting "less-than-best" but adequate controls. Moreover, the argument that prior-fit controls are less expensive assumes that technology is static and that plants built today will not have better, more cost-effective technology available to them in the future[33].

Even where regulatory agencies select emission reduction quotas for categories of emission sources that promise to be effective in keeping down the total costs of their attainment strategy, they use control cost differences in only the crudest way.

Table 8

• Proposed Bay Area Air Quality Control Measures • 1982

MEASURE	HC* reduction (tons/day)	Cost per ton ($1000/ton)
• MOTOR VEHICLE INSPECTION AND MAINTENANCE (I/M) (HC and CO **)	19.41 (480-CO)	2.6-3.7 (0.2-CO)
• STATIONARY SOURCE CONTROL MEASURES FROM BAAQMD (ranked in order of cost effectiveness)***		
1. Tanker Ballasting (31)	2.5	1.6
2. Reciprocating Engines (19)	4.0	0.2
3. Gasoline Distribution (11)	1.0	0.5
4. Pesticides (15)	3.7	0.4
5. Wood Furniture Coating (6)	1.1	0.5
6. Electronics Industry (32)	5.7	1.0
7. Organic Chemical Manufacturing (1)	0.3	0.5
8. Aerospace Assembly and Component Coating (23)	0.5	1.0
9. Aerosol Cans (8)	3.0	0.35
10. Coating of Plastics (33)	2.0	1.0
11. Industrial Maintenance Coatings (20)	1.0	1.0
12. Volatile Organic Compound (VOC) Storage (13)	3.0	0.275 up to 1.5
13. Large Commercial Bakeries (18)	1.1	1.0
14. Marine Lightering (9)	0.6	1.0
15. Zero Gap Seals on Floating Roof Tankers (12)	1.5	1.2
16. Polymer and Resin Manufacturing (5)	0.2	1.6
17. Rubber/Plastics Products (24)	1.1	1.6
18. Coatings Manufacturing (17)	0.2	2.0
19. Natural Gas and Crude Oil Production and Processing (4)	1.6	0.75
20. Sanitary Landfill Sites (39)	7.2	3.6
21. Vegetable Oil Manufacturing (22)	0.4	1.0
22. Volatile Organic Waste Disposal (3)	6.0	unknown
Contingency Measures (if others not sufficient)		
23. Automobile Refinishing (14)	5.2	2.0
24. Letterpress/Offset Printing (3)	3.0	1.0
25. Architectural Coatings (12)	1.0	1.5
26. Ship, Barge, Tanker and Railcar Loading (10)	5.0	2.5 up to 7.0
27. General Solvent and Surface Coating Operations (2)	.5	6.0
28. Pleasure Boats (emission standards for new engines) (25)	7.0	8.0
29. New Source Review (35)	0.2	varies
30. New Service Stations (secondary assist vapor recovery) (41)	(up to 0.002)	unknown
31. Gradual Replacement 2-Stroke Lawnmowers (10a)	0.1	0.2
32. Phase Out ... Off-Road Motorcyc... (...a)	0.8	0.4
33. Wineries (... emissions) (16)	0.1	2.0
34. Marine Vessel Gas-Freeing (30)	0.1	0.5

MEASURE	HC reduction (tons/day)	Cost per ton ($1000/ton)
• TRANSPORTATION CONTROL MEASURES FROM MTC	7.0 (all 15 measures)	0.2 (all 15 measures)
1. Reaffirm commitment to 20% transit ridership increase from 1978 through 1983.		
2. Support post-1983 improvements identified in public transit operators' 5 year plans; after consultation with the operators, adopt ridership increase target for 1983-1987.		
3. Seek to expand and improve public transit beyond commitment levels.		
4. Continue to support development of High Occupancy Vehicle (HOV) lanes. (Emissions credit would not be allowed for specific projects until environmental studies were completed and funds were programmed.)		
5. Continue to support RIDES van and carpooling efforts.		
6. Continue efforts to obtain funding to support long-range transit improvements.		
7. Reaffirm commitment to parking programs that encourage mass transit use.		
8. Encourage transit operators to work with Caltrans to identify under-utilized lots along major transit lines that could be used as park-and-ride lots.		
9. Continue present Commute Alternatives Program.		
10. Encourage cities to change zoning regulations to decrease parking requirements for employers who encourage car/van pooling.		
11. Complete the bicycle element of the MTC Regional Transportation Plan.		
12. Place additional emphasis on flextime programs as part of commute alternatives program.		

MEASURE

13. Encourage cities to use CEQA enforcement procedures to restrict the development of commercial drive-through facilities.
14. Encourage large delivery fleet operators to restrict vehicle idling either through company policy or the use of vehicle controls.
15. Disseminate information to fleet operators in the Bay Area on the economic and technical benefits of alternative engines and fuels.

• ADMINISTRATIVE PROGRAMS FOR LONG-TERM MAINTENANCE FROM ABAG, MTC, BAAQMD (FOR HC and CO)

1. Advisory review of projects and plans.
2. Conformity assessment of federally-supported activities.

• ADDITIONAL MEASURES RECOMMENDED BY THE JOINT AIR QUALITY PLANNING ADVISORY COMMITTEE

1. Land use controls.
2. Mandatory indirect source review.
3. Public support for transit.
4. Additional transportation measures to be identified by the California Air Resources Board.

• ADDITIONAL MEASURES TO REDUCE CO PROPOSED BY ABAG, BAAQMD, MTC

San Jose: Implement Santa Clara Valley Corridor Evaluation recommendations, including a light rail system in the Guadalupe Corridor.

Oakland: study of future development in central business district.

Vallejo: existing programs expected to be sufficient.

Indeed, by ranking control measures in order of average cost structures regulators fail to take advantage of the often substantial differences in marginal costs among sources within the same source category and among different source categories emitting the same type of pollutant. In short, the current regulatory approach will inevitably result in higher than necessary total costs for achieving whatever reductions in total emissions or levels of ambient quality.

There are several reasons for these systematic economic shortcomings of the traditional regulatory approach. First, the achievement of cost-effectiveness as such is not an explicit goal of the existing regulatory regime. The agency personnel developing source-specific standards have only a limited legislative mandate and virtually no incentive to take costs into account[34)]. Second, the command-and-control approach is dependent for its cost-effectiveness on an omniscience that a regulatory bureaucracy cannot be expected to possess. Even where those developing the standards are charged with taking costs into account, defining reasonable effective and economical technology for a half dozen different pollutants, for thousands of sources, in hundreds of plants, in scores of industries, in all areas of the country is inherently a difficult task[35)]. Generally, government regulators cannot know the technological opportunities, the alternative raw materials available, and the control costs to devise a cost-minimizing plan for every plant in every industry. They would have to have access to an enormous quantity of information of a sort which would be difficult to assemble for any regulator not intimately familiar with the scientific, technical, and economic data that are dispersed throughout the country. Furthermore, they would have to revise their standards frequently to accomodate changing costs, new technologies, and changing economic conditions[36)]. In light of the exorbitant information costs involved to determine a least-cost method of compliance for each source and the limited resources of regulatory agencies regulators generally cannot identify and require controls at the points of emissions with the lowest control costs per unit of emission.

Third, in addition to the difficulties regulators are facing in determining least-cost strategies, their technology-based standards create rather disincentives for firms to voluntarily seek out low-cost techniques for controlling emissions[37]. There is sufficient evidence of the "de facto requirement that new sources of air pollution install specific technology to abate their pollution"[38]. In many cases, the abatement technology which is actually being installed is equivalent to the technology suggested by regulators, rather than being designed to meet the limitations per se. The plants may reason that if they do not meet the emission limits, they will be safe from prosecution, so long as they have made a good faith effort to achieve the standards by adopting the technology suggested by the regulatory agency. Thus rather than encouraging less costly innovation or the development of alternative technologies to meet emission limitations, the current command-and-control approach may encourage a risk-averting strategy of adopting the suggested technologies even when they may be expected to generate higher costs compared to those of innovative technologies[39].

Finally, once a source has achieved the level required by the emission standard, it has no incentive whatever to cut further its emissions, no matter how low the cost. Indeed, it has a positive incentive not do so, since any emission reductions beyond those minimally required only would add to costs, reduce profits, and gain nothing in return. Worse yet, it risks making itself and its industry a target for tighter regulations, since it may have shown that the innovative control technology is cost-effective and therefore its industry can do more[40].

Without change, the traditional command-and-control approach would induce only increased costs for both polluters and regulators in areas with continuing air pollution problems. To meet NAAQSs in the nonattainment areas it would be necessary to squeeze more emission reductions from sources already regulated, probably at steeply increasing costs per unit of reduction. To give an example, the incremental emissions reduced when a source moves from 90 to 95 percent control will almost always cost much more than the average costs of the emissions already being reduced. It would also be necessary to seek emission reductions from ever larger numbers of smaller and smaller previously unregulated sources - entailing a more complex and expensive regulatory process for every unit of reduction because the payoff from each interaction is small.

Emissions trading offers opportunities to escape this trap. Unlike the traditional regulatory approach, the emissions trading policy aimes at making effective use of economic incentives to achieve stated air quality goals at the least cost to society. "The primary objective of EPA's Controlled Trading program is to minimize the costs of achieving the goals of the Clean Air Act"[41)]. The policy, therefore, is designed to expand opportunities for states and industries to meet existing air quality requirements by using less-costly control approaches.

Instead of requiring sources to meet the uniform emission limits, the emissions trading policy allows sources the flexibility to develop lower-cost compliance strategies so long as ambient air quality will not be degraded. Emissions trading allows firms to create or purchase low-cost emission reduction credits from one point of emission and to use these reductions to meet or avoid regulatory requirements applicable to other emission points where control costs would be high. Banking introduces time flexibility into a firms lower-cost compliance strategy since a firm may create surplus emission reductions when it is most economical (for example, when installing new control equipment). In short, emissions trading is giving firms the flexibility to substitute "surplus" low-cost emission reductions for expensive ones, and to move to costly controls only after inexpensive options have been implemented. Such transactions can cover multiple emission points within a plant or take place between plants owned by the same or different companies.

By allowing a firm to increase controls where costs are low in return for relaxing controls where costs are high, use of the emissions trading program could sharply reduce a firm's compliance costs. Since control costs tend to vary even more between firms than between in-plant processes, and since cost-savings are derived from this control cost differential multiplant transactions will generally produce greater cost savings than intraplant trades[42].

As emissions trading is entirely voluntary and no state or firm is required to engage in emissions trading, no details regarding the size of potential cost-savings and how far they will be realized can be given. There is, however, sufficient evidence to substantiate the hypothesis that dramatic cost savings have already been achieved through the use of emissions trading. According to the bubble statistics provided by EPA[43], EPA has approved 24 and proposed to approve 10 bubbles for savings of over $ 164 million (non-annualized capital savings, plus operating savings for the first year only) (see also Appendix XI). Savings of $ 3 million each are assumed for the 14 bubbles for which figures are unavailable. Moreover, EPA assumes average cost savings of $ 3 million per bubble for the bubbles already approved under review or development under state generic trading rules. Including other bubbles under development in EPA regions, EPA's best estiamte is 179 bubbles approved, proposed or under development for total savings of $ 608 million.

EPA claims that these examples present only the "tip of the ice-berg" in terms of ultimate potential for emission reductions and transactions that will result in significant cost savings[44]. However, the year-end figures for 1982 indicate that the cost-savings were much less than the $ 1 billion for savings from bubble trades alone EPA had projected in April 1982 when the proposed Emissions Trading Policy was issued[45]. This may be partly due to the fact that EPA did not anticipate the chilling effect on existing-source bubbles of NRDC v. Gorsuch, the con tinued economic slowdown, or certain technical problems in ex-panding the scope of generic rules[46].

While the bubble policy allows existing sources to reduce their control costs, the offset and netting programs serve an analo-gous function for new and expanding sources by allowing them to locate, expand, or modernize cost-effectively in nonattainment or PSD areas. Since the inception of the offset policy in 1976, more than 1.900 successful offset transactions have taken place that have also produced considerable cost-savings.

To sum up, there is very much supporting documentation to substantiate the hypothesis that bubbles, netting out, offsets and the use of ERCs will significantly lower the direct costs of meeting emissions standards and other requirements.

However, direct cost reductions are not the only economic advantage of the emissions trading policy. There are also significant indirect costs (resulting from delays and uncertainties due to the traditional command-and-control approach) that can be decreased by the regulatory reforms.

First, emissions trading can reduce delays for firms trying to expand. Under the regulatory approach, for firms wanting to expand several unsatisfactory and resource-wanting situations can raise the costs of building. Firms may suffer if resources have been expanded, but project construction, completion and production are delayed. Costs for idle non-productive resources and for contracts not met because of insufficient production represent two indirect penalties of delay. Moreover, firms depending on new plants for sale or purchase of products may also be negatively affected by delays. The potential inability to quickly expand could also limit the rapid exploitation of new markets and thus result in a loss of the full profitability of investments.

The emissions trading policy can reduce such delays for firms trying to expand and needing emission reductions for use as offsets. Banking of ERCs would allow them to create or purchase ERCs in advance of their needs, thereby reducing the delays attributable to finding and negotiating for offsets. Even when plans are not yet certain, firms may create or purchase sufficient ERCs for insurance against potential delays in the construction or operation of the planned facilities.

Second, emissions trading can reduce the risk of firms considering new investment. Firms considering new investments make their decisions on the basis of expected profitability. And profitability depends upon many factors that are inherently uncertain such as labor costs, energy costs, interest rates, markets, equipment failure rates, environmental regulations, etc. Other things being equal, the higher the risk, the lower the expected profitability, and thus the likelihood and/or extent of a new investment. By reducing the risk of being unable to obtain an emission reduction at the time needed, or at any reasonable price, emission banking and trading will increase the expected profitability of an investment. By lowering the expected indirect costs that are considered in planning new projects, emissions trading will generate a more favorable climate for new investments and associated income benefits and jobs.

It must be recognized that the cost savings owing to emissions trading may be somewhat reduced by the financial burden placed on the agencies to administer and enforce the emissions trading and banking program the administrative costs incurred by the applicants[47]. However, the cost savings for the firms under the emissions trading approach appear to be considerable even if the transaction costs are taken into account. Since a firm must apply for the trade, it can determine for itself whether the added administrative costs exceed the likely savings or benefits. At least for all trades reported to date, the savings in direct and indirect costs of creating or purchasing emission reduction credits must have been greater than or equal to the transactions costs associated with the trade.

3. Economic development

Environmental issues cannot be separated from questions of regional economic activity and development. In general, any efficient air pollution control strategy should be flexible enough to adapt to normal expansion in economic activities which tend to accentuate air pollution problems. Therefore, environmental regulators face the problem how attainment and maintenance of NAAQSs can be reconciled with the desire for new growth and expansion both in nonattainment and PSD areas.

To reconcile economic growth and air quality goals, the traditional regulatory approach aims at specifying ambitious goals for new or expanding sources so that progress towards cleaner air occurs as new or expanding facilities replace older ones. "Technology-forcing" requirements are also based on the idea that maximum pollution control from new sources is necessary in order to provide room for the location of other sources in the interest of growth and economic development. This is particularly true in light of the requirement for RFP and the indications that emissions from many existing sources in nonattainment areas will be increasing or remain constant. In PSD areas the growth potential may be quickly filled out without technology-forcing requirements, as the first new source(s) built in an attainment area might absorb the entire available "non-deterioration increment", "using up" the assimilative capacity of the area and thus leaving no capacity for future expansion or growth.

Even though the technology-forcing requirements of the current regulatory approach may be growth-protective in theory, they have not always been that way in practice[48]. Since controls on new or expanding sources are much more stringent than those on existing ones, new investment and modernization that could result in improved productivity (since never plants usually embody the latest and most productive technology) have been discouraged to some degree by pollution abatement costs that are higher than for existing plants. Existing plants are given a certain degree of protection from competition by strict technology-forcing requirements for new and expanding sources. Thus older, less efficient, and more polluting sources tend to be kept in operation longer, and shutdowns and geographic shifts are discouraged. Paradoxically, technology-forcing thus not only may have inhibited new investment, modernization, and revitalization of industry, but also may have led to pollution levels that were higher in the interim than if the regulatory hurdle for new investment were lower. And as a result of higher pollution levels, no room for new growth and expansion could be permitted under the terms of the CAA.

As a matter of fact, by the mid-1970s it became apparent that progress toward meeting NAAQSs was too slow, so that many areas failed to meet the statutory deadline. Literally interpreted, the CAA required the states to prevent any new construction or modification in areas failing to meet the deadline, because new sources would worsen already substandard air quality and interfere with the attainment of the NAAQSs. Thus, the current regulatory system would have restricted economic development and growth in areas that were behind schedule in attaining statutory standards.

Since it was not feasible to prohibit growth in the many nonattainment areas, Congress and EPA granted each state the opportunity to develop and implement new strategies to allow for new construction and expansion.

Under the terms of the CAA Amendments states now have the option of a growth-allowance policy which is part of, rather than an alternative to, direct regulations. They may create a growth margin in their SIP by requiring more stringent controls in excess of those required to attain and maintain NAAQSs. In these states, the growth "cushion" or margin, fully or partially, can be used to compensate for emission increases from new or expanding sources. If the growth allowance is used up, states have to require offsets.

As a matter of fact, where sizeable growth-allowance allocations were made available to new or expanding sources (at no cost), firms were highly pleased, especially after having conducted disappointing searches for external offsets. Even had an appreciable cost been charged by the agency, the companies still might have found the benefit of certainty (i.e. a definitive outcome on a permit application within a circumscribed time) worth the charge[49].

Similarly, in PSD areas the "increment" system, which specifies allowable increases of emissions for two pollutants (particulate matter and sulfur oxides) will ensure that economic growth will occur in these areas in a manner consistent with the preservation of existing clean air resources. Each new major facility or modification of a major new source whose emission increases exceed a de minimis level, may consume a portion of the increment, so long as total emissions do not exceed the baseline concentration for criteria pollutants, and the emissions from all new or modified facilities do not exceed the increment. The allowable increase in pollutants under the increment system is about 2 to 5 percent of the NAAQS in class I areas (i.e. certain national parks and wilderness areas), 25 percent in class II areas (i.e. all other attainment areas), and 50 percent in class III areas (this designation is not currently used) for annual standards. Air Quality Control Regions, in turn, will translate the maximum increments into allowable increments; in other words, emissions space that can be allocated to existing or new stationary emission sources. Increment-consumption book-keeping must track and record portions of the increments consumed by the post-1977 siting of installations in a PSD area in order to determine how much of the increment remains available for additional facilities. Moreover, new major sources and modifications of a major source are subject to PSD review and must meet BACT requirements.

In addition to the growth-allowance provision in nonattainment areas and the increment system in PSD areas, states were given the option of developing and implementing the offset policy which now has become a part of the emissions trading policy. The emissions offset policy was adopted as part of the 1977 Amendments to the Clean Air Act as a means for allowing growth and economic development while ensuring or reestablishing RFP in nonattainment areas or curing an increment violation in a PSD area.

Under the emissions trading policy, existing as well as new sources now have several options for expansion and growth:

First, existing facilities expanding or modernizing in PSD or nonattainment areas may be exempted from new source review requirements, so long as the expansion or modernization does not produce a significant "net" increase in plant-wide emissions. Nettin out is accomplished by assuring that any emission increase is compensated for by "surplus" reductions elsewhere within the same plant. By "netting out" of new source review the new facility may be exempted from the offset requirement (i.e. to create emission "offsets" for the emissions increases, that might absorb the entire available "non-deterioration increment"), installation of BACT or LAER control technology, preconstruction permits and associated requirements, and applicable bans on new construction. The new source, however, must still meet applicable NSPS.

Second, new major stationary sources and modifications that cannot "net out" of new source review and whose emission increases would exceed the increment in PSD areas or would jeopardize attainment of NAAQSs in nonattainment areas are required to secure sufficient surplus emission reductions to "offset" their increased emissions. The offset provision in a PSD area requires a new major source or major modification to offset its net increase in emissions with an equal reduction in emissions from existing sources. In a nonattainment area, the reductions required must exceed the amount of emissions added by the new or expanding source.

Third, emission reduction banking allows sources to get emission reduction credits (ERCs) for surplus reductions and to "bank" (store) such ERCs in a legally-protected manner. ERCs can be later used in netting and offset transactions to allow for expansion, modernization and growth without further deterioration of ambient air quality. Under the 1976 Offset Policy, surplus reductions had to be used immediately in a transaction with a new source or the credit for reduction was lost. Creation and storage of offsets for future use were not allowed. This discouraged existing sources from creating surplus reductions at optimal times (for example, when new control equipment was being installed), and made it uncertain, difficult and expensive to find and secure inexpensive "external" offsets. Banking, by contrast, can encourage the creation of less costly ERCs at optimal times and create a pool of readily available credits that provides the certainty needed for firms seeking to locate, expand or modernize in nonattainment or attainment areas.

In theory, emissions trading, if properly and widely implemented, will allow for normal expansion in economic activities. It can significantly facilitate siting and entry of new sources of pollution as well as expansion and revitalization of existing ones. Moreover, emissions trading appears to offer a means of having the proverbial cake and eating it too. Air quality is not sacrificed to economic development. Neither is economic development strangled by environmental constraints.

In practice, almost all states had incorporated offset provisions in their SIPs. As of October 1982, about 1,900 offset transactions have taken place[50]. "Without question, the principal purpose which the offset policy was designed to serve has been satisfied: to provide a 'safety velve' permitting legal continuation of economic growth in nonattainment areas. Had the offset policy not been adopted and implemented, and had the prior legislatory been fully enforced, most of the hundreds of external and internal offset cases ...., either would have relocated to some attainment area, or been drastically cut back, or not have been undertaken[51]".

However, it must be recognized that the gains in terms of better adaptability to economic development do not go automatically to any state which adopts an emissions trading system, since the details of the system a state adopts can significantly affect the amount of offset transactions it will experience.

For example, there is a great deal of discriminatory power put in the hands of state and local control agencies who approve or disapprove offset trades and who establish and administer banking and trading systems. It has been argued that offset provisions could be used for a particular kind of economic development[52] to discourage economic growth, rather than to allow for easy entry of new sources and expansion of existing ones. That is, the agencies could tighten the regulatory screw for new or expanding sources to the limit of their financial capability by establishing high offset rates. Finally, administrative delays in the new source application process due to certain offset provisions could discourage new development.

But so far it has not happened that way. Some studies show that in most cases

-- LAER was set equal to NSPS,
-- offset ratios barely exceeded 1:1, and
-- regulators evidently did not implement systematically the requirement of state-wide compliance[53].

In short, the offset policy did not inhibit economic development.

However, pollution offsets generally are likely to be only available to accomodate expansion by companies already operating facilities in the areas where they wish to expand. Major facilities seeking to locate in certain areas where they are not currently operating are likely to experience difficulties in obtaining offsets[54]. For example, among the many hundreds of offset transactions only about 25 were "external" offsets or interfirm trades. The rest were "internal" offsets which do not resemble market transactions. That is, the market for inter-firm transactions has been limited. It appears that companies with existing pollution reduction potential have been and will be unwilling to lower emissions to create offsets and sell them to a company wishing to construct a new source or expand an existing one, especially in cases where the companies may eventually need offsets for their own expansion[55]. One of the underlying causes for the limited number of interfirm transactions may have been the fact that banking was not available to help sources find outside emission reductions.

Generally, it must be recognized that emissions trading allows expansion by new firms only to the extent that offsets and cheap ERCs for use in offset and trade transactions are available and a viable market for ERCs exists.

In the long run, however, it will become more and more difficult to find suitable sources for offsets in industries that are already highly controlled[56]. If RACT is continuously redefined and made stricter, there are less and less opportunities to obtain cheap ERCs for offset transactions[57]. Furthermore, the bubble and netting policy will inevitably reduce the available supply of cheap ERCs from existing sources which are elementary for the viability of the offset policy. Bubbles, and especially netting, will increase "internal trading" and thus will not facilitate siting and entry of new sources in an area[58].

Moreover, there are some interrelated factors that may be not favorable to the development of a viable market in ERCs, namely:

-- Uncertainties regarding applicable emission reduction baselines and the use of certain emission reductions as a source for ERCs;

-- Uncertainties regarding an effective enforcement that induces the need for emission reductions and thus creates the demand for ERCs.

-- Uncertainties regarding the success of an area's attainment strategy that may affect the integrity of ERCs created;

-- Uncertainties regarding the supply of ERCs, so long as a strategy of hoarding and consuming ERCs internally, as needed, dominates and precludes external offsets[59].

Such uncertainties and market imperfections constitute serious deterrents to an increasing volume of transactions needed to permit room for the expansion of new and existing sources.

On the other hand, there are some factors that indicate that emissions trading may stimulate a higher volume of transactions, such as:

-- As time progresses, replacement of aged plant equipment with more efficient new plants will increase the demand for ERCs (because of the PSD and Offset requirements) and at the same time may generate more supply of ERCs (from imposing LAER on major modifications replacing old facilities having only SIP minimum controls).

-- As regulatory requirements expand to cover more RACT source categories, the demand for ERCs will increase to the extent that credits cna be purchased cheaper than retrofitting new RACT equipment controls.

-- As technology for better controls, more efficient processes, and changes in raw material usage improve, economic choice with regard to manufacturing profitability will likely lead to ERC supply creation.

-- The cited uncertainties will deminish with time and working knowledge, thereby reversing their present dampening effects on ERC supply and demand.

4. Technological Advancement

Despite new pollution from industrial growth, total air emissions in the U.S.A. have decreased significantly. However, more pollution control will be needed to assure that Clean Air Act requirements are met as expeditiously as practicable. To meet the NAAQS(s) in areas with continuing pollution problems, it will be necessary to squeeze more emission reductions from sources already regulated - probably at steeply increasing costs per unit of reduction. At a time of rising control costs and shrinking resources, only increased technological innovation and diffusion could speed continued progress toward clean air, permit more room for economic growth, and mean improved air quality at reduced - rather than increasing - costs. Therefore, an efficient air pollution control policy should establish permanent incentives to develop, install, and operate innovative pollution control technologies.

The traditional regulatory policy of air pollution control is primarily based on the idea that government authorities must always specify ambitious goals for new sources so that progress towards cleaner air automatically occurs as new plants replace oder ones[60]. In part, the "technology-forcing approach" derives from the idea that maximum pollution control from new sources is necessary in order to permit maximal room for potential growth both in PSD and nonattainment areas, as well as to enhance the margin of safety in the SIP. It is also based on the notion that it would be less expensive to incorporate pollution controls in the design of new plants than it would be to "retrofit" controls on older existing sources.

Another argument in the defense of "technology-forcing" is that regulators must guarantee a future market to pollution control equipment manufacturers[61]. Thus assured, these suppliers will respond with innovative technologies, and polluters will be unable to argue that "the required technology does not exis[t]". Finally, the technology-forcing approach derives from a general feeling that controls cannot be tightened continually for air quality improvement if pollution abatement technology is not moving ahead with them. Thus, new source standards become tied up in the drive for gradually setting lower and lower pollution targets[62)].

There is little doubt that, during most of the 1970s, when the United States made great efforts in pollution abatement, technology-forcing requirements of the CAA encouraged considerable technological innovation and diffusion[63)]. But meanwhile it is appropriate to ask whether the process of tightening standards for new and existing sources might slow the pace of technological innovation and diffusion and, in the process, slow short-term progress toward stated air quality goals[64)].

First, the Clean Air Act directed the EPA to set standards for thousands of different sources of pollution. Moreover, these standards are to differ depending upon the pollutants emanating from these sources, the air quality in the region surrounding it, the age of the source, and its financial condition. But establishing these standards has been no easy job. EPA simply has not had the time or the resources to set all these standards. More than 13 years after the 1970 CAA amendments EPA has yet to develop standards for a number of important sources[65)]. The absence of a standard adds uncertainty to any decision to construct such a source or significantly modify an existing one.

A second, and more serious, difficulty besetting the technology-forcing approach is that its effectiveness in terms of technological innovation and diffusion clearly depends on the informational demands on the regulators[66]. In establishing technology-forcing emission standards regulators should possess much specific technical knowledge and an awareness of each source's special problems. However, regulators are likely to be poorly and belatedly informed; they are certain to be ignorant of the specifics of each case and simply cannot deal with the enormous variation and flux of case specifics. A uniform emission standard can never take into account the age, size, design, degree of use, etc. of any particular piece of equipment or process. Therefore, even the best-intentioned bureaucrat cannot, in general, possess the detailed information needed to determine the proper innovative control technologies. Only those who operate the plant have this information. Compared to regulatory agencies, plant operators have undoubtedly far more resources in terms of case-specific knowledge as well as technical and managerial expertise to find innovative, more efficient, and more cost-effective ways of reducing pollution[67].

Third, the technology-forcing approach only can foster new control technologies which lower the costs of meeting the standards. Once a source has achieved the level required by the emission standard, it has no incentive whatever to cut further its emissions, no matter how low the cost. Indeed, it has a positive incentive not do so, since any emission reductions beyond those minimally required only would add to costs, reduce profits, and gain nothing in return. A firm that develops more effective control measures receives no reward or credit for doing so, as extra emission reductions do not generate profitable ERCs that can be traded for cash, held for future expansion, or used to offset an increase in emissions elsewhere in a plant.

Fourth, it is asserted that the traditional regulatory approach creates incentives for polluters rather to cease pollution control research and development of new control techniques and to hide any technological breakthrough from regulatory authorities[68]. These disincentives exist because innovative technologies, once they become known, could be used by regulators as a basis for setting tighter standards in the future, thus imposing new costs on a category of sources. Innovative firms risk making themselves or their industry the target for increased regulatory demands by revealing locations and means by which greater emission reductions are possible. Thus technology-forcing requirements tend to freeze rather than promote innovative control technology.

Fifth, regulators do not legally mandate the type of technology required to achieve compliance with emission standards. Firms are generally free to use alternative technologies to meet the established emission limits[69]. However, there is sufficient evidence of "the de facto requirement that new sources of air ... pollution install specific technology to abate their pollution"[70]. In many cases, the abatement technology which is actually being installed is equivalent to the technology suggested by regulators, rather than being designed to meet the limitations per se. The plants may reason that if they do not meet the emission limits, they will be safe from prosecution and will avoid penalties so long as they have made a good faith effort to achieve the standards by adopting the technology suggested by the control agency. Thus rather than encouraging innovation or the development of alternative technologies to meet emission limitations, the current command-and-control approach may encourage a risk-averting strategy of adopting the suggested technologies even when they may be expected not to meet the standards[71].

Sixth, the introduction of innovative control technology is also discouraged in light of some cases where innovative equipment had been installed but did not perform as anticipated[72]. In such cases, the firms were generally forced to remove the innovative equipment and to replace it by conventional equipment. While Federal law and most state offset regulations encourage introduction of innovative control technology and EPA often provides cost sharing grants for tests of innovative control technology, nevertheless most regional agencies are reluctant to issue permits incorporating innovations unless the applicant agrees to replace the innovative equipment in the event it fails to perform as anticipated. This attitude not only forces a firm to commit capital for the cost of the innovative equipment, which being innovative typically costs more than conventional equipment, but also enforces the firm to budget a contingency for possible total replacement of the innovative technology by proven technology. Thus, the community shares only the benefits of success rather than the risks of failure, that would lead to higher pollution for a period of time.

Finally, since controls on new sources are much more stringent than those on existing sources, companies have had an incentive to keep their older, less efficient, and more heavily polluting plants limping along[73]. Paradoxically, this not only may have inhibited the modernization of industry's plant and equipment, but also may have increased the total amount of pollution.

On the other hand, emissions trading promises to produce more innovations in pollution control technology, faster modernization, and better industrial productivity, all at significantly reduced costs. It could transform existing disincentives into positive and continuous incentives for better control

- not merely the minimum required - because extra control will become profitable and produce a valuable commodity that can be traded for cash. Firms that exceed the legal minimum now can sell the resulting emission reduction credits to other firms with higher abatement costs. Unlike traditional technology-forcing approaches, the emissions trading policy encourages plant managers to seek low-cost pollution control strategies. This can put engineers to work to solve problems instead of lawyers to work litigating whether problems exist to be solved.

Emissions trading will also provide insurance for innovation, since it allows shortfalls in new control technologies to be met by ERCs. Generally, emissions trading will decentralize compliance decisions to the plant managers whose circumstances can neither be anticipated. In theory, emissions trading will thus provide a more dynamic force for innovation in pollution abatement than the most ingenious "technology-forcing standard" any regulator could write down in the Federal Register[74].

Under the emissions trading policy there is generally less incentive to hide emission reduction possibilities. However, since the new approach is only a supplement and not an alternative to current regulations, emission standards will continue to be determined by the air pollution control authorities on a case-by-case basis, so to capture any advances made in air pollution control technology. This may discourage some companies to develop and install innovative equipment to reduce emissions and thus create and trade ERCs, if the transaction itself serves as a signalling device for finding new or more advanced controls and for tightening future emission standards[75]. If the new equipment creating an ERC were jedged technical feasible and cost-effective by the regulators, then such equipment would immediately become the standard for the industry. Although firms that actually create the ERCs are most vulnerable, other firms in the industry with similar pollution control systems may also face more stringent emission standards.

But then who in industry would create an ERC by installing innovative technology that could be used for setting tighter emission standards in the future? From industry's standpoint, such innovations are to be shunned like the plague.

However, firms that actually create the ERCs by employing innovative technologies are not immediately a target for extra regulation. For instance, where sources voluntarily agree to a RACT baseline before RACT has been established in the SIP for their source category, EPA encourages states not to impose more control requirements on such sources for a period of time consistent with the statutory deadlines for attainment, unless there is no other way to satisfy the requirements of the CAA[76)]. This means that even where the source category is a top priority for further control, individual sources which have agreed to negotiate RACT baselines to determine surplus reductions should be exempted from reexamination. As such sources have done more than was required at time, in EPA's view they should not be penalized for helping the states determine what RACT should be for the source category at issue.

The obvious link between emissions trading and command-and-control may have been one of the underlying causes for the fact that, so far, emissions trading did not substantially motivate industrial firms to develop and install innovative technology, reduce emissions, and so create ERC's in the bank[77)].

By and large, emission reductions occured because the plant exchanged currently available controls on some sources for similar controls on others. Moreover, many ERCs for bubbles originated from relatively low-cost investments such as fuel switches, reduced operation already-planned plant and equipment closures, where the costs directly-attributable to creating the ERC are insignificant. Other ERCs originated from emission reductions obtained as an incidental side-benefit of projects undertaken for some other economic reason, such as energy conservation or solvent recovery systems, or plant innovations.

There are only few cases where firms did make substantial investments in alternative control strategies that seem "innovative", either in ways of managing pollution or in actual controls (e.g., the 3 M Bristol bubble, GM in Defiance, Ohio). However, such results should be expected in the early states of a new program, where regulatory risks to users are perceived to be high, where the most inexpensive alternatives would be used first, and where firms would seek to minimize large research or development costs.

5. Administrability

It is conceptually possible to design a strategy which sparkles with acceptable environmental results, better adaptability to economic development, cost-effectiveness in terms of direct costs (i.e. all costs that are directly related to reducing emissions, such as control equipment, operation and maintenance costs), and other desirable features. However, administrative costs may be of such a magnitude that the implementation of such a strategy is not feasible. Therefore, it is important to recognize that the burdens, both public and private, of administering the requirements of the air pollution control policy must be taken into account when examining and comparing alternative strategies. Their omission from consideration would be a serious failure in the evaluation of alternative strategies.

The administrative processes for controlling air emissions under the traditional regulatory approach are no doubt complex, resource-intensive, time-consuming, and costly. Administrative costs, both public and private, incurred in the process of administering the regulatory requirements include:

- Information costs: Identification of the emission sources and determination of their emissions (emission inventory); determination of attainment/nonattainment status (ambient monitoring); determination of the impacts of emissions on ambient concentrations (diffusion modeling); calculation of pollution abatement costs of emitters (as a basis for setting of standards).

- Administrative costs: Control agency personnel to set standards, to develop strategies to attain or maintain ambient air quality standards, to allocate emission reductions to meet ambient standards, to review applications, to issue and revise permits which embody the allocation, to record permits and contracts, to submit and revise SIPs; company staff to apply for permits, to demonstrate the ambient equivalence of permit applications.

Indeed, the administrative costs of the traditional regulatory approach, prove substantial (see Table 9).

Under emissions trading much of the burdensome administrative process associated with the current regulatory scheme will remain in place. Importantly, the same types of permit conditions would be required. Thus, the administration issues under either scheme will be by and large identical. There are, however, some issues of administration that will add to the administrative burden presently experienced by federal, state and local agencies. Additional administrative costs associated with the adoption of emissions trading may incl[illegible]:

(a) Costs for developing generic rules and running the bank

Where states adopt "generic trading rules" to reduce the need for resource-intensive and time-consuming individual SIP revisions, additional administrative costs will be involved in developing such generic rules.

Similarly additional costs are incurred in developing "generic banking rules" and running the bank. This will include verifying and processing ERC requests, certifying ERCs, tracking, and performing clearinghouse functions, i.e. to track ownership, use, and transfer of all banked ERCs and to serve as a clearinghouse for credits on deposit, and account for transfers and withdrawals for ERCs.

Table 9

U.S. Government Transaction Costs for Air Pollution Control, 1972-1982
(billion current dollars)

Year	Regulation and Monitoring		Research and development		Total
	Federal	State and Local	Federal	State and local	
1972	0.048	0.095	0.104	0.017	0.264
1973	0.050	0.115	0.126	0.006	0.297
1974	0.052	0.131	0.100	0.007	0.290
1975	0.066	0.139	0.108	0.008	0.321
1976	0.069	0.135	0.131	0.006	0.341
1977	0.080	0.161	0.144	0.007	0.392
1978	0.094	0.183	0.159	0.008	0.444
1979	0.100	0.200	0.105	0.008	0.413
1980	0.122	0.207	0.130	0.005	0.464
1981	0.108	0.226	0.131	+)	0.465
1982	0.110	0.230	0.138	+)	0.478
+) Less than $ 500,000.					

Source: U.S. Department of Commerce, Bureau of Economic Analysis, "Pollution Abatement and Control Expenditures", Survey of Current Business 61(3): 21-23(1981 and 1984).

Despite some fears of large resource costs for running the bank the banking systems in operation are not at all examples of new bureaucratic agencies.

(b) Costs for examining alternative emission reduction plans

Each time a source proposes an alternative approach to emission reduction, some state and local resources will be needed to review the merits of such an approach. To do so, the agencies will have to establish reliable procedures for determining the applicable emissions baseline and ambient impacts.

The process of assessing and confirming the amount of emissions reduced will inevitably burden the administrative resources of state and local agencies. Even though this burden can be reduced when the documentation of emission reductions is incorporated into existing permitting and SIP systems, additional administrative costs will be associated with the confirmation of emission reductions. Possible additional costs may include:

-- Engineering analysis of proposed alternative emission reduction plans performed by the agency staff to establish the applicable baseline and determine the magnitude of the emission reductions proposed or created;

-- Site visits by agency staff to examine the nature of the change, e.g. installation of additional control equipment, change in process equipment and/or input, shutdown of a source or facility; production curtailment etc., and

-- Monitoring of emissions before and after the proposed change to determine the magnitude of the reductions created.

Ambient tests are required for most of the proposed trades in order to ensure that the air quality impact of trades is equivalent to the impact of the original SIP limits. Therefore, the Policy Statement in its Technical Issues Document proposes modeling requirements linked to the likely ambient effect of a proposed trade. Even though the policy is designed to limit the role of the agencies to deciding what kind of demonstration is required and how adequate the results are, the agencies will still need a great amount of time and expertise just to review the technical data, check all the details, and keep the records.

Indeed, the costs to review the merits of an alternative approach to emission reduction may prove substantial if the proposal is quite innovative and therefore requires more careful consideration, more in-depth information on sources to establish specific emission limits and operating conditions, and prolonged regulatory negotiation.

(c) Increased permitting burdens

Implementing the emissions trading policy will inevitably increase permitting burden. For example, states may have to issue new permits, if the sources involved in a transaction or applying for an ERC are not operating under a permit. As a matter of fact, there are some states without a permitting system; in other states permits may not have been issued for all major sources.

The agencies may also have to issue new permits to small and non-point sources that are involved in emissions trading transactions. Since emission reductions from these sources not historically given much attention by the regulators now can qualify to be credited, issuing permits to an increasing number of such sources may substantially increase the administrative costs of the agencies.

Furthermore, states will have to rewrite existing permits reflect the changes in emissions that will follow a trade or the creation of an ERC. When changing the terms of a permit states may have to specify additional requirements to assure that the permit provides adequate compliance information, e.g. a reliable method of determining compliance through design standards, operating conditions, production records, input factors, or similar indirect means. To be enforceable, the compliance instrument must include not only information on the effectiveness of the proposed pollution control measures, but also specify applicable restrictions on hours of operation, production or input rates, enforceable test methods for determining compliance, and necessary record-keeping or reporting requirements.

To be enforceable, the new policy may even require to expand the number of design standards in order to deal with a variety of new pollution control technologies employed under emissions trading. Rather than being limited to a specific technology or performance level, each existing source would be free to adopt any technique which results in emissions equal to or lower than allowable emissions under the source's permit. Thus, the variety of technologies employed under emissions trading will probably be infinitely greater than under the current regulatory approach. Therefore, EPA will either have to greatly expand the number of its design standards to deal with the wide range of possible technological adjustments and to ensure that all performance requirements are met, or develop more effective techniques to monitor performance directly.

Devising enforceable design standards for all small and non-point sources involved in emissions trading transactions appear to be equally difficult as EPA has not had the time or the resources to establish standards for major categories of a pollution sources, even though approximately 13 years have passed since the Clean Air Act first directed EPA to do so.

For a few states, agreements and permits currently in use may be an acceptable means for exercising the necessary authority over trades and ERCs. For most states, however, existing permits and procedures will need to be augmented to ensure that they provide the necessary information to allow states and EPA to enforce emission limits and compliance plans. Although such revisions need only occur on a case-by-case basis when trade applications are submitted, they may nonetheless involve substantial resources.

Since bubble applications can be submitted even after enforcement actions are well underway, alternative emission reduction proposals may lead to prolonged negotiations. Where a bubble is proposed for a source whose compliance has been the subject of long regulatory negotiations, agencies may have to extend negotiations that otherwise might be concluded.

(d) Additional costs for SIP revisions

Trades outside the scope of approved generic trading rules must continue to be reviewed as individual SIP revisions. Hence, state agencies will have to commit a significant portion of staff time to reviewing proposed SIP revisions and their consistency with the CAA, going through the necessary administrative procedures (including adoption by the board, public hearing, etc.) and then negotiating with EPA for final approval. This process is resource-intensive and may produce lengthy delays.

As bubble, netting, offset and other transactions by definition include at least two emission points, administrative requirements will apply to more than one source. Thus transactions will result at least in a duplication of some of the administrative requirements mentioned above before an activity following a trade can operate. In light of the fact, that, in theory, there is no limitation to the number of emission points that can be included in an alternative emissions reduction plan or another transaction, the agencies may even face a multiplicity of analytical permitting, and other administrative tasks.

A glance at Table 10 will show that, in practice, individual applications for bubbles under New Jersey's Generic VOC Bubble Rule have included a minimum of 3 sources. But there are also other applications where VOC controls are traded among more than 30 sources. In one case alone, New Jersey approved a bubble that allows DuPont's Chambers Works to overcontrol 7 large stacks to 99 % in lieu of 85 % controls on 119 petrochemical process-fugitive sources. To ensure that the emission reductions for all sources involved in such bubbles will not degrade ambient air quality and will be enforceable, the technical information for each of the sources involved in the transaction must be reviewed and the operating permits must be revised. Thus emissions trading may indeed place great demands upon the agencies' administrative capacities.

Hence, there are fears that the implementation of the emissions trading policy will impose more burdens on the agencies' administrative resources than they can bear. As a matter of fact, the pollution control agencies in the United States historically have been underfunded relative to their administrative needs. And just now, state pollution control agencies are threatened with staff reductions due to budget cuts and the "new federalism". Therefore, they will be hard put to take on new duties. To the contrary, a large number of states have indicated that they may reduce certain important air program activities (including the development of emissions trading systems) proportionately to the proposed reductions in the level of federal support for their environmental programs or more (see Table 11).

Table 10

Bubbles Processed under New Jersey's Generic VOC Bubble Rule

Company & Location	Industrial Category	No. of Sources	Emissions Before: After
Du Pont Deepwater	chemical mfg.	119	4750 tpy; 438 tpy
Hoffman-LaRoche Nutley	pharm. mfg.	4	628 tpy; 304 tpy
All Purpose Roll Leaf Paramus	surface coating to produce roll leaf	36	1049 tpy; NA
National Can Edison	Can coating	9	164.1 tpy; 32.8 lb/hr
Permacel New Brunswick	mfg. pressure sensitive tape	19	5376 lb/hr; 4113 lb/hr
Dri Print Foil Rahway	coating	33	1588 lb/hr; 761 lb/hr
3M Corporation Freehold	coating of magnetic tape	6	3644 lb/hr; 1377 lb/hr
East Coast Finishing Fairview	paper coating	3	NA
Inmont Bound Brook	paint mfg.	5	70 tpy; 51 tpy
Rexham Flemington	flexible pkg. material mfg.	8	12703 tpy; 4446 tpy
Keuffel & Esser Rockaway	film & paper coating	6	264 lb/hr; NA
Johnson & Johnson East.Surg.Dress. New Brunswick	coating & misc.	9	848 lb/hr; *848 lb/hr
Burroughs Corp. Carlstadt plant		3	486 lb/hr; 280 lb/hr
Burroughs Corp. Park Ridge plant		3	199 lb/hr *199 lb/hr
American Can Regency plant Edison	can coating	7	83.4 lb/hr *83.4 lb/hr
American Can Dayton plant So. Brunswick	can coating	3	14.8 lb/hr *14.8 lb/hr

Source: EPA, The Controlled Trader, Vol. 1 No. 3, Washington D.C. November 1981, p. 3.

Table 11

States' Response to a 20% Reduction in Federal Support

Air Programs

Environmental Program Activity	Eliminate Activity	Reduce Proportionately to Budget	Not Reduce Activity
	Number of States		
General Permitting	2	27	12
PSD Permitting	11	21	11
Compliance Determination	1	33	5
Enforcement Against Non-Compliance Sources	1	26	13
Toxic Emission Control	7	14	9
Ambient Air Quality Monitoring	1	36	2
Emissions "bubbles"	8	17	9
Emissions "banking"	10	14	4
'82' SIP Development (Stationary)	3	16	3
'82' SIP Development (Mobile)	4	14	3
I/M	4	8	6
Other	0	12	2

Source: National Governors' Association Committee on Energy and Environment, The State of the States: Management of Environmental Programs in the 1980s, Washington, D.C., May 1982.

However, there are some factors that may prevent the administrative burden caused by the emissions trading policy from completely overwhelming the state agencies:

First, by adopting EPA-approved "generic trading rules" the administrative complexity of compliance with the CAA can be reduced by exempting transactions from the need for individual SIP revision and approval by EPA. Normal SIP processing generally is extremely uncertain, resource-intensive, and time-consuming. It often produces lenghty delays and unnecessary federal review of routine decisions by state agencies. Under generic rules, trades which produce no net increase in emissions and whose ambient impact can be evaluated in a simple, straightforward manner can be approved by the state without case-by-case EPA review. However, EPA will have to continue to perform its oversight responsibilities under the Clean Air Act by auditing state applications of these rules to make sure individual trades remain environmentally acceptable. In general, it can be assumed that the adoption of generic rules will substantially reduce the administrative complexity, uncertainty, delays, and costs associated with SIP revisions and thus reduce the administrative costs of EPA, states, and undustry. Based on experience in EPA Region III normal SIP processing and approval of a bubble application took about 10 months, whereas concurrent SIP processing time for a bubble proposal now is only 6 months (see Table 12).

Second, "netting" removes the administrative burden of new source review requirements from plants expanding or modernizing in PSD areas, so long as any increase in plant-wide emissions is insignificant. By netting out of review the new facility may be exempted from preconstruction permits and associated requirements, including monitoring and modeling. Thus netting out of NSR has the advantage of reducing permitting and corresponding administrative demands on regulatory personnel.

Table 12

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III – 6th & Walnut Sts.
Philadelphia, Pa. 19106

SUMMARY OF REGION III BUBBLE ACTIVITIES[a)]

1. REGION III BUBBLES

BUBBLES APPROVED	- 7	TSP - 2	SO_2 - 4	VOC - 1
BUBBLES PROPOSED	- 5	TSP - 2	SO_2 - 3	VOC - 0
BUBBLES UNDER DEVELOPMENT	- 15	TSP - 5	SO_2 - 3	VOC - 7
TOTAL	- 27	9	10	8

2. COST SAVINGS

FOR BUBBLES APPROVED	- $ 41,000,000
FOR BUBBLES PROPOSED	- $ 38,000,000
FOR BUBBLES UNDER DEVELOPMENT	- $100,000,000
TOTAL	- $179,000,000

3. TIME SAVINGS

NORMAL SIP PROCESSING/APPROVAL TIME	- 8 MONTHS/BUBBLE
BUBBLE CONCURRENT SIP PROCESSING TIME	- 4 MONTHS/BUBBLE
SAVINGS	- 4 MONTHS/BUBBLE

a) As of 2/1/83.

Source: U.S. EPA.

Third, while regulatory agencies may face a multiplicity of analytical, permitting, and other administrative tasks if a substantial number of emission points is included in an alternative emissions reduction approach, enforcement burdens may sometimes be lessened in such cases. For example, if abatement efforts under a bubble focus on some major emission points and ignore minor ones, compliance monitoring requirements may be reduced and the enforcement burden lessened. The approved bubble at the DuPont plant in New Jersey will reduce VOC emissions by controlling emissions to 99 percent at seven large stacks in lieu of state-required 85 percent control at over hundred vents, pumps, and seals. The bubble will thus produce easier enforcement, since only seven sources need be controlled and inspected instead of over 100 smaller petrochemical process-fugitive sources.

Fourth, while some bubble applications may extend regulatory negotiations that otherwise might be concluded, others may lead to an earlier conclusion of negotiations; and earlier compliance. Moreover, the additional burden placed on regulatory agencies is likely to be more than offset by gains from lower compliance costs. Therefore, good-faith efforts to comply less expensively should be encouraged even if an alternative emission reduction proposal may lead to prolonged negotiations.

Fifth, while some bubbles and generic rules do require more up-front agency resources than "standardized" permitting (e.g., bubbles involving complex Level III modelling or rules adopting Level II), the great bulk appear to have required no more resources than normal permits. This is true even though most of the "first wave" are prototypes whose processing has not yet been routinized. It can be assumed that administrative costs associated with implementing emissions trading will decline with increasing experience. Furthermore, since the April 1982 Policy Statement EPA has taken several steps -

including the model rule, audit guidance, and new streamlin modelling procedures inter alia incorporating a limited Level III (2/17/83) - to further reduce potential administrative costs .

Sixth, EPA has designed the emissions trading policy to minimize the use of state and local resources by placing the burden of initiating and developing trade proposals as well as demonstrating the ambient equivalence of the proposed transactions on the regulatee. For trades involving open dust sources of particulate emissions, the sources must even agree to postapproval monitoring to determine if predicted air quality results have been realized. The effects of these provisions are twofold: The sources proposing a trade or applying for an ERC will have to bear the initial development and demonstrating costs, thus reducing the financial burden of the agencies. Moreover, since the firms have to bear the costs of developing an alternative compliance strategy and meeting the exacting demonstration requirements, transactions for which these front-end expenses exceed the prospective cost-savings of benefits would be precluded. As a result, the administrative burden of the agencies will be reduced since the number of trade applications to be processed will be restricted to those cases with prospective self-financing of administrative costs.

Seventh, some state agencies have received supplemental appropriations to implement emissions trading programs because of their positive effects in promoting economic revitalization and preserve local jobs. For other state and local trading programs the resource problem in administering and enforcing emissions trading could be partly solved by charging permit fees sufficient to cover the costs of reviewing alternative emission reduction proposals. In fact, the CAA already requires permit fees so that the costs of pollution control programs and requirements are covered by the companies. Therefore, solutions to the funding problem could be that the states implement the permit fee provision to maintain technical competence in the permit review process, but also that EPA makes the implementation of this provision a condition for allowing the states to take advantage of emissions trading. Indeed, EPA will probably incorporate a permit fee section in the final Policy Statement.

To sum up, the administrative burden of emissions trading still is far from clear. The costs associated with each administrative function added cannot yet be estimated. Nonetheless, the demands placed upon the agencies' administrative capacities by the emissions trading policy appear to present special but resolvable problems.A good measure of the issue's weight is the fact that despite states' claims of large resource costs for implementing emissions trading the volume of emissions trading applications, approvals, and states developing generic rules continues to grow. This may also be due to the fact that all generic rules and many bubbles will produce substantial downstream resource savings through clearer decision rules, avoided litigation, faster compliance, as well as reduced Federal "second-guessing" of state actions.

When evaluating alternative strategies to control air pollution it must be recognized that the goal of any policy should not be to minimize the administrative costs only of the agencies and to place the costs of the new policy on the regulatee. Instead, the total administrative costs, both public <u>and</u> private, must be considered when evaluating the administrability of any approach.

As a matter of fact, the administrative burden placed on the <u>regulatee</u>, of complying with the requirements of the emissions trading policy can be significant.

Additional costs associated with alternative emission reduction plans may include:

(a) <u>Front-end expenses in developing compliance alternatives and demonstrating ambient equivalence</u>

While traditional regulations are to be implemented at the expense of the state (or EPA), alternative compliance strategies can only be realized if the applicants bear the administrative costs of demonstrating ambient equivalence. Thus a source proposing a trade or applying for an ERC will incur significant front-end expenses in developing compliance alternatives and meeting EPA's or the state's exacting demonstration requirements.

According to the Policy Statement, <u>ambient tests</u> are required for most of the proposed trades in order to ensure that the air quality impact of trades is equivalent to the impact of the original SIP limits. Therefore, the Policy Statement in its Technical Issues Document proposes modeling requirements linked to the likely ambient effect of a proposed trade.

In <u>Level I</u> of this three-tiered screen, no modeling at all is required, if the proposed TSP, SO_2 or CO trade does not result in a net increase in applicable baseline emissions, the relevant sources are located in the same immediate vicinity, and no increase in emissions occurs at the source with the lower effective plume height.

In <u>Level II</u> a relatively simple mathematical dispersion modeling is done to predict changes in ambient air quality, considering only those emission sources involved in the transaction. This level of analysis requires an expenditure of relatively small resources, in terms of both work-hours and computer time. If the net change in air quality determined by a Level II analysis is less than the level of significance defined by the policy, than the need for more costly refined analysis is removed.

A Level III analysis is required if either there is a net emission increase or if there is a net change in air quality greater than the level of significance as determined by a Level II analysis. Full dispersion modeling, considering alls emission points within the impact area of the sources, whether or not they are involved in the trade, is more time-consuming and resource-intensive. Such refined analysis normally requires long records of sequentially recorded meteorological data (i.e. 1 or 5 Years of hourly data) in more complex dispersion models (e.g. "sequential" models). As a matter of fact, the Policy Statement virtually requires full dispersion modeling for all off-site trades where emissions increases would be in excess of a few pounds per hour. In order to demonstrate ambient equivalence of a proposed trade, in many cases significant expenditures for satisfying full-scale ambient tests are to expected.

For trades involving open dust sources of particulate emissions, the sources must even agree to post-approval monitoring to determine if predicted air quality results have been realized. The front-end expenses to meet these requirements can be significant. For example, Armco Inc.'s efforts to demonstrate the benefits of the bubble concept as applied to iron and steel plant fugitive dust sources at its Middletown, OH Works have spanned several years (from late 1977 through March 1981). The major effort in this bubble proposal was the commitment to proceed with the alternative compliance strategy at a cost of som $ 6 million, while having not guarantee of success or acceptance.

There are fears that in some cases the administrative burden placed on the regulatees may be so great that they will not find alternative compliance proposals or applications for an ERC to be worth the trouble. However, where the use of emissions trading could make a real difference in a source's compliance costs or could generate significant profits, the prospective cost savings or profits will probably more than outweigh the initial development and demonstrating costs.

(b) Search costs

Other transaction costs relevant to the users of emissions trading are search costs. Search costs pertain to the expense and time of gathering information on the availability of potential "surplus" emission reductions for use as offsets. These costs which are generic to bubble and offset transactions between two or more firms can be, and usually are, significant, so long as there is no bank in operation. However, banking can and will improve information on the availability of ERCs and potential offsets, assist industrial new-comers and expanding sources who seek low-cost offsets and thus reduce search costs.

(c) Banking fees

Additional costs that will be incurred by the users of the emissions banking and trading system are the application fee and the withdrawal fee for emission reduction credits. To give an example, the San Francisco Bay Area Air Quality Management District (BAAQMD) requires for deposits of ERCs on its emissions bank an application fee of $ 900 plus $ 150 per source involved. The withdrawal fee accounts for $ 100 per withdrawal. For on-site credits in the informal bank, there is only a $ 100 application fee, and no withdrawal fee.

In light of the significant cost-savings or profits from creating, selling or using ERCs, banking fees cannot be regarded as a major obstacle for the viability of emissions trading.

6. Enforceability

When an emission source is allowed to be operated once the necessary permits are granted, the source can be considered to be in compliance. However, demonstrating initial compliance by meeting the permit requirements does not necessarily ensure the source's compliance over time. To ensure such continuous compliance, enforcement activities of the federal, state and local agencies will generally be necessary, since voluntary compliance with the emission limits and other regulations has usually proved to be unreliable. Given the SIPs, the emission standards, the data and control techniques developed in other functions of environmental regulation, reliable, effective enforcement is crucial to assure that the legally required emission reductions are really made.

A strong and effective enforcement of emission standards will generally entail

- a system of regular inspection of sources to detect possible violations
- a system of enforcement actions including violation notices, abatement orders, civil penalties for violations or court ordered injunctions.

The effectiveness of any strategy clearly depends on the vigor and clout of the enforcement mechanism. Violators of regulations must first be detected. They must then be prosecuted, found guilty, and given a substantial penalty. If any of these steps fails, the violators get away (virtually) free despite their disregard for the emission limits.

Effective enforcement is not only a necessary precondition to assure compliance with the legal requirements and thus achieve the stated air quality goals but also to any cost-effectiveness argument in favor of a particular control strategy. Fair comparisons of pollution control costs are not possible if the alternatives approaches are not equally enforceable and do not bring about approximately the same ambient air quality results.

The traditional regulatory approach addresses the problem of reaching and maintaining NAAQSs by relying on enforceable requirements for individual pollution "sources". Enforcing source-specific emission limits often consists of ensuring that the mandated control technology or the proper type of fuel is being used, or that the source is not operated for a longer period of time than permitted.

Unfortunately, enforcing source-specific emission limits under the current regulatory approach and assuring continuous compliance has proved difficult if not impossible. There is great uncertainty about the extent to which sources actually comply with their emission limits. Most attainment projections assume full compliance, but non-compliance is common, apparently much more so than EPA recotnizes. For 1980, EPA reported that 90 percent of major air pollution sources were in compliance with emission limitations (see Table 13). An investigation by GAO, however, challenges EPA's data. GAO concluded that the national compliance rate was considerably less and noted that EPA itself had found "out of 921 inspections of sources supposedly in compliance, 200 or 22 percent, ... in violation". In two regions GAO visited, it found that 70 percent of sources subject to enforcement action since 1973 and reported as complying with their abatement schedules in fact were not in compliance. In addition, noncomplying sources, as compared to sources in complicance, produced disproportionately large amonts of emissions.

There are several reasons for these shortcomings of the traditional regulatory approach:

Table 13

Compliance Status of Major Air Pollution Sources, 1980

Industry	Number of total sources	Number and percentage ( ) in compliance with emissions limitations		Number and percentage ( ) in violation: Meeting compliance schedule		Violating emissions limitations		Violating compliance schedule		On compliance schedule, status unknown	Status unknown	
Power plants (coal/oil)	700	559	(80)	54	(7)	67	(10)	3	(—)	0	17	(2)
Iron and steel (integrated)	60	8	(13)	19	(32)	32	(53)	1	(2)	0	0	
Iron and steel (other)	144	102	(71)	15	(10)	24	(17)	3	(2)	0	0	
Primary smelters	28	13	(46)	3	(11)	8	(25)	1	(4)	0	3	(11)
Pulp and paper	475	417	(87)	17	(4)	24	(5)	7	(1)	0	10	(2)
Municipal incinerators	72	60	(83)	2	(3)	7	(10)	3	(4)	0	0	
Petroleum refineries	214	170	(79)	15	(7)	21	(10)	0		1	7	(3)
Aluminum reduction	49	37	(76)	2	(4)	8	(16)	2	(4)	0	0	
Portland cement	200	176	(88)	3	(2)	18	(9)	1	(—)	0	2	(1)
Sulfuric acid	262	246	(94)	4	(2)	10	(4)	2	(—)	0	0	
Phosphatic fertilizers	69	62	(90)	1	(—)	4	(6)	0		0	2	(3)
Coal cleaning	409	395	(97)	1	(—)	4	(1)	0		0	9	(2)
Grey iron	433	381	(88)	10	(2)	29	(7)	2	(—)	2	9	(2)
Asphalt concrete	2,862	2,752	(96)	14	(—)	39	(1)	3	(—)	0	54	(2)
Total	5,977	5,378	(90)	160	(3)	295	(5)	28	(—)	3	113	(2)

Source: Information provided by the U.S. Environmental Protection Agency.

First, control agencies have not had the resources and time to inspect all sources operating under a permit regularly. Monitoring techniques for stack emissions are complex and costly, thus preventing EPA and the states from inspecting enough sources to assure compliance over time. Moreover, even the less expensive enforcement methods (i.e. inspections and opacity readings) are infrequently used. An investigation by the U.S. General Accounting Office (GAO) concluded that only "few major air pollution sources have been classified in compliance as a result of onsite inspections and source tests, the most reliable methods of determining compliance". According to GAO "only 25 percent of the major sources were found in compliance by the most reliable methods" and "72 percent were certified by the States based on unverified information".

Second, even where compliance tests have taken place, the methods applied, such as monitoring techniques, 'snapshot' inspections, use of self-reporting data provided by the sources, or indirect methods of determining compliance are not necessarily reliable and thus will not assure adequate compliance.

As a matter of fact, the determination of the compliance status of most sources with any precision is difficult, if not impossible. As stated above, monitoring techniques for stack emissions are complex and imprecise. Moreover, monitoring techniques for non-point sources such as wind blown dust and most other particulates are almost speculative.

According to EPA "snapshot" inspections are not an effective means to assure compliance over time either. Indeed, many sources are not visited more often than once a year, although those inspected tend to be sources with especially high emissions or sources with a past record of frequent noncompliance. Moreover, a significant number of inspections are preannounced thus allowing potential violators to come into compliance before the inspection take place. Finally, several studies suggest that high turnover among inspectors, and consequently a low level of experience, hampered the effectiveness and credibility of the inspections.

Allowing sources to self-certify their compliance status appears to be equally questionable so long as there is no auditing program to complement government inspections and enforcement. And indirect methods of determining compliance (by using production or input factors) are also not necessarily reliable.

Third, enforcement actions by EPA and the states against detected violators generally take a long time and are often ineffective.

Effective enforcement also plays an important role for the viability of emissions trading. Strong, effective enforcement of emission limits is one of the necessary preconditions for emissions trading to operate effectively. If there is not an equally strong and certain incentive for sources to comply with their emission limits, a source will not make the required emission reductions. It is the individual sources' need for emission reductions that creates the demand for ERCs that is an essential, central component in emissions trading. Unless sources need ERCs, there is no incentive to seek and buy ERCs. However, without (sufficient) demand for ERCs there is little incentive for other sources to find emission reductions and to create ERCs for sale.

Since emissions trading is only a supplement and not an alternative to current regulations, under emissions trading much of the burdensome enforcement process associated with current regulations will remain in place. Since enforceable compliance instruments will be required for any transaction under the emissions trading program, many of the enforcement difficulties associated with the traditional command-and-control approach will equally apply to enforcement under the new scheme. Thus, the enforcement issues under either scheme will be by and large identical.

There are, however, some issues of enforcement under the emissions trading policy that will add to the monitoring and enforcement problems presently experienced by state and loca agencies:

First, emissions trading will add to the enforcement burden in terms of quantities. It will increase the number of sources that must be monitored and thus may overwhelm resources available to assure adequate and continuous compliance with regulations. An examination of some of the early trades indicates that the new policy will involve small and non-point sources not historically given much attention by the regulators, the emissions of which have hence not been inventoried or monitored. The emissions trading policy requires not only to issue permits to those sources not previously subject to regulation and to measure their emission reductions, but also to enforce the terms of the permits to ensure that the trade agreements are kept. Measuring emissions directly from these sources, especially from the open dust sources, may be extremely difficult and expensive. Even if the burden of post-approval monitoring to demonstrate if predicted air results have been realized is placed on the regulate, it would still take significant resources of the agencies to check the validity of the monitoring results. However, the post-approval monitoring is a one-time verification of the effectiveness of control measures. Once verified, the monitoring is of the measures themselves (e.g. road paving) which are usually quite easy to check.

Second, in many cases the (major) point-sources on the inventory will need to be inspected more frequently than under the existing regulatory approach. For example, state and local authorities now often prioritize inspection procedures so that sources operating substantially below their allowable emission limitations are only infrequently inspected. However, when emission limitations for these sources operating below their allowable emission rates are lowered in exchange for a real increase in emissions elsewhere, these sources must be inspected more frequently, because periods of higher emissions will be then more cirtical to the overall attainment strategy. On the other hand, sources will still only agree to limits which they can meet with a substantial margin of safety to avoid violations, whether or not the particular emission limit has been lowered as a result of a trade. Therefore it appears that exceedance of the new limits under an alternative emission reduction plan creates neither a greater danger to ambient attainment, nor a more difficult enforcement problem, than exceedance where the limits were not re-arranged. Moreover, in some cases where control activities under a transaction focus on some major emission points and ignore minor ones, compliance monitoring requirements may be reduced and the enforcement burden lessened (e.g., the Du Pont Chambers Works VOC bubble). Similarly, where emission reductions result from shutdowns and equipment removal, enforcement of the reductions becomes a simple matter.

Since bubble applications can be submitted at any time, and even after enforcement actions are will underway, the opportunities to disrupt enforcement programs and to delay compliance may be significant. According to the Policy Statement, a bubble can be approved even for an individual emission source which is the subject of a federal enforcement action or outstanding enforcement order so long a EPA (and where necessary the appropriate court) approves the proposal and the compliance schedule it contains. There are well-founded fears that, in practice, the concept will provide recalcitrant polluters with another means to confound enforcement agencies and to successfully delay compliance. If. at this late date, a source has not committed to a compliance schedule, the owners have probably utilized numerous delaying tactics to avoid making this commitment. The potential to bubble into compliance provides yet another opportunity to delay while the proposed bubble is investigated. However, to the extent that emissions trading puts engineers to work to comply with emission standards less expensively instead of lawyers to work fighting such requirements, it can cut enforcement costs, especially for litigation.

Finally, while government enforcement responsibilities tend to expand under the emissions trading program, resources for enforcement are obviously decreasing. There are a number of indications that EPA and state and local agencies are reducing their enforcement activities. Although federal, state, and local governments share responsibility for enforcement, EPA is currently emphasizing the state role, and has sent significantly less cases to the U.S. Justice Department for enforcement and moreover has asked the Justice Department to drop a number of pending cases. Simultaneously, EPA has reduced both its own enforcement budget and the amount of fundes being made available to state authorities. Since state funding and personnel levels needed to enforce the conventional regulatory policy historically have been grossly inadequate, the implementation of emissions trading can only compound this resource problem in enforcement. As a matter of fact, a large number of state agencies have indicated that importand activities including compliance determination and enforcement against non-complying sources will be reduced at least proportionately to the proposed cuts in federal support (see Table 11 on p. 178). Therefore, it is not unreasonable to question whether enforcement will be sufficient to provide necessary conditions for the viability and effectiveness of the emissions trading policy. EPA, state and local agencies can barely manage to enforce existing emission limits, the presence of a significant number of trades to be monitored over time could be overwhelming.

7. Legal Feasibility

Emissions trading in its present form reflects the present administration's commitment to regulatory reform, although its origins date back to the Carter and even Ford administration. The offset policy has a firm statutory basis. Sections 172 and 173 of the Clean Air Act as amended by the 1977 Clean Air Act Amendments set forth the basic elements of the offset policy. EPA's authority to carry out the offset program is undisputed. However, the bubble and netting policies do not have such a firm statutory basis. They rest on EPA's interpretation of vague statutory terms used in connection with preconstruction review and SIP requirements such as "source", "as expeditiously as practicable" and "reasonable further progress" [78)]. It is safe to say that EPA has a wide margin of discretion to carry out the Clean Air Act's mandate to attain the NAAQSs and to prevent a significant deterioration of air quality in clean areas. The courts will generally defer to EPA's expertise and political judgement in carrying out the Act. However, the consistency of EPA's regulatory reform program with the objectives as well as clear provisions of the Act will be scrutinized, the more so since the emissions trading policy has undergone a considerable liberalization of prerequisites that were expressly designed to safeguard the policy objectives of the Act. The US Court of Appeal decision in the recent case Natural Resources Defense Council v. Gorsuch [79)] demonstrates the court's determination to have a hard look at EPA's regulatory reform program where the court feels that the basic policy objectives of the Act are at stake. This decision, although limited to netting in nonattainment areas, contains such broad language that it created uncertainty about EPA's authority to carry out the whole program or at least other important components of it.

a) Consistency of the Netting Program with the Clean Air Act

From the very beginning of the emissions trading program, EPA focused on the definition of "source" and "facility" to match the lack of express authority to carry out the program. Plants or production lines normally contain two or more emission points. If source or facility is defined to mean the whole plant or at least the whole production line, emissions trading is automatically allowed because the plant operator can compensate increased emissions from one point by decreases from another point. If source or facility is defined in a narrow way to mean a single emission point, emission trading requires authority to exempt sources from the requirements of the Act [80]. There is no express authority of this kind in the Act. However, EPA has great discretionary authority to regulate or make policy for the control of air pollution. Therefore, the lack of express authority for the netting program does not mean that the program is inconsistent with the Act. Another effect of a broad definition of source is that it subjects minor new facilities within a plant that have emissions above the threshold of significant modification to new source review while under a narrow definition they would escape that review. Three highly complex and not easily reconcilable [81] decisions of the US Court of Appeal for the District of Columbia, namely ASARCO Inc. v. EPA[82], Alabama Power v. Costle [83] and Natural Resources Defense Council v. Gorsuch[84], state the law in respect of the different control programs that were at issue in each case.

ASARCO [85] overturned the definition of "source" the Agency had chosen for the Sec. 111 NSPS program with respect to modified existing sources. Sec. 111 (a)(3) of the Clean Air Act defines source as a "building, structure, facility or installation" without further explaining these terms. EPA defined the term "source" as to mean the whole plant where modifications to individual facilities within a whole plant were concerned[86]. This allowed modernizing plants to avoid the NSPS if they could compensate increased emissions from the modified facility by decreases from other facilities (NSPS bubble). However, the broad definition of source was not applied to the construction of a new facility within a plant, or to the construction of a new plant with several facilities[87]. The court held that this dual definition of source was inconsistent, contradicted the plain language of the Act and did not comport with the objectives of the NSPS program to enhance rather than simply maintain air quality. However, it noted, that EPA had a certain discretion in defining the notion of "source", suggesting that where a whole plant was an appropriate unit for emissions control under the NSPS program, the notion of "source" could be extended accordingly.

Although the later decision in Alabama Power was generally understood to give EPA more leeway in defining "source"[88], EPA has until recently never tried to use the potential of ASARCO to reintroduce a NSPS bubble program. Probably, the heavy reliance of the court on the language of the Act deterred the Agency. However, recently, the reintroduction of modified NSPS bubble programs (compliance bubbles) is being considered. In the case of a combination of new facilities within a plant each of which is subject to NSPS, the plant manager could be granted discretion to deviate from the applicable emission limitations as long as the aggregate emissions of the plant do not change. To comply with the mandate of ASARCO, Alabama Power and NRDC to consider the basic objectives of the NSPS program, namely improvement of air quality through technology forcing, it is being considered to impose on the combination or group of new facilities an emission standard that is somewhat stricter than the aggregate individual emission limitations[89].

In Alabama Power[90] the court considered the netting program in PSD areas that allowed modernizing existing plants to avoid PSD new source review by keeping the net emissions increase below the threshold triggering that review; however, the applicable regulations limited netting to the modification of equipment within the plant and excluded reconstruction of equipment[91]. Technically this was done by a definition of "facility" (which term is used in the PSD program in lieu of "source") as to mean any "building, structure, facility, installation, equipment or operation." The court, relying on the statutory list of facilities subject to the PSD program and on its purpose and structure, held that EPA had latitude to adopt definitions of "facility" that encompassed the whole plant; it further held that EPA had unduly restricted the possibility of netting by excluding reconstruction. The second Alabama decision[92] even came close to stating that the Act required a definition of "facility" as to comprise the whole plant. The court distinguished ASARCO on several grounds, the most persuasive of which is the distinction of the respective legislative purposes[93]: in contrast to the NSPS program, the PSD program was designed to apply only where new industrial activity increased pollution in an area. EPA responded to Alabama Power by adopting regulations that defined "facility" as to mean the whole plant and allowing netting for all changes within the plant, including reconstruction[94].

In NRDC[95], the court considered netting in nonattainment areas. EPA originally had taken the position that for purposes of the nonattainment program netting should not be allowed because this was inconsistent with the objective of the Act to timely attain the NAAQSs. The 1980 nonattainment regulations, therefore, set forth a "dual" definition of "source"; they defined "building", "structure" and "facility" as to mean "plant", but defined "installation" as to mean "an identifiable piece of process equipment"; in a related provision, reconstructed facilities were considered to be new sources[96]. This dual definition allowed minor new sources within a plant to be subject to new source review while avoiding that modified sources, by netting plant-wide increases and decreases of emissions, could escape from that review. In 1981, under the Reagan administration, EPA changed its position and equated the source definition of the nonattainment program to that of the PSD program, focussing on the burdens and complexities of the air pollution control program and the primary role of the states in air pollution control[97]. This change was meant to allow "netting out" of new source review where there was no plant-wide net increase of emissions above the significance threshold. In a related action, the reconstruction rule was deleted[98].

The US Court of Appeal for the District of Columbia in NRDC overturned the extension of the netting policy to nonattainment areas and directed EPA to restore the dual definition of "source" and the reconstruction rule. The court tried to reconcile ASARCO and Alabama Power by strongly relying on the different legislative purposes of the regulatory programs under consideration, holding that EPA could define the term "source" differently for different programs to take account of each's purpose[99]. Netting is allowed for programs that are designed merely to maintain existing air quality, such as the PSD program; it is inappropriate in programs enacted to improve the quality of the air, such as the NSPS program. Applying this simple legislative purpose test, which the Court thought was established by the previous decision and to which is was bound, the Court concluded that the netting concept in nonattainment areas was inconsistent with the Act's purpose to ameliorate existing air quality in these areas in order to achieve expeditious compliance with the NAAQSs[100]. Given this premise, the Court did not reach the argument that Congress intended the states to have the major responsibility in assuring that the NAAQSs be met by the statutory deadline. The court expressly rejected the argument that since the states were still bound by the requirement of reasonable further progress and the attainment deadlines, they could be given flexibility in allowing netting[101]; this was inconsistent with the construction moratorium and the nonattainment permit program. As one commentator[102)] stated, the court may have reached this conclusion because it believed that the SIP process alone could not be expected to produce attainment on its own.

NRDC was a major (although temporary) setback for the whole emissions trading program[103)]. At least major changes of the netting program in nonattainment areas were made necessary. However, an outright return to the pre-1981 law (that disallowed netting in nonattainment areas) arguably was not required by the court's holding. It is submitted that the court's primary reliance on the legislative purpose of the Act would have allowed EPA to modify the program so as to contribute to an improvement of existing air quality. This could have been done by requiring, as in the offset program, a more than even compensation of increased emissions from modified equipment by plant-wide decreases in nonattainment areas.

b) Consistency of the Bubble Program with the Clean Air Act

The more serious question was that of the repercussions of NRDC on other elements of the emissions trading program. On its face's value, NRDC is limited to netting in nonattainment areas. However, since the court primarily relied on a simple legislative purpose test and rejected the argument that the requirement of reasonable further progress and the attainment deadlines sufficiently ensured expeditious attainment, it could not be ruled out that the bubble policy in nonattainment areas might be affected in the future. As has been pointed out by one commentator [104)] a key element of the court's reasoning, namely that the whole program for nonattainment areas is designed to improve ambient air quality, is present; however, it was the intention of Congress to let states decide how to allocate the burden of reducing emissions among (existing) source categories[105]. Where a state has an approved SIP ensuring expeditious attainment and reasonable further progress, it could be argued that this latter goal of the Act is paramount and justifies an allocation of control burdens among existing sources by using the bubble concept.

The situation might be different where a nonattainment area lacks an approved SIP. Here too, the court's holding is not directly applicable because the court said only "that it was inappropriate to use the bubble to avoid mandatory federal programs for nonattainment areas, not that the absence of those programs for other reasons precludes use of the concept"[106]. However, in the light of the court's concern with the objectives of the nonattainment program to improve air quality and the priority of this concern over economic considerations, it could be predicted that the courts would have a hard look at nonattainment area bubbles in areas lacking an approved SIP. Since these areas have not established reasonable further progress as expeditiously as practicable, there is no assurance that the NAAQSs will be achieved timely or at least by the statutory deadline and that the emission reductions credited will not be needed for (timely)attainment. It should be noted that California for exactly this reason disallows bubbles in nonattainment areas. The problem is that there is no much statutory guidance as to the interpretation of the statutory SIP requirements such as reasonable further progress and attainment as expeditiously as practicable, and Court decisions are missing[107]. Also, the powers for the states to create a growth allowance (Sec. 172 (b) (5) CAA) could be advanced for the proposition that all that a state needs to do is to ensure attainment by the statutory deadlines. However, there is no language in the Act from which one could conclude that a SIP that creates a growth allowance is dispensed with the normal statutory SIP requirements. The growth allowance policy does not generally empower the state to postpone attainment until the ultimate statutory deadline; rather, the states must create more emission reductions than mandated by the requirements of reasonable further progress and timely attainment to create a growth margin. Even if this were not the case, the growth allowance policy is designed to enable economic growth from new or modernizing existing sources; it is not applicable to bubbles.

The Policy Statement makes the attempt to immunize the bubble policy in nonattainment areas by carefully worded reservations that are designed to ensure compliance with the statutory SIP requirements. Each bubble transaction in nonattainment areas that have not received an extension must contribute to an improvement of existing air quality (e.g. by requiring a negotiated RACT baseline), while not compromising the power of the state to require further reductions in the future, where necessary to attain the NAAQSs (no "giving away" of RACT). In areas that have been granted an extension or are nonattainment with respect to secondary standards, alternatively an actual emissions baseline can be used if the parties to a bubble transaction commit themselves to achieve further emission reductions when RACT is defined for that area; moreover, the states are advised that RACT definition must occur "as expeditiously as practicable". It is also true that many arguments that are voiced against bubbles in nonattainment areas are more political than legal in nature. For example, the argument that EPA's policy would perpetuate dirty air or exert a disruptive influence on the SIP revision process hardly is a legal argument.

Nevertheless, bubbles in nonattainment areas that lack an approved implementation plan could be challenged as inconsistent with the Act. Where use of a negotiated RACT baseline is allowed, EPA advised the states not to reexamine the agreed-upon individual emission levels for a period of time consistent with the statutory deadlines for attainment (i.e. possibly until 1987), unless there is no other practical way to satisfy the requirements of the Clean Air Act.

This deferral of additional measures for emission reduction arguably violates the requirement of attainment "as expeditiously as practicable"[108]. Sources involved in a bubble transaction are here granted a period of protection from additional SIP requirements without examining whether or not an earlier attainment by including these sources in the state improvement program is possible.

Where actual emissions are the baseline, the requirement of timely attainment is met because individual sources that have effectuated a bubble transaction based on an actual emissions baseline are subject to future RACT requirements to the same extent as all other sources. However, the simple commitment by these sources to comply with future RACT emission limits without an assurance that this is at all feasible, seems objectionable. Also, the emission reductions credited in a bubble transaction may be needed to ensure "reasonable further progress" towards attainment. But all told, the use of an actual emission baseline perhaps comports more with the goals of the Act than that of a negotiated RACT baseline coupled with a long protection of sources involved in a bubble trade.

In evaluating the legality of the bubble policy in nonattainment areas, it must be considered that the statutory SIP requirements are poorly defined, and EPA enjoys a wide margin of discretion in approving revised SIPs. The ultimate decision would seem to depend on whether one emphasizes one of two conflicting statutory principles: the right of the states to decide themselves on the allocation of the burdens of emission reduction among different sources, or the mandate of the Act to attain the NAAQSs as timely as possible.

Arguably, EPA could have immunized the bubble policy from challenges based on NRDC if it would have modified it in such a way as to ensure a net air quality benefit (as in the offset program). This could have been achieved by requiring, either generally or limited to nonattainment areas lacking an approved SIP, a more than even reduction of emissions.

Environmental groups have recently challenged certain nonattainment area bubbles for inconsistency with the basic federal requirements of the Act[109]. However, in commenting on the Policy Statement, they have not opposed the bubble policy in nonattainment areas as a matter of principle but rather signalled possible agreement with a modification of the bubble policy in the sense of requiring a net air qualify benefit[110].

c) Consistency of Single Elements of the Emissions Trading Policy with the Clean Air Act

Apart from the issues of consistency of the entire netting and bubble program with the purpose of the Clean Air Act, certain elements especially of the bubble program in nonattainment areas have been asserted to be contrary to the Act. This is especially true of the use of allowable emissions for determining the baseline where the SIP's demonstration of attainment is based on actual emissions, or of the use of shutdowns for creating ERCs, either generally or at least without regard to the useful life of the relevant plant[111]. These objections cannot be based on NRDC and the legislative purpose test adopted by the court; rather, they rest on a strict interpretation of statutory SIP requirements auch as "reasonable further progress" and attainment "as expeditiously as practicable".

The requirement of reasonable further progress is so poorly defined in the Act that it is hard to decide how significant emission reductions are needed to meet this requirement and to what extent a delay of attainment past the date set in the SIP would violate the requirement. Arguably, a bubble trade may not result in a setback of the area's control efforts towards attainment of the NAAQS unless this is mandated by overriding economic considerations inherent in the concept of <u>reasonable</u> further progress (feasibility of control requirements)[112]. Where a SIP in a nonattainment area is based on allowables, There is no objection based on principle to using them as a basis for creating ERCs. However, it is more doubtful whether the restrictive conditions placed by EPA on the use of allowables for establishing the baseline in nonattainment areas whose SIP is based on actual immissions. satisfy this test. This would clearly only be the case if the increased emissions resulting from the bubble transaction are compensated by decreases at another place. The somewhat cryptic language in the Policy Statement[113] does not make it clear that the state would in all other cases be required to make a new reasonable further progress demonstration in its revised SIP independent of a "substantial inadequacy" notice by EPA. It seems doubtful whether the remaining restrictive conditions established by EPA for the use of allowables will work. Given the global nature of most SIPs, it may be difficult to determine whether an emissions trade based on allowables will contribute to a new ambient violation or prevent the planned removal of an existing violation.

The use of allowables in nonattainment areas whose SIP is based on actual emissions may also violate the requirement of timely attainment. This test allows for a balancing of interests affected by an area's control strategy, including control costs. However, it is questionable that the grant of ERCs for use in emissions trades based on mere paper reductions still is a legitimate exercise of the discretion granted to the states. This method assumes that the sources have a vested right to the allowable emission limits set by the state without regard to timely attainment[114] and the method used in the SIP for demonstrating attainment. It is true that the sources that operate at full capacity can use their allowables and it might seem fair to permit sources that do not, to transfer unused allowable pollution units to other sources. However, since the rules for nonattainment areas do not only require the maintenance but, rather, an improvement of actual air quality, the vested-rights argument is not cogent. At least where use of allowables for emission trades in areas whose SIP is based on actual emissions reflects a wide-spread practice in an AQCR or AQMA, this arguably runs counter to timely attainment.

With respect to the use of shutdowns for creating ERCs in nonattainment areas the basic argument of environmental groups that crediting such shutdowns will generally impede reasonable further progress towards timely attaining the standards does not seem well-founded. Where a plant is shut down "prematurely", especially as a result of an emissions trade, crediting does not alter the attainment status of the area; the Emissions Trading Policy is an incentive to such closures. However, the granting of such ERCs beyond the probable useful life of the source, i.e. the neglect for temporal equivalence of emission reduction and duration of credit, arguably violates the requirement of timely attainment[115]. If the ERC granted for the shutdown were limited to the useful life of the relevant source (which, admittedly is not easy to ascertain), the shutdown would ultimately contribute to the improvement of the ambient air quality towards the ultimate goal of attainment. The grant of an indefinite, marketable ERC to the owner of the affected source is an unjustified enrichment rather than a measure taken for cost considerations or for protection of investment-backed expectations. Existing sources that are significantly modified or reconstructed in nonattainment areas would have to meet new source review requirements without being allowed to net out of these requirements. This shows that these sources do not have a pre-existing vested right in the pollution units represented by their permit. Therefore, the admission of shutdowns as a source of ERCs beyond the useful life of the relevant source impedes an improvement of the ambient air quality which would otherwise be possible. An argument in favor of this method of creating ERCs is that it encourages the early reconstruction and replacement of existing sources[116]. This may promote economic growth and productivity in the area and, due to the imposition of NSPSs on new or modified sources, may lead to lower pollution per production unit. It does not contribute to an improvement of ambient air quality where and insofar as the emission reductions caused by the shutdown are fully credited.

The use of shutdowns for creating ERCs meets with other objections, namely that of double-counting. Where a SIP has already assumed a certain "turnover" amount of emission reductions due to shutdowns, EPA requires that this amount be exceeded before credit can be given. However, the assumptions in most SIPs are too general, too little area-specific as to allow the conclusion that a particular shutdown does not amount to double-counting[117)]. Also, the Policy Statement, in contrast to some generic rules, does not consider the problem of displaced demand. Other sources may increase their production (within their allowables) or new minor sources not subject to new source review might locate in the area as the result of a shutdown. Here again, double-counting will occur. Double-counting of emission reductions clearly violates the requirement of timely attainment and it might compromise the area's reasonable further progress towards attainment (in nonattainment areas) or its attainment status with respect to NAAQSs or increments (in PSD areas).

Ultimately, the answer to these questions will again turn on the extent of discretion granted the states in devising their control programs for achieving the NAAQSs. If one stresses the right of states to decide themselves on the allocation of the burden of emission reduction among different categories of sources, the use of allowables and shutdowns might be held as still consistent with the Act. If one stresses the mandate of the Act to attain the NAAQSs as timely as possible, the answer might be negative.

d) Position Taken by EPA in the New Policy Statement of August 1983 as to the Permissibility of Credits for Shutdowns in Nonattainment Areas

In the new Policy Statement of August 1983[118] EPA, in discussing the critical comments on the Policy Statement of April 1982 received by the agency, confirms its position that in principle credits for shutdowns in nonattainment areas with or without an approved SIP are permissible. However, apart from a primarily politically, not legally motivated possible reorientation of the whole bubble policy in case of shutdowns, EPA in the new Policy Statement concedes that credits for shutdowns may be legally problematic in a particular case. This is true of the prohibition of double-counting of shutdowns which, due to the structure of the SIP, can apparently not be complied with in many AQCRs[119]. Moreover, EPA appears to consider credits for shutdowns to be legally beyond any doubt only in such nonattainment areas that have demonstrated future attainment of ambient quality standards. So long as the SIP is not eroded, in EPA's view there is no reason to compel the state to attain the ambient standards more expeditiously[120]. This view seems to be supported by the U.S. Supreme Court decision in Union Electric v. EPA[121] where the court only held that EPA had discretion - but was under no obligation - to require a more speedy attainment. With respect to nonattainment areas lacking a demonstration of attainment, EPA now recognizes that there are valid counter-arguments against the view previously emphasized that the granting of credits for shutdowns fostered speedy partial clean-up of highly polluted marginal facilities. These counter-arguments are that crediting shutdowns perpetuates a pollution problem and progress thus achieved is not sufficient to secure "further reasonable progress" and attainment "as expeditiously as possible". EPA notes that in such a case it can substitute its own implementation plan for a deficient SIP. As an alternative it advances the idea also supported by environmental organizations that credits for shutdowns in such nonattainment areas should secure a direct and immediate substantial contribution to the improvement of air quality[122].

e) The Decision of the Supreme Court on the Netting Policy in Nonattainment Areas

In Chevron, U.S.A. Inc. v. Natural Resources Defense Council the Supreme Court has rejected the legal objections of the D.C. Court of Appeal in NRDC against the netting policy in nonattainment areas.

The decisive difference to the lower court decision is the scope of review of EPA's interpretation of the CAA. In this respect, the Supreme Court in contrast to the "activist" lower court took the view that where the construction of broad statutory terms by a governmental department required expertise and political choices, the construction given the statute by the agency had a considerable weight and that the courts, as a matter of principle, could not substitute their view for that of the agency. The court was not empowered to review the question whether the regulation concerned was appropriate in the light of the legislative purpose but, rather, whether EPA's view that it was appropriate was a reasonable one.

On the merits, the Supreme Court held that the statutory definition of "source" with its overlapping, illustrative terms was intended to enlarge, rather than confine, the agency's power to regulate particular sources. Legislative history did not present any indicia for a limitation of EPA's discretion. The fact that EPA had changed its construction of the term "source" several times did not rule out that the court must defer to the agency's construction. The construction of the term "source" and thereby of the scope of the netting program requires, in the opinion of the Supreme Court, a political accommodation of the economic interest in permitting capital improvements to continue and the environmental interest in improving air quality. Congress did not resolve this conflict but rather left it to be resolved by the agency. EPA had considered the matter in a detailed and reasoned fashion

Plaintiff - NRDC - in reality was not contesting a violation of the Act but rather the appropriateness of the political decision of EPA. Such a review of an agency decision was no judicial task.

With this liberal interpretation of the Act and judicial self-restraint the Supreme Court has not only saved the netting program from far-reaching changes. It has also given green light to a further liberalization of the emissions trading policy, e.g. with respect to the NSPSs. By overgeneralizing the legislative purpose of the offset program and postulating that economic and environmental interests have generally been granted equal weight by Congress (for which there is no support in the language of the Act as well as in legislative history), the Supreme Court accords EPA a far-reaching discretion for political determination of the future shaping of the emissions trading policy.

8. Conclusions

a) Main advantages

If the advantages and improvements theoretically to be expected from the emissions trading policy are contrasted with the purely regulatory strategy formerly practised, the following main advantages emerge:

- Partial, lasting or temporary improvements in environmental quality

  For example, an overcompensation of new emissions is necessary with newly located or expanded plants in non attainment areas. Limited or final non-utilization of emission reduction credits also serves to reduce the emission level. The enforcement of regulations is accelerated in an environmentally effective manner through the approval of alternative, more cost-effective emission reduction measures.

- A growth-conforming orientation of clean air policy

  In the wake of offset policy, growth-promoting new, expansionary or modernizing projects in non attainment and PSD areas are facilitated.

- Increased cost-effectiveness of clean air measures in the private sector

  Differences in the specific avoidance costs can be utilized in a manner which cuts across plant, firm and branch of industry insofar as emissions and immissions do not increase overall. The opportunity costs of delayed investment are reduced by the banking policy.

- Greater incentives for environment and productivity oriented technical progress

Innovative emission reductions going beyond the minimum requirements are stimulated by emissions trading since they can have cost-reducing or profit-increasing effects for the firms. Shutdown of old, emission intensive production plants in favour of new, more productive plants is not longer inhibited, since the existing emission permits (in some cases) can continue to be used as credits for a firm's own projects or projects of third parties.

- Partial reduction of administrative costs for clean air policy authorities and industry

In the framework of "netting out" in modernization and expansion projects, a simplification of permitting procedures comes about. The acceptance of cost saving alternatives in the enforcement of regulations will probably serve to reduce the number of litigation and costly legal actions.

Transactions in the context of emissions trading policy serve to improve the data situation for the general regulatory strategy of the authorities. In some cases enforcement is also facilitated if, in emissions monitoring, the authorities can concentrate on a small number of emission-intensive plants instead of having to deal with a large number of unimportant individual sources. Finally, the improved exploitation of the innovation potential of the plant operators yields the expectation that the administrative costs for the authorities to promote technical environmental protection measures will be reduced.

- Reducing the intensity of state intervention and increasing the discretionary scope of individual enterprises

Since more environmental protection can become profitable for enterprises, the innovation potential of the economy is better exploited; the state can then withdraw from certain areas of individual regulation with specific proposals for technical problem solution.

- More planning security for investment dicisions of individual firms

  Investment projects become calculable again due to the availability of emission reduction credits on the basis of the banking system.

b) Neutral Effects

In addition to the evaluation criteria of clean air policy, which as a result of flexible regulatory policy are at least in some cases producing signs of distinct improvement in relation to pure regulatory strategy, areas and problems can be mentioned where, as a result of the new policy instruments, hardly any changes are to be expected. In certain individual areas, the new clean air policy will basically yield no advantages, but also no disadvantages in relation to the traditional regulatory policy:

- As regards air quality, the individual elements of the emissions trading policy generally allow no deterioration, but also do not solve certain problems of pure regulatory policy

  More often than not, only an equivalence and not an improvement of the air quality situation must be guaranteed after a transaction has been made. An abuse of trivial clauses and also the long-distance transportation of harmful materials are not excluded by the new concept. Environmental problems resulting from inadequate measuring techniques and air quality modeling also exert an effect upon emissions trading policy.

- The precautionary principle remains in force

  New plants and significant modifications to existing plants continue to be subject to more stringent emission standards than existing plants.

- Most of the administrative tasks and costs of the pure regulatory system also arise with flexible regulatory policy

  Permitting and continuous supervision of transactions in emissions trading policy do not differ over wide areas from traditional regulatory practice.

- Negative distributional policy effects are also not abolished through flexible regulatory policy

  The unequal treatment of existing and new plants in the same branch of industry and of differening sectoral origin yet producing similar emissions is continued; regional differences in enforcement are not abolished.

c) Problems, Risks and Weak Points during Implementation

In addition to the advantageous or neutral effects of the flexible, market-oriented regulatory strategy in comparison to traditional regulatory policy, a number of problems, risks and weak points should be mentioned which may arise during their implementation:

- A partial deterioration of air quality is not to be excluded

  The prevailing status quo orientation with regard to air quality effects of transactions can lead to delays in reaching scheduled clean air policy goals in nonattainment areas where rapid successes are necessary. Difficulties in establishing the measurement principles for emission reduction credits can, in the presence of nominally unchanged emissions, result in a deterioration of air quality.The factual, temporal and spatial equivalence of the effects of immissions in the presence of emission reductions and emission increases quantitatively compensating each other is not present in all cases.

- Embedding the new concept in the traditional regulatory policy might reduce the desired incentives to innovation

  Applicants must fear the new technologies used to create emission reduction credits will be declared by the einforcing authorities to be the state-of-available-technology and that they will thus attract the disapproval of competitors in their branch of industry.

- A partial increase in the administrative costs for authorities and firms cannot be excluded

  Despite individual steps taken to reduce administrative costs by means of general guidelines ("generic rules"), management of the new instrument in some cases will generate further costs for authorities and firms: among other things for assessing applications for air quality modeling, running the "bank", etc. In enforcement too, changes in monitoring priorities and application of qualitatively higher requirements can lead to increased burdens.

- The new policy might create new and exacerbate existing distributional problems

  By definition redistribution of emission reduction measures under cost aspects causes a local shift of emissions and immissions i.e. ground level concentrations. Areas in an air quality control region relatively less affected by immission ("cold spots") are thus balanced out by areas subject to a relatively high degree of immissions ("hot spots"). Applicants who offer more cost-effective solutions both for the individual enterprises and for the economy as a whole are "penalized" by the increased administrative costs, while economically inefficient clean air policy solutions outsid of emissions trading are rewarded by having their administrative cost burden shouldered by the state (see also para. 4c).

- The existence of a market for emission reduction credit does not itself guarantee that the cost advantages of emissions trading can actually be realized and that growth is not inhibited

  There is a risk of monopolization of the supply and of hoarding emission reduction credits, i.e. emission reduction credits are generated but not passed on to third parties.

d) Conclusions

Whether and to what extent these advantages and disadvantages of flexible regulatory policy will in fact come about, is ultimately a question of specific clean air policy. Desired improvements and threatening deteriorations alike do not occur automatically and inevitably. The possible advantages of the emissions trading policy are thus permanently dependent on the effectiveness and success of the regulatory elements in a combined scheme of application of regulations and market-oriented incentives.

If no effective regulatory policy is pursued with regard to existing plants, significant modifications or new plants, or if for example enforcement and monitoring of compliance with regulations is neglected, hardly any demand will arise in the economy for additional, more cost-effective emission reductions. If, however, the demand is missing or if the clean air strategy (SIP) proves to be inadequate so that all emission reduction credits are threatened by depreciation or confiscation a corresponding supply can scarcely be expected. The advantages of flexible regulatory policy would then be limited to a small number of individual cases.

As regards the problems, risks and weak points of the new instruments these can in principle be fully overcome without any necessity for altering the conceptional orientation of the new clean air policy in the USA. In this respect the EPA, by allowing choice and by stipulating only general conditions is already offering sufficient possibilities of avoiding any negative environmental effects through the medium of tightened regional regulations. This option has indeed already been used by the federal states. Furthermore the final policy statement has taken into account many misgivings expressed by the environmental groups and regional authorities.

Insofar as it may subsequently emerge that transactions in the context of emissions trading might hinder (timely) attainment of clean air policy goals, the possibility exists, as before, of creating supplementary ordinances and applying other measures within the framework of the implementation plan (SIP).

The increased administrative costs are by no means unusually high and, as experience increases, will probably take a degressive course anyway. Apart from the rule that transactions must finance themselves, the regional authority also has recourse to the possibility, offered by the Clean Air Act, of charging fees to finance any additional administrative costs incurred in emissions trading.

The danger of hoarding of emission reduction credits can be countered by appropriately structuring the temporal modalities of the credit system (e.g. by imposing a time limit on their use).

Generally therefore, it can be concluded that the combination of market-oriented approaches and regulatory policy as has been conceived in the USA for clean air policy, if appropriately designed and implemented promises substantial improvements in relation to traditional regulatory solutions.

Footnotes (Chapter C)

1) For a discussion of the broad set of criteria that can be applied in evaluating the advantages and disadvantages of any environmental policy, see for example W.J. Baumol and W.E. Oates, The Theory of Environmental Policy (Englewood Cliffs, New Jersey: Prentice-Hall 1975), pp. 232-42; M.J. Roberts, Environmental Protection: The Coplexities of Real Policy Choice, in: N. Swainson (ed.), Managing the Water Environment (Vancouver: University of British Columbia Press, 1976), pp. 176-78; B.T. Bower, C.N. Ehler, and A.V. Kneese, Incentives for managing the environment, Environmental Science & Technology, Vol. 11 (March 1977), pp.253-54; E.C. Breedlove, Growth with Clean Air: Analysis of the
2 x Emissions Offset Policy (Draft), August 1979, pp. American Petroleum Institute, Background Paper on the Use of Economic Incentives for Environmental Protection, Washington, D.C.: API, 1980) pp. 3-22; R. Liroff, Air Pollution Offsets: Trading, Selling, and Banking (Washington, D.C.: The Conservation Foundation, 1980, p. 2; F. Roach, C. Kolstad, A.E. Kneese, R. Tobin, and M. Williams, Alternative Air Quality Policy Options in the Four Corners Region, The Southwestern Review, Vol. 1, No. 2 (Summer 1981), pp. 37-58.

2) For a discussion of the complaints coming from public officials, industrialists, and environmentalists, see for example Summary & Comments, The Great Clean Air Act Debate of 1981: Envirionmentalists, Industry, Air Quality Commission Take Positions, 11 ELR 10027 (1981).

3) See W.J. Baumol and S.A.B. Blackman, Emission Permits vs. Effluent Charges (Draft), 1979

4) See Policy Statement, p. 15076 col. 1

5) Ibid.

6) See Policy Statement, p. 15077 col. 3 - p. 15078 col. 1.

7) See B.R. Raffle, Prevention of Significant Deterioration and Nonattainment Under The Clean Air Act: A Comprehensive Review. Bureau of National Affairs, Inc. Monograph ≠ 27, Vol. 10, No. 1 (May 4, 1979), p. 8.

8) See Policy Statement, p. 15078 Col. 1.

9) See L.S. Ritts, Summary of Comments Emissions Trading Policy Statement & Technical Issues Document, Washington, D.C., October 1983, p. 59.

10) Op. cit., p. 61-2.

11) Ibid, p. 59.

12) See, American Petroleum Institute, op. cit.

13) See L.S. Ritts, op. cit., p. 59.

14) Ibd., p. 81.

15) See J.A. del Calvo y Gonzalez, Markets in Air: Problems and Prospects of Controlled Trading. Harvard Environmental Law Review 1981, 5 (2), p. 389.

16) U.S. General Accounting Office (Program Analysis Division), A Market Approach To Air Pollution Control Could Reduce Compliance Costa Without Jeopardizing Clean Air Goals. (PAD-82-15), Washington, D.C., March 23, 1983, p. 36.

17) P. Del Duca, The Clean Air Act: A Realistic Assessment of Cost-Effectiveness, Harvard Environmental Law Review, Vol. 5: 184 (1981), p. 190.

18) See National Commission on Air Quality, To Breathe Clean Air. Report of the National Commission on Air Quality. Washington, D.C.: U.S. Government Printing Office, March 1981. See also B.I. Reffle, op. cit., p. 66.

19) See A. Seltz-Petrash, Marketplace Solutions of Air Pollution, Civil Engineering, Vol. 50, No. 1, (January 1980), p. 72.

20) See C.R. Courant, Emission Reductions from Shutdowns: Their Use in Banking and Trading Systems, U.S. Environmental Protextion Agency, Office of Planning and Evaluation, Emission Reduction Banking and Trading Project. August, 1980.

21) Ibid.

22) Policy Statement, Technical Issues Document, p. 15080 col. 2.

23) See L.S. Ritts, op.cit., p. 28.

24) For a fuller discussion on these issues, see L.S. Ritts, op. cit.

25) For a discussion of the various costs that should be included when evaluating the cost-effectiveness of any environmental policy, see American Petroleum Institute, Background Paper on the Use of Economic Incentives for Envirionmental Protection, p. 4-5.

26) EPA Comments to the GAO Draft Report, " A Market Approach to Air Pollution Control Could Reduce Compliance Costs Without Jeopardizing the Goals of the Clean Air Act. Quoted in: U.S. General Accounting Office, A Market Approach to Air Pollution Control Could Reduce Compliance Costa without Jeopardizing Clean Air Goals, (U.S. General Accounting Office, March 23, 1982, ≠ PAD-82-15), p. 143.

27) BACT for new sources or modifications in attainment areas "means an emission limitation based on the maximum degree of reduction ... which the permitting authority, on a case-by-case basis, taking into account energy, environmental and economic impacts ... determines is achievable for such facility ..." Section 169 (3), 42 U.S.C. 7479 (3). LAER for new sources or modifications in nonattainment areas "means, for any source, that rate of emissions which reflects (A) the most stringent emission limitation ... contained in ... any (SIP) for such ... category of source, unless the ... operator ... demonstrates ... such limitations are not achievable, or (B) the most stringent emission limitation ... achieved in practice by such ... category of source, whichever is more stringent." Section 171 (=), 42 U.S.C. 7501 (3).

28) NSPS must reflect "the degree of emission ... reduction achievable through ... application of the best technological system of continuous emission reduction which (taking into consideration ... cost and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." Section 111 (a) (1), 42 U.S.C. 7411(a)(1).

29) RACT can be defined in general terms as a standard that a particular emission source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

For RACT, EPA issues Control Technology Guidelines (CTGs), Each CTG contains recommendations to the states of what EPA called the "presumptive norm" for RACT, based on EPA's current evaluation of the capabilities and problems general to the industry that is the subject of the CTG. EPA recommends that when they include RACT provisions in their SIP revisions states adopt requirements consistent with the presumptive norm level. Since the CTGs are based on a general evaluation of industry, a state may wish to deviate from the EPA recommendations, since the general guidance may be inappropriate to particular facilities in the state. However, a state must justify its deviation to EPA. The role of CTGs is discussed in the general preamble EPA has adopted to accompany its proposed rulemaking on approval of state implementation plan revisions for nonattainment areas. See 44 Fed. Reg. 5361 (17 September 1979). Quoted from R.Liroff, Air Pollution Offsets, p.48.

30) See Association of Bay Area Governments (ed.), Let's Clear the Air: San Francisco Bay Area 1983, Air Quality Plan Update, (ABAG: Berkeley, Cal. June 1982).

31) See F.R. Anderson et al., Environmental Improvement Through Economic Incentives, p. 11.

32) P. del Duca, The Clean Air Act: A Realistic Assessment of Cost-Effectiveness. Harcard Environmental Law Review 1981, 5 (1), p. 191.

33) See "Will EPA stop Investment?" First Chicago World Report, May-June, 1978, p. 8.

34) See M.H. Kosters, Government Regulation: Present Status and Need for Reform, pp. 333-34.

35) Ibidem, p. 334.

36) See A.V. Kneese, C.L. Schultze, Pollution Prices and Public Policy. (Washington, D.C.: The Brookings Institution, 1975), p. 88. See also U.S. General Accounting Office, A Market Approach to Air Pollution Control Could Reduce Compliance Costs without Jeopardizing Clean Air Goals, U.S. Gerneral Accounting Office, March 23, 1982, p. 21.

37) See also A.M. Freeman III, Technology-Based Effluent Standards: The U.S. Case, Water Resources Research, Vol. 16, No. 1 (February 1980), p. 25.

38) The Council on Environmental Quality, "Environmental Quality - 1979, The 10th Annual Report", Washington, December 1979, p. 671. - "Whether done by installing scrabbers or electrostatic precipitators, or by changing production processes or input mixessubstitution low- for high-sulfur coal, for one example- should not matter. Yet technology-based standards do not allow firms to use certain of these methods for meeting ambient or performance standards, even though such methods may occasionally be relatively inexpensive. Instead, they can condemn the nation to spend more to meet its environmental goals than is necessary." Ibidem.

39) See A.M. Freeman III, Technology-Based Effluent Standards: The U.S. Case, p. 25.

40) For an excellent discussion of this point, see A.V. Kneese, Ch.L. Schultze, Pollution, Prices, and Public Policy, p. 63. See also F.R. Anderson et al., op. cit., pp. 13-14.

41) U.S. EPA, Draft Proposed Controlled Trading Policy Statement, July 13, 1981, p. 15.

42) See for example, M.T. Maloney and B. Yandle, Bubbles and Efficiency: Cleaner Air at lower Cost, Regulation, 4 (May/June 1980).

43) Environmental Protection Agency (Office of Policy and Resource Management), Emission Trading -- End-of-Year Status Report (Memorandam from J.A. Cannon to the Administrator), Washington, D.C., April 5, 1983, Appendix A.

44) See Remarks by A.M. Gorsuch, Administrator, U.S.E.P.A., Announcing Signing of EMISSIONS TRADING POLICY, April 2, 1982, p. 1.

45) EPA, Emissions Trading-end-of-Year Status Report, ibidem, Appendix A.

46) Ibidem.

47) For a more detailed discussion, see chapters C.4-5.

48) See M.H. Kosters, Government Regulation. Present Status and Need for Reform, in: M.L. Wachter and S.M. Wachter (ed.), Toward a New U.S. Industrial Policy? (Philadelphia: University of Pennsylvania Press, 1981), p. 333.

49) See W. Vivian and W. Hall, An Empirical Examination of U.S. Market Trading in Air Pollution Offsets (University of Michigan, Institute of Public Policy, 1981).

50) See EPA, Status report, op. cit.

51) W. Vivian and W. Hall, op. cit., Chapter 4, p. 22.

52) See B. Yandle, Alternative Systems for Allocating Air Quality. The Prevention of Significant Deterioration. Staff Paper for the Council on Wage and Price Stability. August 1979.

53) See W. Vivian and W. Hall, An Examination of U.S. Market Trading in Air Pollution Offsets, op. cit., Chapter 3, p. 7. And "NSPS are often not set at the structest standard available but somewhere in the middle range of available emission controls, so that most facilities can comply with them". See EPA, NSPS Bubble Issues 9 (prepared for discussion at the National Air Pollution Control Technical Advisory Committee Meeting, June 16-17, 1982).
See also R.A. Liroff, The Bubble Concept for Air Pollution Control: A Political and Administrative Perspective.

54) National Commission on Air Quality, To Breathe Clean Air: Findings and Recommendations, Washington, D.C. March 1981, p. 2.1-29.

55) Ibidem.

56) See also American Petroleum Institute, Background Paper on the Use of Economic Incentives for Environmental Protection, p. 11.

57) Ibidem, p. 13.

58) See S.S. Watson, Banking and Emission Offset Policy: A Market Approach to Pollution Control (Graduate Study Requirement, School of Public Policy), University of California, Berkeley. June 1978, pp. 74-5.

59) See, for example, B.D. Appel, Emissions Banking in a Non-Attainment Area - A Flawed Concept, Draft, San Francisco, January 14, 1983.

60) For a broader discussion of technology-forcing arguments, see R.W. Crandall, Regulatory Reform and Air Pollution Policy: Recent History and Future Prospects, preliminary draft, 1981, pp. V - 10 - 11.

61) Ibid.

62) Ibid.

63) R.A. Liroff, The Bubble Concept for Air Pollution Control: A Political and Administrative Perspective. Paper (81-53.1) Prepared for delivery, 74th Annual Meeting, Air Pollution Control Association, June 1981.

64) Ibid.

65) See R. Crandall and P. Portney, The Free Market and Clean Air, Teh Washington Post, August 20, 1981.

66) See the discussion on cost-effectiveness.

67) See also F.R. Anderson et al., op. cit., p. 14.

68) See, for example, A.V. Kneese and C.L. Schultze, op. cit., p. 88.

69) The Council on Environmental Quality, op. cit., p. 671.

70) Ibidem.

71) See also A.M. Freeman III, op. cit., p. 25.

72) See W. Vivian and W. Hall, An Empirical Examination of U.S. Market Trading in Air Pollution Offsets (University of Michigan, Institute of Public Policy, 1981), Chapter 5, p. 5.

73) M.H. Koster, op. cit., p. 333.

74) Remarks of Christopher De Muth at the announcement of EPA's Emissions Trading Policy (April 2, 1982).

75) See U.S. General Accounting Office, A Market Approach to Air Pollution Control Could Reduce Compliance Costs without Jeopardizing Clean Air Goals, U.S. General Accounting Office, March 23, 1982, ≠ PAD-82-15; p. 42. See also EPA, Checklist of Regulatory Alternatives, Washington D.C. July 1980, p. 7-2.

76) See Policy Statement 15080 col. 2.

77) See EPA, Emission Reduction Banking & Trading Update, Vol. 2, October 1980. See also Appel, Bruce D., Emissions Banking in a Non-Attainment Area - A 1983 Flawed Concept, Draft, San Francisco, January 14, 1983, and Appendices X and XII.

78) CAA §§ 111(a)(3), 169(1); CAA §§ 110(a)(A)(i), 172 (a)(2); CAA §§ 171(1), 172(b)(3)

79) Natural Resources Defense Council v. Gorsuch, 12 Envt'l L. Rep. 20942 (D.C. Cir., Aug. 17, 1982): see Comment, 12 Envt'l L. Rep. 10089 (1982)

80) See Currie, 128 U. Pa. L. Rev. 1389, at 1397 et seq. (1980); Comment, 12 Envt'l L. Rep. 10089, at 10090/91 (1982)

81) Rhinelander, 1 Va. J. Nat. Resources L. 177, at 215 (1981); Note, 32 Stanford L. Rev. 943, at 958 et seq. (1980); Comment, supra note 3, at 10091 et seq.

82) ASARCO v. EPA, 578 F.2d 319 (D.C. Cir. 1978)

83) Alabama Power Co. v. Costle, 636 F.2d 323 (D.C. Cir. 1979), superseding 606 F.2d 1068 (D.C. Cir. 1979)

84) Supra note 2

85) Supra note 5

86) 40 C.F.R. § 60.2(d), 14(d) (1977), 40 Fed. Reg. 58416 (1975)

87) 40 C.F.R. § 60.15 (1977), 40 Fed. Reg. 58416 (1975)

88) Comment, supra note 3, at 10094

89) Cf. New Source Performance Bubble Issues, OAQPS, 1982; NRDC, Statement on New Source Performance Bubble Issues, 1982; UARG, Comments on Policy Statement, p. 8 et seq.; Note, supra note 4, at 951 et seq.

90) 606 F.2d 1068

91) 40 C.F.R. §§ 51.24(b)(4), 52.21(b)(4)

92) 636 F.2d 323

93) See Comment, supra note 3, at 10094

94) 40 C.F.R. §§ 51.24(b)(5), (6), 52.21(b)(5), (6); 45 Fed. Reg. 52676, 52693-96 (1980)

95) Supra note 2

96) 45 Fed. Reg. 52696-98, 52746 (1980)

97) 46 Fed. Reg. 50766 (1981)

98) 46 Fed. Reg. 50766 (1981)

99) Supra note 2, at 20947; see Comment, supra note 3, at 10093

100) Supra note 2, at 20947

101) Supra note 2, at 20948

102) Comment, supra note 3, at 10094

103) Comment, supra note 3, at 10095

104) Comment, supra note 3, at 10095; see also Connecticut Fund v. EPA (case III), 13 Envt'l L.Rep. 20151, 20154 (2d Cir., Dec. 1, 1982)

105) Train v. Natural Resources Defense Council, 421 U.S. 60, 79/80 (1975); Union Electric Co. v. EPA, 427 U.S. 246, 266 (1976)

106) Comment, supra note 3, at 10095

107) But see the dicta in Train v. NRDC, supra note 28, at 96/97; Union Electric Co., supra note 28, at 259/260, 264 n. 13

108) NRDC, Comments on Policy Statement, p. 8/9. In Union Electric, supra note 28, at 264 note 13 the Court stated that where the economic and technical possibility to make more rapid progress existed, the EPA could disapprove a SIP; but see Train v. NRDC, supra note 28, at 96/97 where the court declared that SIP revisions that postpone attainment in principle are permissible because the law mandates attainment as expeditiously as practicable, not as expeditiously as was thought when devising the original SIP.

109) See BNA Envt.Rep., Curr. Developments, 9 Oct. 1982, p.631

110) NRDC, supra note 31, at 4 et seq.; Ritts, Summary of Comments on Policy Statement, p. 28 et seq.; see also Conservation Foundation, State of the Environment, 1982, p. 71 and 418; note, supra note 4, at 968; cf. del Calvo y Gonzales, 5 Harv. Envt'l L. Rev. 377, at 420/421 (1981)

111) With respect to the use of allowable emissions: NRDC, supra note 31, at 16 et seq.; Ritts, Summary of Comments on Policy Statement, p. 28 et seq.; with respect to shut-downs: NRDC, supra note 31, at 11 et seq.; Ritts, Summary of Comments on Policy Statement, p. 39 et seq.

112) But see Train v. NRDC, supra note 28, at 96/97

113) The Policy Statement, p. 15080 col. 2 suggests such a possibility merely by reference to its part III

114) Cf. Ritts, Summary of Comments on Policy Statement, p. 45

115) NRDC, supra note 31, p. 13 et seq.; Ritts, Summary of Comments on Policy Statement, p. 41

116) CMA, Comments on Policy Statement, p. 6

117) Ritts, Summary of Comments on Policy Statement, p. 44

118) 48 Fed. Reg. 39580 (1983)

119) Policy Statement supra note 41, at 39581 col. 1/2, at 39584 col. 2/3

120) Policy Statement supra note 41, at 39581 col. 3, at 39582 col. 1

121) Supra note 28, at 264 note 13

122) Policy Statement supra note 41, at 39583 col. 2/3

D. Possibilities of Transferring the US Emissions Trading Concept into W. German Law

I. The W. German Regulatory System

The W. German regulatory system [1] in the area of air pollution control is grossly comparable to the American system. The existing differences are not so fundamental that a transfer of the Emissions Trading Policy, if advocated as a matter of policy, would necessitate fundamental changes of existing law. However, some features of the German law such as the lack of specific emission standards for existing sources raise problems with respect to establishing the baseline for emission reduction credits that are difficult to overcome.

1. Basic Requirements under the Federal Emissions Control Act of 1974

a) Ambient Air Quality Standards

Under Sec. 5 No. 1 of the Federal Emissions Control Act (FECA) major facilities (facilities requiring a permit) shall be so constructed and operated that harmful environmental effects and other dangers, substantial detriments and substantial molestations upon the public and the neighborhood cannot be caused. This requirement is the central principle of the FECA. It is similar to the American requirement forbidding the construction of a major new facility that would cause a violation of the ambient air quality standards.

Sec. 5 No. 1 FECA applies to any pollutant. However, in order to avoid case-by-case determination of whether a proposed facility meets the requirement, the Federal Government is empowered to adopt, with the agreement of the Bundesrat, administrative guidelines that set forth ambient air quality standards. [2] Pursuant to this authority, the Federal Government promulgated in the Technische Anleitung zur Reinhaltung der Luft (TA-Luft - Technical Guidelines for the Control of Air Pollution) of 1974 [3] both long- and short-term ambient standards for a number of pollutants considered to be most important from the point of view of air pollution control, namely dustfall, suspended particulates, carbon monoxide, sulphur dioxide, hydrogen sulfide, nitrogen dioxide, nitric oxide, hydrochloric acid and chlorine. According to the purpose of the law as set forth in Sec. 1 and the enabling provision of Sec. 48 which refers back to Sec. 5 of the Act, the ambient quality standards are designed to protect against risks for public health as well as against risks for public welfare (such as ecological damage, damage to crops and buildings, simple molestations). However, in practice, the ambient air quality standards were oriented only at the protection of public health. The Federal Government has drawn from this deficiency the conclusion that the existing health-oriented ambient air quality standards must be supplemented by a second set of air quality standards that effectively protect public welfare. The Amendments of 1983 of the TA-Luft (TA-Luft 1983) [4] therefore establish primary and secondary ambient air quality standards. Primary standards are established for suspended particulates, lead and anorganic lead compounds in suspended particulates, cadmium and anorganic cadmium compounds in suspended particulates, chlorine, hydrochloric acid, carbon monoxide, sulfur dioxide and nitrogen dioxide. Secondary standards are established for dustfall, lead, cadmium and thallium and their anorganic compounds in dustfall and hydrofluorine and anorganic gaseous fluorine compounds.

These standards are not comparable to the American primary and secondary standards because they have a double function. The primary purpose of the primary standards is the protection of public health, as the primary purpose of the secondary standards is the protection of public welfare. However, the primary standard also is designed to promote public welfare, and the secondary standard also has functions in the protection of public health. The necessary differentiation is achieved by different regimes of application of these standards. With respect to protection of public health, the primary standards are mandatory; they may, in principle, not be exceeded. Compliance with them is sufficient. If the secondary standards are exceeded, a case-by-case determination as to the kind and extent of emissions and dangers caused by them is necessary. With respect of public welfare, compliance with either the primary or secondary standards is in principle sufficient. However, where particularly sensitive animals, plants or buildings are liable to be affected, a case-by-case determination is necessary, provided specified increments of pollutant concentration levels are exceeded. If the secondary standards are exceeded, a new source must nevertheless be permitted if specified increments are not exceeded or it is determined that, because of the particular circumstances of the individual case, no substantial detriments or molestations will be caused. In making this determination, various factors such as the preexisting use of the affected property, determinations in land-use plans, restrictions on use agreed by or imposed on the owner, soil pollution and reduction of emissions from existing sources must be considered. The long-term standard basically is an annual arithmetic mean; the short-term standard must be met by 95 % of the individual monitoring results taken over a longer period. According to the TA-Luft, the standards must be met only within a limited assessment zone whose area depends on stack height and does not extend beyond an area 12,5 by 12,5 kilometers around the source even if the area of actual dispersion is much larger; within this measuring zone, monitoring is required for any assessment area of one by one kilometer. However, there are some recent court decisions that have required compliance with the ambient air quality standards within the whole area of actual dispersion.[5)]

The ambient air quality standards are intended to make concrete and specific the duty imposed by Sec. 5 FECA not to cause environmental harm. In contrast to the US, the ambient quality standards do not have the force of law; they are administrative guidelines and in principle only binding upon the administration. However, the Federal Administrative Court[6)] has held that, since the standards were based on sound scientific evidence, they could be considered "anticipatory expert testimony" and were binding in the absence of new knowledge as to the harmful effects of the relevant pollutants. Thus, the standards have a "prima facie" effect. This decision was rendered under the TA-Luft 1974 that provided for uniform standards with virtually no possibilities for case-by-case determinations. It remains to be seen whether the structure of the TA-Luft 1983 will permit the courts to uphold this opinion. It is submitted that the widespread recourse to case-by-case determinations in the new TA-Luft will make it difficult to consider the standards as "anticipatory expert testimony"; probably, only the primary standards - confined to health effects - will continue to be considered "prima facie" binding.

The primary instrument to enforce the ambient air quality standards is the statutory permit requirement. Sec. 4 and 15 FECA provide that major new emitting facilities as well as significant modifications of existing major facilities require a permit. The permit is only granted if the operator complies with the duty not to cause environmental harm and, where ambient air quality standards are set forth, does not exceed these standards.

This concept of the FECA necessitates a case-by-case determination as to whether the ambient air quality standards are met, although the competent authority may, in clean areas, be satisfied with a rough estimation of the ambient impacts of the new source. In contrast to American law, there is no general requirement of setting forth implementation plans that determine requirements applicable to individual sources or categories of sources to meet the ambient quality standards. An equivalence to the American implementation plan only exists in heavily polluted areas, i.e. nonattainment areas and areas where the ambient quality standards may in the near future be exceeded (pre-nonattainment areas).

The permit requirement is applicable to facilities that by reason of their construction or operation are especially apt to cause harmful environmental effects. Regulations specify nearly 100 kinds of such facilities. [7)]

Apart from new construction, also significant modifications of major facilities are subject to the permit requirement. [8)] The notion of "significant modification" is very broad. If suffices that a modification (physical change or change of method of operation or capacity) [9)] is liable to have an impact on the permit prerequisites, that is, that the modification may cause harmful environmental effects and there is reason to conclude that a new ambient impact analysis is warranted; whether the modification actually causes such effects, will be determined in the permit procedure. [10)] The ambient impact analysis is in principle limited to the modified parts of the facility;

however, when there are impacts on the emissions of the unchanged parts of the facility, these impacts also have to be checked.[11] A reconstruction is not considered as a modification.

Existing facilities are not subject to the permit requirement. However, the duty arising under Sec. 5 not to cause environmental harm and to comply with ambient air quality standards in principle is also applicable to these facilities if the competent state authority requires so by "subsequent order". Sec. 17 FECA provides that the competent authorities may issue subsequent orders to fulfil the duties arising under the Act or regulations made under the Act, including compliance with the ambient air quality standards. Where the public or the neighborhood is not adequately protected from harmful environmental effects, that is, in particular, where the ambient quality standards are exceeded, the normal discretion the authorities enjoy in determining whether or not to issue such orders is reduced. Unless there are paramount countervailing interests, the authorities must issue a subsequent order.[12] However, two important conditions limit the availability of subsequent orders: the order must be achievable by applying technology that corresponds to the state of the art, and it must be economically feasible. Economic feasibility means feasibility for the individual source operator; however, subsequent orders may also be issued if the measure is economically feasible at least for the operator of an average (standard) facility of the same kind. The prevailing interpretation requires that the operator of the facility or an average facility must be able to make a reasonable profit after installing the required technology.[13] Since it is difficult to demonstrate economic feasibility for a fictitious average source, in practice the individual circumstances are controlling. The prerequisite of economic feasibility also limits the kind of control technology to be applied by existing sources. In principle, the measures applicable to new sources, especially compliance with the emission standards, shall be envisaged.[14)] However, this directive is subject to considerations of economic feasibility. Thus, less stringent control technology may have to be installed on a case-by-case basis. There are no existing source standards comparable to RACT (except in the framework of the new regulations on fuel burning facilities). This severely limits the scope of Sec. 17 and has resulted in quite different regimes for new and existing and among existing facilities.[15)]

According to a draft for an amendment of the Federal Emission Protection Act submitted by the Bundesrat to the Bundestag[15a)] the protection of existing facilities shall be diminished by substituting the requirement of proportionality for that of economic feasibility.

In general, the operator is free to choose the means by which he will meet ambient standards. The Act does not exclude any particular method. The Federal Administrative Court[16)] has held that stack gas cleaning, fuel substitution, modified production processes, high stacks and the modification or shutdown of existing plants all are acceptable, as long as the ambient standards are met. In particular, dispersion techniques are an acceptable means of meeting the standards; however, dispersion is not a primary method of pollution control as new sources must meet other, technology-based requirements independent of the ambient air quality standards which cannot be complied with by using dispersion techniques.

b) Emission Standards and State-of-the-Art

Apart from compliance with the basic duty to prevent environmental harm and to meet the ambient air quality standards, Sec. 5 No. 2 FECA provides that all major sources must take precautions against harmful environmental effects, in particular by use of emission limitation measures reflecting the state of the art. This so-called principle of precaution is the second important principle of German air pollution control. The interpretation of the principle is controversial; in particular, it is unclear whether the duty to use state-of-the-art technology is conditional on a determination that this is necessary as a precaution against concrete harmful environmental effects, e.g. in the case where future violations of the ambient standards are probable, or whether all emissions that are avoidable at reasonable cost must be avoided. The Federal and State governments as well as the lower courts have taken the latter position;[17)] the only limitation to the principle of precaution accepted in the practice is that the relation between the emission reduction achieved and the cost incurred must not be disproportionate.[18)]
The Federal Administrative Court, in a recent decision[18a)], has taken a position that is similar to that of the practice and the lower courts, but diverges from this position by requiring proportionality between the measures taken and the potential risk and by calling for a long-term concept designed for a uniform and equal implementation.
Sec. 3 (6) FECA defines state of the art as that "state of development of advanced processes, equipment, or methods of operation which ensures the practicability of an emission limitation measure". Practicability means that the technology must be already proven in operation, although routine operation is not necessary; moreover, there must be a reasonable relation between the emission reduction achieved and the cost incurred.[19)] It is clear that this definition leaves the administrators and the courts much latitude to determine what is practicable. Therefore, the

powers granted the Federal Government to issue regulations or guidelines that specify performance and specification standards[20] are of particular importance. Accordingly, the TA-Luft contains emission limitations for a long list of particulates (having hazardous components) and gaseous substances (almost 200 substances are covered). In particular, it contains emission standards and technical requirements for particular facilities or processes; for example, flue gas desulphurization is declared practicable for larger fuel-burning facilities.[21] The emission standards are expressed as concentration values (quantity per cubic meter of emitted air).

All in all, these provisions only reflect the "average" or "conventional" and by no means the advanced state of the art. Nevertheless, they are the most important means of air pollution control in W. Germany since in practice, ambient impacts of new sources are normally only considered where there is reason to conclude that a violation might occur.

As in the case of ambient air quality standards, the statutory permit requirement is the primary instrument to ensure compliance with the state of the art.[22]

The state-of-the-art requirement and emission standards can also be applied to existing major facilities by issuing "subsequent orders" under Sec. 17 FECA. Where the ambient air quality standards are exceeded, the competent authority normally must issue such orders; otherwise it has discretion. In both cases, the requirement of technical and economic feasibility limits the powers of the authority. In practice, adjustment of existing sources to the state of the art is rarely required in clean air areas.[23] However, the TA-Luft 1983 directs the authorities to issue, subject to economic feasibility, such orders at least where the emissions of existing facilities exceed certain emission standards or are 200 or 150 percent in excess of certain other emission standards.[24]

A new regulation, the Regulation on Major Fuel Burning Facilities[25], sets forth rather strict emission standards for SO_2 and some other pollutants emitted by such facilities. One of its main purpose is to force existing facilities to either close down or adjust, within a reasonable period of time, to the requirements for SO_2 applicable to new or modified existing sources (400 milligrams per cubic meter and 85 percent reduction of the sulphur content of the fuel; if technically not feasible: up to 650 milligrams per cubic meter; coal-burning facilities between 100 and 300 Megawatt: 1700 or 2000 milligrams per cubic meter and 60 percent reduction). Large existing facilities (above 300 Megawatt) that will further operate more than 30000 hours (500 hours roughly being equivalent to a year) must immediately comply with new source emission standards; large existing facilities that will further operate between 10000 and 30000 hours are subject to a special emission standard for SO_2 (2500 milligrams per cubic meter); large existing sources with a lower number of future operation hours need only comply with the conditions of the existing permit; smaller existing facilities (50 to 300 Megawatt) that operate more than 10000 hours must meet a special emission standard of 2500 milligrams per cubic meter. This scheme of phasing out existing fuel-burning facilities is designed to achieve a major reduction of total emissions of SO_2 that contribute to acid rain and the ensuing damage to the W.German forests. Moreover, the regulation provides for stricter emission standards for PSP, carbon monoxide, nitrogen oxide, and chloride and fluorine compounds.

The regulation raises some problems of statutory authority[26] since the powers granted in Sec. 7 of the Act arguably do not include a generalized concretisation of "economic feasibility" in the meaning of Sec. 17 and the substitution of general regulations for individual subsequent orders; on the other hand, since the statutory criteria for economic feasibility are generic ones, referring to the average operator of facilities of the same category, it may be said that the requirements contained in the proposed regulation are economically feasible for existing fuel-burning facilities having a useful life as set forth in the regulation.

c) <u>Hazardous Pollutant Standards</u>

The FECA does not expressly provide for the establishment of hazardous pollutant standards. However, in practice such standards have been established by using the powers under Sec. 48 of the Act for setting forth emission standards.

The TA-Luft differentiates emission standards according to risk categories. There are three risk categories. The most dangerous substances, such as asbestos, beryllium, cadmium, and lead, may not exceed 20 milligrams per cubic meter, while 50 or 75 milligrams per cubic meter are allowed for less dangerous substances.[27)]

The TA-Luft 1983 also introduced a regulation of cancerogenic pollutants. Emissions of such substances must be reduced as far as possible, taking regard to the principle of proportionality.[28)] Here, the reference to the state of the art is practically eliminated. Apart from that, the TA-Luft 1983 establishes emission standards for these substances which are differentiated according to three risk categories. These standards range from 0.1 mg to 5 mg per cubic meter. This differentiation of standards can be justified by recourse to the basic objectives of the Act to prevent harm to health and the concept of proportionality. Although Sec. 48 of the Act expressly only allows the determination of technology-based emission standards, it is believed that the prescribed or necessary control technology may be the more stringent the higher is the risk associated with a particular substance.[29)] The authority for differentiating emission standards according to risk categories, although somewhat doubtful, has never been seriously disputed.

2. Nonattainment areas

Contrary to American law, there is no entirely special regime for nonattainment areas. Sec. 5 and 6 FECA provide that a major new or modified facility may not be constructed if the ambient quality standards are already exceeded or will be exceeded after putting the new source into operation. To avoid the ensuing production ban, the TA-Luft 1974 provided that the operator of the new or modified source must use technology that reduces emissions beyond the emission standards, switch to fuels having a lower pollutant content, reduce the capacity of the facility or disperse the emissions by constructing a higher stack. Also, to a certain extent, a compensation of increased emissions from the new facility by reducing emissions from existing facilities was allowed. Finally, a temporary violation of the ambient quality standards was permitted if an air quality maintenance plan ensured future attainment of the standards.[30)] The 1983 Amendments of the TA-Luft no longer mention offsets for meeting the ambient quality standards. However, this is not intended to change the law since this offset concept has been confirmed by the Federal Administrative Court in the Voerde decision.[31)] There are new provisions somewhat expanding the possibilities for compensating emissions in nonattainment areas (see infra III I).

Moreover, Sec. 47 of the Act prescribes the establishment of air quality maintenance plans in heavily polluted areas. Such plans must be established by the Laender - with little federal supervision - in areas in which air pollution occurs or is to be expected that can cause harmful environmental effects in especial degree[32]. The primary objective of the air quality maintenance plan is to ensure attainment of the ambient air quality standards, although other pollutants for which no such standards have been set forth are included and some of the existing air quality maintenance plans actually contain provisions for such pollutants. The plan must contain a detailed description of the pollution situation, measures for the reduction of air pollution and precautionary measures. In practice, the official documents propose rather generic, vague measures for categories of sources; only the officials have individual lists of concrete measures for emission reduction applicable to individual polluters.

In contrast to American law, the air quality maintenance plans do not have the force of law. They are action plans binding on the authorities. The measures envisaged can be carried out only pursuant to powers contained in the Act elsewhere. In the case of existing facilities, this means that the plan must be enforced by recourse to the weak powers under Sec. 17 of the Act to issue subsequent orders.

3. Clean Areas

The FECA does not contain an express non-degradation policy. However, the basic objective of the Act as expressed in Sec. 1 to take precautions against the occurrence of harmful environmental effect would arguably allow the development of such a policy. Indeed, the TA-Luft 1974 as well as the Amendments of 1983 contain certain provisions that may be considered as something like a non-degradation policy.

With respect to SO_2, the TA-Luft 1974 provided that in areas where the ambient air quality was better than 0.06 milligrams per cubic meter (long-term standard) - the normal standard being 0.14 milligrams - this standard must be observed unless the Laender authorities granted an exception; this was only permitted if the exception did not frustrate the objectives of the Act.[33] The Amendments of 1983 set alternative standards of 0.05 or 0.06.[34] The draft of the new TA-Luft had linked the (retained) agency powers to grant an exception to the concept of a balanced development of the area. This means that industrialization of the area was permitted if it occurred pursuant to sound land-use and development planning. The Bundesrat rejected this clause without substantially changing the meaning of the regulation. The non-degradation standards are not absolutely mandatory; the TA-Luft 1983 merely directs the authorities to take care that these standards be attained. This allows the Laender to pursue the policies mentioned in the draft but accords them somewhat more latitude.

Furthermore, the use of increments for either permitting emissions in excess of (secondary) ambient quality standards or requiring a special case-by-case determination of ambient impact inspite of compliance with (secondary) ambient quality standards may be considered as to reflect a non-degradation policy.

II. General Comparison of Strategies, Instruments and Implementation of the Air Pollution Control Policy in West Germany and the United States

1. Strategies

The American and the W. German air pollution control policy is characterized by a -internationally rare - combination of ambient- and emissions-oriented strategies. Ambient air quality standards are designed to secure a pollutant concentration level in the air that is so that hazards to human health and - to a lesser degree - also to plants, animals and buildings are not to be expected; furthermore, in clean areas the deterioration of the existing air quality shall be avoided. The implementation of this ambient-oriented strategy is achieved by a system of emission limitations for major facilities. Apart from this, major facilities are subject to emission limitations set forth for reasons of precaution or at least having no direct link to the ambient quality standards. The ambient air quality and emission standards have an important impact on control and production technologies, while direct regulation of these technologies (such as specification and design standards) is rare. Ambient air quality standards also influence the localization of industry. Regulation of input materials exists only to a limited extent.

If one proceeds from this level of global comparison to a level of more concrete and detailed considerations, it becomes clear that the differences between the American and the German air pollution control policy are quite considerable. The following aspects must be emphasized:

- In the American air pollution control policy, attainment of ambient air quality standards is subject to (sometimes unrealistically) strict deadlines whose observance shall be secured by the SIP; the German air pollution control policy theoretically requires the ambient air quality standards to be met immediately, but in practice is more flexible.

- In the American air pollution control policy the prohibition of significant deterioration of existing air quality is an important element of the overall policy, in the German air pollution control policy the non-deterioration principle is confined to a single pollutant (SO_2) and to areas in which a particular non-deterioration standard is not already exceeded.

- In the United States, the enforcement of ambient air quality standards - in contrast to the prohibition of significant deterioration - is in principle achieved by generic emission limitations (emission standards), while in W. Germany individual emission limitations are used. In practice, the differences between the two systems have been blurred to some extent because in W. Germany, too, the emission standards, although designed as means of precaution, in part serve to attain and maintain the ambient air quality standards.

- In W. Germany the use of low-pollutant (e.g. low-sulphur) input materials and the mere dispersion of emissions are accepted methods of attaining the ambient air quality standards where a sufficient emission limitation at the source is not possible. In the United States this is permissible only to a much more limited extent. The American air pollution control policy thus is more oriented at influencing control and production policies. However, this does not mean that the American emission standards reflect a higher state of control technology; arguably, the reverse is true.

- In the American air pollution control policy, emission standards are highly differentiated. With respect to new and significantly modified existing sources there are precautionary standards (NSPSs) and emission standards for attaining the ambient air quality standards (LAER) as well as individual emission limitations for the implementation of the prohibition of significant deterioration (BACT); with respect to existing sources in nonattainment areas, there are special emission standards for attaining the ambient air quality standards (RACT). By contrast, in W. Germany, apart from the Regulation on Major Fuel-Burning Installations which uses a system of differentiated emission standards, there are uniform emission standards applicable to new and existing sources, whose enforcement against existing sources, however, depends on economic feasibility.

- The structure of emission standards is different in that the United States limit the freight (volume) of pollutants per unit of input or production, whereas in W. Germany emission standards fix the permissible concentration level of pollutants per volume unit of emitted air.

2. Instruments

In the American as well as W. German air pollution control policy the permit requirement for new and significantly modified existing facilities is an essential instrument for implementing the ambient air quality and emission standards; in the case of existing sources, statutory adjustment obligations or agency powers of intervention fulfill equivalent functions. However, at the level of instruments there are also considerable differences between the American and W. German air pollution control policy:

- Scope of application and legal effects of implementation plans are quite different. In the United States the SIP is the primary instrument for implementing the strategies of air pollution control; in W. Germany, the air quality maintenance plan is limited to formally declared nonattainment areas and is no more than an internal action plan that does not bind the polluters. Therefore, the American system presents itself as a coordinated, controlled system of implementing the strategies of air pollution control, while in W. Germany implementation of air pollution control policy is carried out in a less coordinated and controlled fashion.

- The different structure of ambient air quality standards in the United States and W. Germany and the lack of uniformity in monitoring methods in the United States has the result that monitoring data in the United States may be more accurate temporarily, but certainly less accurate geographically and often are hardly comparable with one another. On the other hand, the W. German monitoring procedures do not necessarily cover the whole area of dispersion around a particular source.

3. Implementation and Enforcement

In both countries, the federal structure of the political-administrative system leads to a division of roles between federal and state (or Laender) agencies which attributes the latter essential competences and thereby impedes or even excludes a centralized steering and control of the implementation and enforcement of air pollution control policy. In both countries bargaining strategies not provided by the law - in lieu of imposition of sanctions - play an important role in the implementation and enforcement process. In both countries, there seem to be not negligible implementation and enforcement gaps. Nonetheless, there are a number of characteristic differences in implementation and enforcement:

- The degree of decentralization of the implementation and enforcement of W. German air pollution control policy is much greater than that of the United States. Apart from informal steering methods such as the permanent Conference of Environmental Ministers and the participation of the Federal Executive in the Laender Committee on Air Pollution and Noise Control, in W. Germany the steering devices of the Federal Executive in practice are confined to making regulations and administrative guidelines. In the United States, EPA has a key role because it must approve the SIPs and participates in permit proceedings in PSD areas. To a limited extent, EPA also exercises influence on implementation and enforcement "on the ground". However, it must be noted that under the Reagan administration there is a tendency to delegate regulatory powers for the control of air pollution to the states. The admission of "generic rules" in the framework of the emissions trading policy also leads to a weakening of EPA's role in implementation and enforcement.

- The tendency of agencies not to use the sanctions provided in the relevant statutes but rather reach an agreement on required emission reductions by bargaining probably is stronger in W. Germany than in the United States.

- EPA is more politicized than the W. German environmental administration. Therefore, new environmental policy concepts such as the emissions trading policy will be carried through with more vigor in the United States than this could be expected in W. Germany.

III. Parallels to the American Emissions Trading Concept under the Federal Emissions Control Act[34a]

The FECA does not contain any language from which one could derive that the legislature contemplated something like the American Emissions Trading Policy in the context of air pollution control in W. Germany. However, certain elements of control concepts that are similar to the American offset and netting policy are practiced in W. Germany. Contrary to what is assumed by some authors, this is not just an expression of "informal administrative behaviour"; rather, these concepts are a part of the official air pollution control strategy as laid down in the TA-Luft of 1964 and 1974 and the Amendments of 1983. In the practice also certain bubble transactions have been effectuated without any formal authority.

1. Offsets

a) Offsets for Attaining Ambient Air Quality Standards

It is well established that under the FECA offsets to meet ambient air quality standards ("attainment offsets") are permitted. The TA-Luft 1974 contained an express provision allowing such offsets.[35] Where nonattainment of the ambient quality standards was to be expected, the operator of a major new facility or modified existing major facility could meet the ambient quality standards, among others, by reducing the emissions from other, existing facilities operated by him. If a contemporaneous offset was not possible, the operator could be granted a delay of 6 months for reducing the emissions. The offset clause was limited to sources operated by the same person. However, since the *Voerde* decision[36] of the Federal Administrative Court, this limitation does not seem to be valid law. In *Voerde*, the applicant for a permit for a new facility proposed to reduce emissions from another facility owned by an affiliate. The court did not object to this.

The requirements for this attainment offset are very liberal. The Federal Administrative Court has held that the offset concept is a part of the ambient air quality prognosis which has to be made when considering an application for a permit. Since the future, increased emissions from the new facility must be considered, it is consequential that also future emission decreases from other sources must be included in the prognosis. It is not necessary that the existing source whose emissions are reduced already applies control technology reflecting the state of the art. Only the factual situation counts, i.e. the reductions must be sufficient to meet the ambient quality standards (However, the court did not decide how to treat existing facilities that had not complied with enforceable subsequent orders requiring them to meet certain emission standards). Moreover, a reduction of emissions from the existing source is not absolutely necessary. The court also declared an improvement of the dispersion of unchanged emissions from the existing facility to be sufficient as long as the new facility complied with the state of the art of control technology and the ambient air quality standards were attained.[37)]

To sum up, an offset to attain the ambient air quality standards is permitted by reducing emissions from existing sources operated by the applicant or third parties or by improving the dispersion of these emissions.

The Amendments of 1983 have not retained the provisions on attainment offset. However, in view of the Voerde decision, this is not meant to change the law. It was believed that that decision provided the necessary clarification and an express reference in the TA-Luft was no longer needed.

In actual practice, the attainment offset has been used relatively frequently.[38)] It must be noted, however, that there are relatively few areas in W. Germany where the ambient air quality standards are exceeded or about to be exceeded and the offset clause could have been applied.

b) Offsets in Nonattainment Areas

With respect to "nonattainment" offsets, the W. German law of air pollution control is rather cautious. The TA-Luft of 1974 contained provisions allowing offsets inspite of nonattainment of ambient air quality standards only under narrowly defined circumstances: Certain netting transactions (replacement of an existing source) were permitted in nonattainment areas; furthermore, another provision of the TA-Luft allowed permits for new facilities where an air quality maintenance plan ensured future compliance with the ambient air quality standards.

In the process of amending the TA-Luft, various proposals had been made by the Government to expand the possibilities for offsets in nonattainment areas. The offset provisions that ultimately became part of the 1983 Amendments are less far-reaching than many of the proposals. That a certain expansion of the offset provisions was at all considered, may be explained by the fact that the 1983 Amendments, by changing the measurement methods, considerably stiffen the ambient air quality standards and therefore somewhat expanded possibilities for offsetting increased emissions from new sources are necessary in order to avoid widespread construction bans.

The new TA-Luft provides[39)] that where the ambient air quality with respect to any pollutant exceeds the long- or short-term standards (primary standards) in any assessment area[40)], the new facility must nevertheless be permitted where it meets several conditions:

-- the additional long-term increment of concentration levels with respect to the relevant pollutant in any assessment area is not higher than 1 percent of the standard;

-- a condition attached to the permit ensures that, normally within 6 months after putting the new source into operation, clean-up measures, such as shut-down, dismantling or modification of or in existing facilities of the operator or third parties will be carried out that are liable to improve the ambient air quality in the annual mean in any assessment area inspite of the increased emissions;

-- emission reductions in existing facilities pursuant to orders addressed to the existing source before the application are not eligible;

-- an improvement of ambient air quality by improving the dispersion of emissions from existing facilities (high stacks etc.) can be used for meeting the offset requirements only if the existing facility has taken all measures for the reduction of emissions by applying the state of the art (even beyond the "conventional" state of the art reflected in emission standards).

The offset provision is very narrow. It only applies where the contribution of the new source to ambient concentration levels is minimal and the increased emissions are more than offset by emission decreases in any one-by-one-kilometer assessment area. However, the rigour of the offset provision is mitigated by an exception introduced on an experimental basis which permits offsets also in cases where the additional long-term increment of concentration levels exceeds 1 percent of the standard and the improvement of the existing air quality does not occur in all assessment areas. In order to find out to what extent in these cases clean-up measures can be carried out to a larger extent and thereby the ambient air quality be additionally improved, offsets are generally permitted in nonattainment areas where stack height is limited by other provisions if the ambient air quality is immediately improved in the annual mean and the emissions are limited as far as possible, taking regard to the principle of proportionality.[41] This provision is a compromise between the mandate of the Act to improve the air quality in nonattainment areas and the requirements of an active investment and industrial location policy. It was thought that the 1-percent rule might cause operators of existing facilities to continue operations only because clean-up measures were not possible. It is especially intended to apply to West Berlin where the stack height is limited for the protection of air traffic.

The TA-Luft does not expressly provide that the operator of the new facility must first exhaust all possibilities for meeting the ambient quality standards himself by using state-of-the-art control technology or switching to fuels that have a lower pollutant content. However, in view of the objective of the Act to achieve the ambient air quality standards as soon as possible, this duty would seem to be implied in the offset concept.

Where the new TA-Luft prescribes a case-by-case determination of the ambient impact of a new facility, the offset concept is built into this determination. One factor that is to be considered here are clean-up measures carried out, in connection with the proposal, in existing facilities of the operator or third parties.[42]

The offset concept also is applicable to the modification of existing major facilities.[43]

Besides the offset concept, the TA-Luft also provides for a parallel to the American <u>growth allowance</u>. In areas where the ambient quality standards are exceeded, a new facility must be permitted if the increment of air pollution in any reference area with respect to any pollutant covered by an ambient standard is not higher than 1 percent of the long-term standard and measures provided in an air quality maintenance plan ensure an improvement of air quality in the annual mean within 3 years.[44] This provision does not require an improvement of air quality in all reference areas. It permits a concentration of measures for emission reduction in assessment areas that are most heavily polluted. On the other hand, it generally allows the creation of a growth allowance within 3 years.

It is not beyond any doubt that the nonattainment offset is consistent with the FECA. A dictum by the Federal Administrative Court in a decision concerning the modification of an existing facility[45] could be interpreted in the sense that such offset is not permitted. However, in the case decided by the court the new emissions and the reduced emissions from the existing facility (odors) were qualitatively different. A lower court decision is very restrictive while some commentators take the view that nonattainment offsets are generally permitted by the Act.[46] Although Sec. 5 and 6 of the Act seem to prohibit any new construction in nonattainment areas, it is thought that a restrictive interpretation of these provisions is apposite in view of the overriding purpose of Sec. 1 of the Act. The Act cannot have envisaged the immediate ban on all new construction in nonattainment areas. Since the offset concept ensures an improvement of the existing air quality, it would be formalistic to prevent such improvement by reliance on Sec. 5 and 6 FECA. The difficulty with this reasoning is that 8 years after the enactment of the FECA there should have been sufficient time to attain the ambient air quality standards throughout the country. This may explain the reluctance of the Government to considerably expand the offset policy. The 1 percent compensation clause is officially justified by the argument that a deterioration of existing ambient air quality by less than 1 percent can hardly be monitored and, therefore, cannot be attributed to the new facility concerned. However, this justification is open to doubt. In any case, it should be noted that the statutory limits of the offset concept are not clear. Some expansion beyond its present limits arguably is consistent with the Act, especially in respect of mere welfare impacts (molestations and ecological harm).

2. Netting

The TA-Luft 1974 permitted netting, i.e. compensation of emission increases from a plant modification by reductions from an existing source within the same plant, only to a very limited extent and not with the far-reaching procedural consequences of the American netting concept. The German netting concept is more of an extension of the offset policy. In nonattainment areas, a new facility had to be permitted where it replaced an existing facility of the same kind and total emissions as well as ambient concentrations were "substantially reduced". If necessary, a deadline of normally 6 months could be granted to the operator to reduce emissions from the existing facility. This provision also applies to a substantial modification of an existing facility.[47)] This provision was sometimes used in practice, even beyond its wording; in particular, the requirement of "same pollutant" which underlies the provision was sometimes ignored and reconstructions were permitted that exceeded the ambient quality standards with respect to a particular, less dangerous or important pollutant but, by replacing an existing source, caused a substantial reduction of a more dangerous or important pollutant[48)].

The 1983 Amendments have modified the compensation rule insofar as not reconstructed sources but rather only significant modifications of existing sources are privileged. A permit for a significant modification of an existing facility may not be refused where the ambient quality standards are already exceeded in individual assessment areas, but the modification exclusively or predominantly serves to improve the existing air quality.[49)] The formulation "serves" does not mean that the modification must be intended to improve the ambient air quality; it is sufficient that it merely has such an effect. However, it is unclear what is meant by requiring at least a "predominant" improvement of the existing ambient quality. The TA-Luft intended to give the competent authorities the power also to permit a modified facility that contributed, with respect to a particular assessment area, to an ambient violation where it "predominantly", i.e. with respect to other assessment areas, improved the quality of the air. It is more doubtful whether also a compensation of different pollutants, for example a reduction of emissions of hazardous pollutants accompanied by an increase of emissions of less hazardous pollutants, is permissible.

Whether the netting provision of the 1983 Amendments conforms with the FECA, is doubtful. The Federal Administrative Court[50)] has held that in the case of significant modifications the previous air quality is irrelevant, i.e. an improvement cannot be used for compensation, where there is a qualitative change of the air quality due to the emissions from the modification. This holding at its face's value only confirms the rule also existing in W.Germany that any compensation normally requires that the same pollutant be involved. However, in a dictum, the court also said that in determining whether the facility caused substantial molestations in the meaning of Sec. 5 FECA, the new emissions were (merely) the "starting point" for the ambient impact analysis; the previous emissions could be considered in determining whether there was an overall substantial molestation. While this dictum allows for some flexibility with regard to pollutants for which no ambient air quality standard has been set forth, it seems clear that if the reduced emissions of a modified facility still exceed the standards, this is not consistent with Sec. 5 of the Act. The possibilities of qualifying this result by resort to the constitutional protection of existing facilities are relatively narrow. Under the caselaw of the administrative courts, the constitutional protection of existing sources does not justify causing dangers to health but, rather, is limited to substantial detriments and substantial molestation; furthermore, the protection of existing facilities requires that a significant modification is accompanied by no or at most a minimal expansion. Moreover it is doubtful whether a protection of existing facilities extends to reconstruction. Also, Sec. 17 subparagraph 3 FECA does not justify the netting clause. This provision provides that the requirements for existing facilities have priority where a subsequent order addressed to an existing facility leads to a significant modification. However, this provision only concerns parts of an existing facility which must be modified because of a subsequent order; it does not concern parts of an existing facility that have been modified voluntarily. At best, the rationale underlying Sec. 17 subparagraph 3 FECA could be applied where the competent agency could have addressed a subsequent order under Sec. 17 FECA to the entire existing facility, this order would have necessitated a significant modification of the facility and the emission reduction associated with this order would have been equal to the emission reduction that is achieved, in the framework of the netting clause, by a voluntary modification of the facility. In other cases support for the netting provision, therefore, can only be based on the reasoning that in view of the paramount general purpose of the Act an improvement of the ambient air quality achieved by a modification still is preferable to the previous situation. However, one commentator has asked whether in determining whether an improvement has occurred those emission reductions at the existing facility which could have been achieved by issuing a subsequent order to that facility should not be deducted.[51)] The Federal Administrative Court rejected this approach with respect to attainment offsets.[52)] In the case of nonattainment, the concept would seem to be much more plausible. It is conceivable to apply the compensation clause for new facilities (No. 2.2.1.1 b subparagraph 2 TA-Luft) by analogy; however, this would only have the result that emission reductions caused by subsequent orders already addressed to the facility cannot be credited.

Finally, the possibilities under W. German law to use the netting concept to <u>avoid</u> the whole permit procedure for modified facilities are slight. First of all, the notion of "facility" is narrow so that many changes that theoretically could be regarded as a modification are a new construction and hence subject to the permit procedure irrespective of whether or not they are "significant". Sec. 3 (5) FECA defines facilities as workplaces and other stationary installations. It is recognized that this definition only broadly describes what can be a facility and leaves the government some latitude to determine the notion of facility in regulations made under Sec. 4 of the Act.[53] However, the regulation concerning facilities requiring a permit of 1974 are not much help, either. Sometimes, they refer to the whole plant; more often, they simply repeat the statutory notion of facility without clarifying whether the whole plant or each piece of equipment is meant. The issue is further complicated by the generally held view that certain extensions of the term "facility" are covered by the Act. Thus, ancillary facilities may form a part of the principal facility and are subject to the permit requirement even if, when regarded alone, they would not.[54] "Common facilities" are considered to be a single facility.[55]

The courts have long taken the position that the notion of "facility" is narrow. In the leading case, the Tunnelofen case,[56] the Federal Administrative Court held that a new kiln of a brick factory that replaced an existing kiln was not a modification of an existing facility - the brick plant - but rather a new construction. In another case,[57] different production lines in a factory were held to constitute different facilities. This case law has been criticized as extremely narrow[58] but, nevertheless, must be considered valid law.

A judicial pronouncement on the concept of "common facility" is still missing. A common facility is defined as several facilities that use a common stack (or common control equipment, such as a desulphurization installation), or serve a common purpose and are established in close vicinity.[59] To the extent that this concept is reflected in the Regulation concerning Permit-Requiring Facilities or in the Regulation concerning Major Fuel-Burning Facilities, it is encompassed by the discretion granted the government to define the notion of facility. The same is true of supplementary Laender regulations or administrative guidelines that define the notion, such as the Refinery Directive of Northrhine-Westfalia.[60] Common facilities are subject to a single emission limitation that considers the total emissions from all equipment within the plant.[61] This allows for some flexibility in case of modifications within the plant. However, a reconstruction of one of its components, or addition of a new unit would arguably not be a mere modification. The Regulation on Major Fuel-Burning Facilities provides that where a single facility is enlarged by adding a new facility in such a way that the two facilities form a common facility, the new facility is subject to new source requirements for facilities having the total capacity of the common facility; the existing facility remains to be subject to the previous requirements.[62]

Second, the broad notion of "significant" modification normally excludes the netting concept as a means to avoid the permit procedure. Since a modification already is subject to the permit procedure where it is simply liable to cause harmful environmental effects, the demonstration that there is no net increase of emissions normally would not exempt the facility from new source review; this question will be considered in the permit procedure only.

3. <u>Bubbles</u>

Until very recently, the bubble concept has never officially been accepted in W. German air pollution control policy, although empirical studies show that bubbles between existing sources and, more frequently, between new and modified sources and existing sources have been effected in practice.[63]

However, the TA-Luft 1983 contains a provision that, although primarily designed for the legal protection of new sources that have been permitted under the compensation clause, could be interpreted to allow bubbles for existing sources.[64] It provides that subsequent orders may not be addressed to existing sources to remedy a violation of ambient air quality standards where a permit for a new source could not be refused on this ground under No. 2.2.1.-2.2.3. TA-Luft. This reference to the provisions concerning new facilities arguably also comprises the offset and netting provisions of the TA-Luft. However, it is not easy to conceive what this reference actually means. One could argue that an existing facility required to meet ambient-oriented emission limitations can comply with these limitations also by reducing emissions from another facility to an extent that there is an improvement of the ambient quality beyond what could be achieved by the subsequent order alone, provided the contribution of the facility to the ambient violation is not more than 1 percent of the ambient standard. As in the case of new facilities, emission reductions at the other facility that had already been ordered before issuing the subsequent order could not be used for such a bubble transaction.

The new Regulation on Major Fuel-Burning Facilities allows some forms of bubbles to meet the emission limitations for SO_2 laid down in the regulation. The regulation affords operators of major facilities, mostly power plants, an option to phase out such plants or to comply with new source or specific existing source requirements. Facilities with a remaining useful life of up to 10,000 operational hours need to comply only with the present permit conditions. For large facilities having a useful life of 10,000 up to 30,000 hours, specific existing source emission limitations are set forth; such facilities with a useful life or more than 30,000 hours must comply with new source requirements. For smaller facilities having a useful life above 10,000 hours, a specific, less stringent emission standard is set.

Where several existing facilities are part of a common facility, the operator can specify the remaining useful life of each facility. Only facilities that are within the same useful-life class are considered for the purpose of applying the relevant emission standards. However, by reducing the remaining useful life of one facility, the operator cannot bring the common facility within the threshold for smaller facilities and avoid the emission standards for larger facilities or even avoid the application of the regulation entirely; in determining total capacity, the common facility as a whole is the reference unit.

Further possibilities for bubbles are not provided in the regulation. Theoretically, one could also conceive that a plant operator having two separate facilities of the same category, say less than 10,000 hours useful life, could immediately shut down one facility and be given credit by allowing him to operate the other facility for further 20,000 hours with the emission limitations contained in the existing permit (remaining useful life bubble). Also, it is conceivable that a credit be given to the operator for immediate shutdown of a facility of the first useful-life category - useful life less than 10,000 hours - which can be used in the operation of a facility of the second or third category.

However, the regulation is designed to compel operators of facilities with a high further useful life to immediately comply with new source or a special existing source emission limitation, as the case may be. The reason for this concept is that facilities having a longer useful life are able to amortize the control equipment that has to be installed to meet the new requirements. The operator already is given the choice to determine himself the useful life of the facility. A further option to meet the relevant requirements by using the bubble concept was not envisaged by the government since the regulation is oriented at facilities rather than plants.

The only theoretical possibility would be resort to Sec.33 of the regulation that accords the competent authorities the power to grant exceptions. An exception is possible where, in regard of the circumstances of the particular case, it is proven that requirements of the regulation cannot or can be complied with only at disproportionate cost. While this prerequisite could arguably be considered to be met in an appropriate case where a bubble transaction is sought, the further prerequisite of Sec. 33, namely that the state of the art for limiting the emissions must be applied, shows that this provision contemplates single facilities and does not take into account a combination of facilities effectuating a bubble transaction.

Finally, it must be asked to what extent the FECA itself allows the use of the bubble concept. This question is relevant for determining the consistency of the new TA-Luft and the Regulation on Major Fuel-Burning Facilities with the Act and, more generally, for deciding whether subsequent orders may incorporate the bubble concept and whether new source bubbles are possible beyond the narrow limitations laid down in the TA-Luft and the regulation.

The prerequisite of "economic feasibility" raises some problems with respect to introducing the bubble concept in German air pollution control law. As stated, the test for economic feasibility is a dual one. Measures that are feasible for the individual facility can be imposed by the competent authority. Only if a particular measure is not feasible for the individual facility, the question arises whether it is feasible for an average member of the same category of facilities. Economic feasibility means, according to the prevailing, although not undisputed, opinion, that the operator must be able to make an appropriate profit after installing the required control technology. The reference unit is the plant, if the facility is equivalent to a plant, or else the economic unit for which cost and earnings calculations can be made.[66] It follows from that that the competent authorities can impose on each facility of a group of facilities for which a bubble transaction is sought those measures that are economically feasible for each individual facility. Since according to the TA-Luft subsequent orders shall endeavor to impose on existing sources control technology that reflects the state of the art, there may be little room for more stringent emission limitations at one of two existing sources to compensate for lower requirements at the other facility. However, actual practice shows that often subsequent orders or agreements made with existing facilities for adjustment to the state of the art do not reflect the most recent state of the art. Also, plant closures and production curtailments may have to be considered. Assuming that there is a certain potential for bubble transactions among existing sources, the question remains whether the reference unit for determining economic feasibility can be shifted from the facility to a group of facilities; only if this were the case, a facility that assumed more stringent controls beyond average economic feasibility in exchange for less than economically feasible controls at another facility, could be sure that this transaction would have to be permitted in any case.. It is safe to say that the Act mandates that the reference unit for determining economic feasibility be the facility rather than a group of facilities chosen by the operator. The agency could argue that the assumption of more stringent controls by one of the two facilities shows that these controls are economically feasible and could by force of law be imposed on this facility. This argument is cogent only insofar as the relevant facility can bear the additional costs incurred only because these costs are incurred in exchange for lower costs at the other facility. This will not always be the case.

Similar considerations obtain if, as a recent proposal by the Bundesrat provides, the prerequisite of proportionality should be substituted for that of economic feasibility.

Inspite of this, it would seem that Sec. 17 of the Act is not entirely inimical to bubbles. This provision in principle grants the competent authorities discretion for issuing subsequent orders. Even if it is determined that the general public or the neighborhood are not sufficiently protected from environmental harm, in particular if the ambient quality standards are exceeded, the authority can, under particular circumstances, abstain from issuing a subsequent order or impose measures that are less stringent than those applicable to new facilities. Where existing facilities only do not comply with emission standards, the margin of discretion of the competent agency is much broader, although the Amendment of the TA-Luft (No. 2.4.2) in principle obliges the agency to address subsequent orders to operators who exceed certain emission standards by a certain percentage. A German emissions trading policy for existing facilities could focus on this latter area. Generally speaking, bubble transactions that reflect the principle of ambient equivalence, in principle are within the discretion granted the competent authorities under Sec. 17 of the Act. This is at least true of transactions whose net ambient impact, geographically and temporally, is equivalent to that of emission limitations applicable, i.e. economically feasible, for each individual facility. The air quality objectives of the Act are safeguarded as if each facility would be subject to requirements individually feasible. Moreover, the competent agency has a wider margin of discretion where only emission standards or generally the state of technology is not complied with; in this area, a gradual adjustment of existing facilities by using the bubble concept normally is permissible.

4. New Source Performance Bubbles

As stated supra D, the American law, as a matter of principle, does not allow the use of emission reduction credits for complying with technology-oriented requirements for new facilities. To this extent, the precautionary principle is enforced "absolutely".

The German draft regulation on major fuel-burning facilities went one step further; it also provided for a new source performance standards bubble. Major coal-burning facilities having a capacity between 200 and 400 Megawatt that couple electric power and heat production only needed to comply with an emission standard of 2000 milligrams per cubic meter for SO_2 and SO_3 (and not the 60 percent reduction rate) if 50 percent or more of their heat production were used, within 5 years after the beginning of operation, in lieu of household heating installations or other heating installations having small stacks.[65] This provision was designed to encourage measures of energy saving; the mitigation of the new source emission limits was thought to be appropriate because the replacement of smaller heating installations by the relevant facilities would have a positive net ambient impact. However, this proposal was not retained in the final regulation because it was considered to be inconsistent with Sec. 5 No. 2 FECA and there was no assurance for the ambient equivalence of the transaction.

The question whether and to what extent the operator of a new source can escape the application of state-of-the-art technology where he effects a reduction of emissions from other sources, largely depends on the interpretation of the principle of precaution (see supra I 1 b). In nonattainment areas this is not possible. In attainment areas a new source bubble could be allowable if, contrary to the interpretation of the principle of precaution by the administration and the lower courts, state-of-the-art control technology could be required only to the extent that its application contributes, in an ascertainable manner, to an improvement of the ambient air quality in the measurement area around the facility. In such a case increased emissions from a new source that is subject to emission limitations that do not reflect the state of the art could be compensated by equivalent emission reductions from existing sources. However, if the principle of precaution means that emissions must be as low as possible, there arguably is no or only little room for new source performance bubbles because the acceptance of bubble transactions would interfere with the technology-forcing purposes of the principle.

The Federal Administrative Court[67)] has held that the principle of precaution requires a preventive protection against air pollution beyond a concrete calculation of ambient impact. This protection must be proportional to the risk potential of the pollution to be prevented and is to keep risks that are presented by lack of knowledge on the health and environmental hazards associated with particular pollutants and by lacking possibilities of attributing ambient impacts to particular polluters (long-distance transport of air pollution) as low as feasible according to the existing control technology. The Federal Administrative Court has declared the rejection of a "heat production emission reduction credit" in the Regulation of Major Fuel-Burning Facilities to be consistent with the Act because a general reduction of emissions by coupling production of electric power and heat could not be proven and, moreover, the long-distance transport of emissions could be taken into account by the Regulation. It is only a small step to consider the granting of such a credit as even in violation of the principle of precaution. Generally speaking, on the basis of the construction of the principle of precaution advanced by the Federal Administrative Court, bubbles for complying with new source requirements that reflect the principle of precaution seem to be only permissible where the risk potential of the pollutants concerned is low and the transaction contributes to an improvement of air quality.[67a)]

IV. Necessary Changes of the FECA for Introduction of A "Pure" American Modell of Emissions Trading

As stated, the structure of the FECA in principle allows the introduction of an emissions trading policy and existing regulations and administrative guidelines contain some elements of such a policy. However, a "pure" model of an American emissions trading policy, comprising the offset, metting and bubble programs, could not be introduced without considerable changes of the FECA. The following section briefly describes the changes of the Act that would be necessary if such a transfer of the American model were intended as a matter of policy, without discussing, at this point, the political desireability of such transfer itself.

1. Offsets

The W. German law todate offers few possiblities for nonattainment offsets. With respect to health effects of air pollution, this position is mandated by the purpose and the central provisions of the FECA. With respect to welfare impacts of air pollution, such as molestations and ecological and materials damage, an enlarged offset could arguably be based on case law that interpretes the notion of "substantiality" of a molestation or detriment (Sec. 3 I, 5 No. 1 FECA) differently according to the preexisting character of the impacted area[68)]. However, the limits of this concept are not clear. An amendment of the Act would be needed in order to base nonattainment offsets on a firm statutory base. Since enlarged possiblities for offsetting emissions are an exception to the principle laid down in Sec. 5 No. 1, 6 No. 1 FECA that a permit requires assurance that no dangers, molestations or detriments will be caused, it seems appropriate to amend Sec. 6 FECA by adding a new subparagraph. A direct reference to ambient air quality standards as was contained in the Government draft of 1979[69)] that proposed to introduce a "clean-up clause" into the Act is not advisable because it would require an express reference to such standards in Sec. 5 FECA itself. In order to make sure that the nonattainment status of the relevant area will not be perpetuated by application of the compensation clause, one might, furthermore, consider to link the compensation clause with the air quality maintenance plan and its implementation or with other measures for adjusting existing facilities to the statutory requirements and their implementation, and to set a deadline for attainment of ambient air quality standards.

The following wording of Sec. 6 FECA could be envisaged:

(1) [former § 6]

(2) In areas in which it is not ensured that adverse environmental effects and other dangers, substantial detriments and substantial molestations to the public at large and the neighborhood cannot be caused, a permit may be granted if

1. clean-up measures taken by existing facilities substantially improve the ambient air quality with respect to any pollutant in spite of the increased emissions and

2. measures that are provided with respect to other existing facilities in an air quality maintenance plan (§ 47) or under §§ 17, 21 and probably are enforceable ensure that adverse environmental effects and other dangers, substantial detriments and substantial molestations to the public at large and the neighbourhood will not be caused after the end of a period of no more than 3 years.

2. Netting

The introduction of the American netting concept in its pure form, i.e. in the sense that the operator can avoid substantive and procedural new source review requirements, is not possible under the Act. Sec. 15 II FECA only provides that in a netting situation - a significant modification will probably not cause additional or other emissions - the competent authority can decide on the permit application in an informal procedure. The substantive new source review requirements are not affected. A transfer of a pure American netting model, therefore, would require a complete alteration of the structure of Sec. 15 FECA in such a way that, apart from emission standards under Sec. 5 No. 2, 48 FECA which cannot be complied with by using the bubble concept, the requirements of the previous permit remain valid where additional emissions from the modified facility are compensated by emission reductions achieved within the plant. Technically, this result can be achieved by a "dual" definition of significant modification or more simply by modifying the legal consequences attached to a significant modification.

The following wording of Sec. 15 could be envisaged:

§ 15 Significant modification of permit-requiring facilities

(1) [former subparagraph (1)]

(2) The competent authority may only desist from making the application and the accompanying documents available to the public and publishing the proposal if it is not to be expected that additional or other emissions or in any other way dangers, detriments or molestations of the public at large and the neighbourhood can be caused by the modification. Sentence 1 also applies if additional emissions are offset by decreases of emissions

from other facilities within the same working place.

(3) If the prerequisites of subparagraph (2) 2nd sentence are met,notwithstanding § 5 No. 2 the requirements of the existing permit remain applicable.

It must be noted that, if the netting concept were confined to attainment areas, the envisaged amendment of Sec. 15 III FECA would not be appropriate. Since a significantly modified facility must comply with the ambient air quality standards, in this case only the procedural relief provided in the proposed Sec. 15 II FECA can be retained.

The following wording of Sec. 15 could be envisaged.

.....

(2) The competent authority may only desist from making the application and the accompanying documents available to the public and publishing the proposal if it is not to be expected that additional or other emissions or in any other way dangers, detriments or molestations of the public at large and the neighborhood can be caused by the modification. Sentence 1 also applies if additional emissions are offset by decreases of emissions from other facilities within the same working place.

An alternative to the proposed changes is the simple modification of the notion of facility. For this a statutory amendment would not be necessary because Sec. 3 V, IV I FECA grant the government a certain margin of discretion for defining the notion of facility. Therefore it would be sufficient to modify the notion of facility in the framework of the pending amendment of the regulation on facilities requiring a permit. A broader notion of facility has the result that a modification of a plant will more often than previously be considered as a significant modification of the facility rather than a new facility. Procedurally, this has the result that where the emissions from the modified part of the facility are increased but are compensated by emission reductions from existing parts of the facility, the permit can be granted in the non-public procedure under Sec. 15 II FECA. Under substantive law, a broader notion of facility does not have the result that ambient or technology-oriented requirements would not be applicable for the modified parts of the facility. However, compliance with ambient air quality standards can be achieved by compensation. Moreover, in nonattainment areas the "clean-up clause" has a broader scope of application so that existing parts of the facility can be used to a larger extent for compensation and adjusting the whole facility to new source requirements; in the case of new facilities a compensation would more frequently be frustrated by the 1 percent limitation contained in the relevant compensation clause of the TA-Luft.

A modification of the notion of facility would also be possible in conjunction with the envisaged change of Sec. 15 FECA. This would result in an extended applicability of the relief proposed there for insignificant modifications.

3. Bubbles

Bubbles for existing sources in principle are permissible under Sec. 17 FECA. An amendment of the Act, therefore, is not necessary. However, it is doubtful to what extent a bubble program could be specified by regulation. Also, the lack of express powers to set specific existing source performance standards that contain generic "economic feasibility" requirements may be an obstacle to introducing

a bubble program. The lack of such standards and the grossly unequal treatment of existing sources in practice makes the establishment of a baseline very difficult. Therefore, Sec. 7 FECA could be amended so as to expressly allow the introduction of a bubble program and the setting of existing source performance standards.
The following wording of Sec. 7 FECA could be envisaged:

§ 7 Requirements for the establishment, the condition and the operation of facilities requiring a permit

(1) /unchanged/

(2) The Federal Government, after hearing of interested persons and groups (§ 51) and with the consent of the Bundesrat, is empowered to prescribe by a regulation that, after a permit has been granted, operators, in order to comply with the obligations arising under § 5, must comply with certain requirements in the meaning of subparagraph 1 that are

1. economically feasible for facilities of the same kind /proportionate/, and
2. achievable with control technology that corresponds to the state of the art.

It may also be prescribed that operators that do not reduce their emissions so as to meet the requirements under § 17 or under this subparagraph can offset these emissions by equivalent reductions of emissions from other facilities that go beyond the requirements under § 17 or this subparagraph.

Furthermore, Sec. 17 II FECA would have to be adjusted to the proposal. This provision could read:

......

(2) Notwithstanding a regulation made under § 7 subparagraph 2 the competent agency may not address a subsequent order if ...

Alternatively, one could desist from amending the Act and simply change the provision of the TA-Luft concerning subsequent orders in such a way that bubbles between existing facilities are permissible.

In a new No. 2.2.4.3 - the existing No. 2.24.3 would then become No. 2.2.4.4 - it could be provided:

> The agency can desist from issuing a subsequent order where another facility of the operator or of a third party makes a substantial contribution to the reduction of emissions and improvement of air quality without being obliged to do so by a subsequent order addressed to him.

However, this wording does not take into account possible emission reductions which could have been required from the other facility under Sec. 17 II FECA if a subsequent order had already been addressed to the operator of this facility. As stated above, this would lead to an unequal treatment of existing facilities (problem of an equal baseline). Also, the wording does not ensure the ambient equivalence of the bubble transaction. In order to comply with these requirements, the following wording could be considered:

> The agency can desist from issuing a subsequent order where another facility of the operator or of a third operator reduces the emissions beyond the requirements under § 17 subparagraph 2 FECA, a regulation made under § 7 FECA or No. 2.3 or 3 (alternatively: under 2.2.4.2) and thereby makes a contribution to the improvement of air quality with respect to a pollutant that equals that which under the provisions just mentioned could have been required from both operators.

V. Functional Prerequisites for a Successful Application of the American Model in the Federal Republic of Germany

1. Potential Demand for Emission Reduction Credits

A fundamental prerequisite for the functioning of any emission trading policy is that there must be sufficient demand for credits for utilization in complying with the statutory or administrative requirements. In other words, there must be a political-administrative pressure on operators of facilities to reduce their emissions to a larger extent than they do at present or - in the case of new facilities - than they are able to do at reasonable cost in applying the conventional state of the art. In discussing the problem of demand for credits in the framework of the German regulatory system nonattainment areas, clean areas (i.e. areas subject to the prohibition of deterioration of existing SO_2 concentration levels) and other areas must be distinguished. Facilities subject to the Regulation on Major Fuel-Burning Facilities form a special category.

a) Nonattainment Areas

In areas in which the air quality standards are exceeded or would be exceeded by additional emissions from new facilities, theoretically there is sufficient pressure to reduce the emissions from new facilities; this pressure could lead to a corresponding demand for emission reduction credits. However, a number of factors will have the result that this pressure will not be so strong as in the United States. First, the share of nonattainment areas of the total area of the Federal Republic of Germany and even of the total urban area is relatively small (only some areas in the western Ruhr area, Sarreland and West Berlin). Therefore, new facilities can to a large extent avoid strict air quality controls by locating outside nonattainment areas without foregoing the locational advantages originating from location in an urban area. The far-reaching possibilities of attaining the air quality standards by utilization of low-pollution fuels or dispersion of emissions will also hamper demand for credits. More important, the Laender concerned have always tried to create margins for new growth in nonattainment areas by reducing emissions from existing facilities, if necessary through grants and subsidies; an instrument for achieving this goal is, in particular, the implementation plan clause of the TA-Luft (see above III.1). This is the reason why, in contrast to the United States, in W. Germany the threat of a general construction ban in nonattainment areas has never played a particular role in the political discussion on air quality problems, although in the framework of the proposed - but then failed - amendment of the FECA of 1979 this problem had been taken into account in the proposed "clean-up clause". Also, beyond the Voerde case there are no reported cases where in nonattainment areas new facilities were confronted with a construction ban.

With respect to substantial modifications of existing facilities, the situation is similar. However, there is one difference, namely that the operators concerned can hardly "emigrate" in order to avoid strict controls; therefore, there is more pressure for reducing emissions (often even beyond the modified pieces of equipment because the authorities often try to achieve a clean-up of the whole facility). Moreover, extension of the notion of facility would result in an increase of the number of modifications in relation to new construction because modifications in a plant which hitherto were considered as new construction would now be considered as substantial modifications. This will not by itself lead to an increase of the demand for emission reduction credits since the adjustment pressure remains unchanged. However, the demand for credits might be higher than in the case of new construction because the TA-Luft affords broader options for offsets and netting.

With respect to existing facilities, § 17 subparagraph 1 FECA provides that in nonattainment areas the authorities shall issue subsequent orders for adjustment of existing facilities to the state of the art. However, there is no "automatic" adjustment pressure comparable to that existing in the United States. There are no special existing source standards corresponding to RACT; also, the air quality maintenance plans do not contain generic emission limitations for existing facilities. Therefore, the authorities are compelled to orient their requirements at "economic feasibility" in the individual case. Inspite of the objective criteria of § 17 FECA, in practice this amounts to a differentiation on a case-by-case basis according to the individual situation of the operator. The favorable bargaining position of operators has the result that the adjustment pressure exercised via § 17 FECA, although not negligeable, will be relatively weak. Therefore, it would seem that even in nonattainment areas there will be no demand for emission reduction credits to be used for bubble transactions comparable to that in the United States. Moreover, it should be noted that the weak adjustment pressure that may exist is limited to the few nonattainment areas.

b) Clean Areas (Prohibition of Deterioration of Air Quality)

In areas in which - with respect to SO_2 - the prohibition of deterioration of existing air quality is applicable, the adjustment pressure for new facilities will remain relatively weak so long as this prohibition is not a mandatory rule but only a guideline for administrators and exceptions are always allowed. In the United States, too, the offset policy is relatively seldom applied in PSD areas because, in the absence of increment violations, there is no need for application.

In the case of existing facilities, in contrast to nonattainment areas the competent authorities in principle have discretion in deciding whether or not to address a subsequent order to an existing facility. However, under the TA-Luft 1983, this discretion is limited where particular emission standards are exceeded or exceeded by a certain percentage. Moreover, a limitation of agency discretion would seem to follow from the general objectives of air quality policy relating to areas to which the prohibition of deterioration of air quality is applicable. All told, agency pressure for adjustment of existing sources to the emission standards or a more stringent state of the art will be weaker than in nonattainment areas, while economic infeasibility is equally available as a defense. Therefore, a particular demand by existing sources for emission reduction credits cannot be expected in clean areas.

c) Other Areas

In areas which are neither nonattainment areas nor clean areas in the strict sense (meaning areas subject to the prohibition of deterioration), the primary question is whether existing facilities that do not conform with the state of the art will demand emission reduction credits for utilization in bubble transactions. According to what was stated above, this question must be answered in the negative. The lack of special existing source standards, the discretion anjoyed by the authorities in deciding on subsequent orders, and the reservation of the defense of economic feasibility have so far had the result that the system of the FECA, namely that the fundamental obligations arising under § 5 must in principle also be complied with by existing facilities, does not function in practice. (However, there are some differences of degree in this respect among the several Laender). In other words, it is relatively rare that existing facilities in these areas are compelled to adjust to existing emission standards or a more stringent state of the art determined on a case-by-case basis. Normally, the authorities wait until a substantial modification of the facility becomes necessary; in such a case they may try to achieve an adjustment of the whole facility (including the unchanged parts). For these reasons, it would seem that there will not be a strong demand for credits by existing facilities. However, it should be noted that in the case of certain emission standards, the TA-Luft 1983 now obliges the authorities to issue subsequent orders, which, however, does not dispense them from respecting the defense of economic infeasibility.

d) Regulation on Major Fuel-Burning Facilities

Under the Regulation on Major Fuel-Burning Facilities, there is a direct and immediate adjustment pressure for many existing power plants. However, this pressure is mitigated by the option of the operator to choose a lower remaining useful life of the facility and thereby avoid retrofitting or at least reduce its extent.

2. Potential Offer of Emission Reduction Credits

A second fundamental prerequisite for the functioning of an exchange of emission reduction credits is that there is an offer of such credits by facilities located in the vicinity of the demanding facility, in other words, that other enterprises are willing and able to reduce their emissions beyond the level required under the statutory or administrative provisions. Without a saving potential, especially in existing facilities, the emissions trading policy will not function. Generally speaking, the saving (or reduction) potential depends on the stringency of the control requirements applicable to existing sources. On the one hand, the German requirements, expressed in emission standards or - less frequently - in case-by-case decisions on the state of the art, might well be more stringent than the American RACT standard. This can be concluded from the fact that the German emission standards are applicable to new and existing facilities and therefore, although they only represent a conventional state of the art, do not need to take economic feasibility for existing facilities into account. This reduces the saving potential in comparison to the United States.

On the other hand, the situation is more favorable than that in the United States because the authorities in practice often abstain from fully enforcing the emission standards or the state of the art against existing facilities, although this would be permissible under § 17 FECA. Insofar as existing facilities operate below the state of the art, there is a considerable saving potential - even if varied according to category of facility and industry. However, it seems improbable that demand for, and offer of, emission reduction credits will coincide geographically. In the absence of sufficient enforcement of the state of the art against existing facilities, the saving potential is highest in less polluted areas, whereas there is no or no considerable demand for credits (assuming that new source performance bubbles are in principle not allowed). In nonattainment areas where the demand for emission reduction credits is highest, the saving potential at the same time tends to decrease to the extent to which the state of the art will be enforced against existing sources or cannot be enforced because of economic infeasibility. Of course, it must be stressed that the creation of credits by plant shutdowns theoretically will always be possible. To what extent credits are actually granted for shutdowns, depends on the question whether and to what extent this is admissible as a matter of policy, in particular, whether the allowable emissions are the baseline, or hypothetical emission reductions the operator could have achieved anyway according to the state of the art must be deducted.

A special situation arises once again with respect to facilities that are subject to the Regulation on Major Fuel-Burning Facilities. The variation of requirements for existing facilities according to the remaining useful life laid down in the regulation is an expression of generic economic feasibility. Therefore, at least theoretically it must be assumed that individual facilities are able to reduce their emissions beyond the requirements under the regulation in order to create emission reduction credits. However, in view of the relatively uniform control technology used for power plants, some practical reservations must be made.

3. Determination of the Baseline

In an emissions transaction only such emission reductions can be credited that constitute a "surplus", i.e. that exceed the statutory or administrative requirements or, where the latter are lower, the actual emissions. Under American law the applicable SIP provides a uniform base for determining the baseline for the entire AQCR (although not beyond this region). According to the structure of the SIP the allowable or the actual emissions form the baseline; in the absence of an approved SIP, the possibility of taking negotiated RACT requirements as the baseline also provides for a certain measure of equality between the polluters. Although absolute (total) emission limitations are not imposed, the structure of American emission standards that mainly are expressed as process rates (volume of pollutant per unit of input or production output) enables the authorities to compute the total allowable or actual emissions on the basis of (maximum or actual) production capacity.

Under German law, there is no general base for determining the emission baseline because, notwithstanding the Regulation on Major Fuel-Burning Facilities, there are no uniform existing source standards and the air quality maintenance plans do not contain mandatory standards. Therefore, the emission baseline can only be established case by case on the basis of the requirements of the individual permit or, where these are lower, the actual emissions. Furthermore, the structure of German emission standards and individual emission limitations which are expressed in pollutant concentration rates per volume of emitted air impede the calculation of total emissions on the basis of production data.

Whether the requirements of the individual permit or the actual emissions should be the baseline, is a matter of political choice. The values of the permit have the advantage that they provide a relatively secure base and exclude cheating. The danger of "bargaining down" is no particular problem inherent in the emissions trading policy. In contrast to emission charges that are based on the values of the permit, the always existing interest of the operator in bargaining for requirements as lenient as possible will not be reinforced further. The values of the permit do not confer on the operator present disadvantages (in the form of financial sanctions for non-compliance) which go beyond the compliance costs; at most, if the operator does not succeed in "bargaining down", he has less opportunities for deriving from the permit values future benefits by creating emission reduction credits. Therefore, his primary interest will not be the preservation of these opportunities for future creation of credits but, rather, the reduction of control costs as such.

Taking the - lower - actual emissions as baseline has the advantage that the creation of paper reductions is avoided. On the other hand, administrative costs are higher, the danger of cheating is greater, and, especially in a recession, there may be difficult problems of evaluation in determining the reference period.

All told, all these problems are not fundamentally different from those arising under the American system of air pollution control. Severe differences only arise insofar as the absence of generally binding criteria for the determination of the emission baseline, i.e. the lack of existing source standards in West Germany, will reinforce the already existing unequal treatment of existing sources. Efficient facilities that have adjusted to the state of the art normally no longer are capable of producing emission reduction credits in order to utilize them for modernization of equipment or sell them. Efficient facilities that have succeeded in cheating the authorities about their efficiency, or inefficient facilities are remunerated because they can easily produce emission reduction credits.

The danger of unequal treatment of existing facilities could be excluded if each facility that creates a credit would be hypothetically subjected to the existing emission standards or a more stringent state of the art determined ad hoc, in other words, if one would only grant credits for such emission reductions that exceed these levels. The administrative costs of such a procedure should be low. On the other hand, the saving potential would be drastically reduced and in practice the creation of credits would be limited to plant shutdowns, which is problematic from an air quality policy perspective. Similar objections, although to a somewhat lesser degree, obtain with respect to a possible compromise, namely taking those emission standards as the baseline for which the TA-Luft mandates subsequent orders for adjustment of the facility where they are exceeded by a certain percentage (150-200 percent according to pollutant). Both methods would ignore the statutory requirement of economic feasibility (Sec. 17 subparagraph 2 FECA) which protects existing facilities against enforcement of emission standards, including the percentage values, and a more stringent state of the art. There is only one method of determining the baseline that conforms with the regulatory system of the FECA, namely, similar to the American negotiated RACT, taking control measures and ensuing emissions which would hypothetically be economically feasible in the meaning of § 17 FECA as the baseline. However, with this method the deficiencies of § 17 of the Act and of its application in practice would be transferred to the emission trading policy. If the criterion of economic feasibility does not function well in practice in the case of subsequent orders, it cannot be expected that it will function well in the framework of the emissions trading policy in determining the baseline. We do not see a way out of this dilemma between unequal treatment of existing sources and reduction of the offer of credits, unless one would change the entire system and introduce special existing source standards.

4. The Criterion of Air Quality Neutrality of Transactions

From an air quality point of view, emission transactions may not deteriorate air quality; in nonattainment areas they must, at least in the case of new sources, contribute to an improvement of existing air quality. Therefore, the geographic distance between the sources participating in a transaction is a crucial question. The American emissions trading policy has some deficiencies in this respect because its requirements do not correspond to the temporary structure of air quality standards and the monitoring methods are not always accurate enough and in any case not uniform. The German system of measuring and assessing air quality impacts in 1 square kilometer areas is preferable, at least with respect to pollutants having important local impacts such as SO_2 and particulate matter. However, this system would seem to severely limit the opportunities for emission transactions. Also, the limitation of the assessment area to an area of 12.5 by 12.5 kilometers around the source is problematic because this area does not necessarily correspond to the actual area of dispersion. However, this is a weakness already inherent in the traditional control system and which might be reinforced at most marginally by the emission trading policy.

5. Administrability

Finally, a severe deficiency of a German system of emissions trading policy would be that the possibilities for central steering are minimal. A German emissions trading policy would in practice develop in quite an uncoordinated manner, even if the federal government or the Laender would issue implementing rules. This could reinforce the already existing regional imbalance of the implementation of the German air quality policy.

VI. Legal-Political Assessment of the Introduction of An Emissions Trading Policy into German Law

For the reasons stated in section 2., a definitive assessment of the transferability of the American emissions trading policy or some variant of this policy more geared to the German legal system to German law is not possible. The following discussion is subject to this qualification.

1. Assurance of the Functioning of a German Emissions Trading Policy

It was stated in section 2. that the lack of a uniform baseline which is due to lacking governmental powers to establish special emission standards for existing facilities poses particular problems with respect to the functioning of a German emissions trading policy. This is true of all variants of the emissions trading policy, including those that have already been practiced in W. Germany, since existing facilities are the primary or even exclusive producers of emission reduction credits. The solution of the existing compensation and clean-up clauses which consider each emission reduction that is not already mandated by an enforcible subsequent order as suitable sources of a credit, is not acceptable for the reasons already stated. Also, a further development of the concept underlying No. 2.4.2 TA-Luft whereby the competent agency shall issue subsequent orders where an existing source exceeds the emission standards by a certain percentage is no solution. These percentage values do not reflect, in a generic fashion, the requirement of economic feasibility. Therefore, the barrier of economic feasibility remains valid in all cases covered by No. 2.4.2 TA-Luft and, under the Act, must remain valid. The requirement of a uniform baseline is no purely technical problem of simply calculating emission reductions, which, indeed, could be solved relying on No. 2.4.2 TA-Luft; rather, it is a problem of justice (or in economic terms: income distribution) between different operators, industries and regions. It would be no solution, either, if, in parallel to the American RACT, not each emission reduction but only such reductions would be credited that go beyond what is economically feasible in the meaning of Sec. 17 II FECA. The problems inherent in Sec. II FECA are the determination and enforcement of economically feasible control measures; these problems are not resolved by referring, in the framework of the emissions trading policy, to economic feasibility on a case-by-case basis.

General powers to establish existing source standards appear necessary in order to ensure the functioning of a future German emissions trading policy. These powers could be used step by step under ecological efficiency perspectives, i.e. with respect to critical pollutants and critical industries (highly-polluting industries), so that the administrative feasibility of this concept does not become a problem. The advantage of this concept is that a selective administrative clean-up policy could be supported by the market-oriented emissions trading policy. More stringent requirements would be tolerable for the industries concerned insofar as the operators would have flexibility in complying with these requirements under the emissions trading policy.

If this proposal is not followed, at best small steps towards cautions extension of existing variants of the German emissions trading policy can be recommended.

2. Offsets

The conformity of the compensation and clean-up clauses of the TA-Luft with Sec. 5 No. 1 FECA is not beyond doubt. Already for this reason, following the proposals made in section IV 1, 2 this provision of the Act should be changed in order to create a safe legal basis for a German emissions trading policy.

Apart from this, the scope of application of the compensation and clean-up clauses of the TA-Luft is very narrow. The limitation of compensation for new or significantly modified existing sources in nonattainment areas as a matter of principle, to an ambient impact below 2 percent reduces the compensation to a de minimis exception. However, it must be considered that this clause is supplemented by broader and more flexible compensation clauses that refer to the air quality maintenance plan and to case-by-case assessment of ambient air quality.

In the political discussion on the proposed amendment of the Act of 1979 a number of environmental objections have been voiced against the clean-up clause. These objections, on the one hand, were that the legislature should create the means for an effective clean-up of existing sources in the first place;[70] this can only be achieved on the basis of the proposal made above to introduce special existing source standards. On the other hand, in keeping with the objections raised here, it has been pointed out that the clean-up clause will perpetuate a violation of the ambient air quality standards. This is so because and insofar as emission reductions which would have been achieved anyway or at least within a short period of time (e.g., because they are economically feasible or the facility concerned would have been shut down anyway) are a source of emission reduction credits; these credits could then be used by a new or significantly modified existing source during its (longer) useful life.[71] It had been proposed to cope with this danger by introducing the requirement of a substantial improvement of air quality or - in the framework of the implementation plan clause - by deadlines for attainment of the area concerned;[72] some authors rejected the clean-up clause in nonattainment areas entirely where health hazards were involved.[73]

The dangers of the clean-up clause thus accurately described could partly be coped with by making the creation of emission reduction credits conditional on restrictive prerequisites (e.g., restrictions in case of shutdowns) or by limiting the use of such credits (e.g., by the requirement of over-compensation). This is a general problem of the entire emissions trading policy. Apart from that, an extension of the compensation clauses with respect to health-related ambient air quality standards could only be advocated if it were ensured that the ambient quality standards will be met within a foreseeable period of time. Therefore, one might consider to link the compensation and implementation plan clauses and in addition, to set a deadline of, say, 3 years within which attainment must be ensured. Of course, the problem is that in contrast to American law the German air quality maintenance plan is not mandatory for the operator and the measures provided in the plan may not be enforceable for lack of economic feasibility. Therefore, the wording of the clause would have to include a qualification that attainment within the deadline on the basis of the implementation plan and its expected enforcement must be ensured.

Furthermore, the requirement of a substantial improvement of ambient air quality should be introduced; the regulation of details could be left to administrative rules.

As stated in section II., the ambient impact assessment method prescribed in the TA-Luft - 1 by 1 kilometer assessment areas - limits the potential of a German emissions trading policy considerably. It is true that this restriction is not applicable in the framework of the Berlin exception, the implementation plan clause and case-by-case air quality assessment. The question is whether the compensation clause could not be liberalized by the requirement that a deterioration of air quality must be excluded in all 1 by 1 kilometer assessment areas (this should apply to all clauses)[74], but a substantial improvement of air quality would only be required in the majority of assessment areas. With respect to pollutants with ubiquitous dispersion such as NO_x, a system of geographical discounting (increase of the compensation rate according to the distance between the sources involved in a transaction) would satisfy environmental considerations.

3. Netting

The transfer of the American netting policy cannot be recommended. Contrary to the fundamental objectives of the FECA, the netting concept desists from requiring significantly modified facilities to contribute to the clean-up of nonattainment areas. It is true that under the American netting concept, the implementation of the principle of precaution is ensured because the NSPSs are applicable and, consequently, in case of transfer of this policy to the German law, the German emission standards would have to be applicable.

The functional equivalent in German law to the American netting concept is the clean-up clause under No. 2.2.3.2 TA-Luft. This clause is in practice an important means of cleaning-up nonattainment areas and, therefore, should cautiously be extended.[75] The scope of application of the clean-up clause at present is limited because the narrow notion of facility under the Regulation on Permit-

Requiring Facilities has the result that numerous modifications in a plant are to be considered as construction of a new facility to which only the (narrower) compensation clause, not the clean-up clause is applicable. Here, the pending amendment of this regulation offers the possibility of a cautious extension of the term of facility. As stated, this would be covered by the statutory definition under Sec. 3 V and the powers to make regulations under Sec. 4 I of the Act. However, an extension of the notion of facility is no solution for the primary question whether the clean-up clause is at all consistent with the FECA. To this extent, as in the case of the compensation clause, a clarification in the Act is to be recommended.

4. Bubbles for Existing Sources

Bubbles for existing sources are, within certain limits, consistent with Sec. 17 II FECA. If the proposed change of the concept underlying Sec. 17 II FECA, namely introducing existing source standards and supplementary compensation options were not accepted, one might consider to supplement No. 2.2.4 TA-Luft to the extent that bubbles between existing sources are admitted in principle.

5. Bubbles for Complying with State-of-the-Art Requirements for New Sources

The question whether bubbles for compliance with emission standards for new sources are consistent with the FECA arguably should be answered in the negative. The decision of the Federal Administrative Court on the "heat production emission reduction credit" has not entirely clarified the issue because the Court has only held that the Federal Executive could deny the granting of the credit rather than that it was impermissible under the Act. However, the arguments advanced by the Court for a broad construction of the principle of precaution lend some support to the proposition that bubbles for compliance with technology-based requirementsfor new sources are not permissible. In any case, the legislature could define the scope of the principle of precaution and admit bubbles. In view of the environmental importance of the principle of precaution which has recently been revived, there are good arguments for demanding that the rigor of the principle should not be mitigated even if new source bubbles would be associated with considerable cost savings. From an environmental perspective, the admission of new source bubbles could at best be considered if in the framework of the pending amendment of part 3 of the TA-Luft the emission standards would be conceived as stringent new source performance standards that reflect a progressive state of the art and if, furthermore, a substantial over-compensation would be required.

6. Modification of the American Model in the Light of Environmental Requirements

There are no objections based on principle against building environmentally-motivated restrictions into a German version of the emissions trading policy. This is particularly true of the principle of temporary equivalence between emission reduction and credit, which plays an important role in admitting shutdowns as a source of credits. It is technically possible to insert this principle into the statutory or other provisions that permit or regulate emissions trading. However, the practicality of this concept is open to doubt because the presumptive (future) useful life of a facility which would determine the duration of a credit produced by a shutdown is not easy to establish. It remains to be seen whether the system of presumptions now envisaged by EPA will be workable in practice. More important, in the practice of the German variants of the emissions trading policy, shutdowns represent the primary source for emission reduction credits. It is to be anticipated that, if the utilization of shutdowns for the creation of emission reduction credits were radically restricted - and the principle of temporary equivalence exactly amounts to this -, the functioning of the emissions trading policy as a whole would be in danger.

As has been stated above, the American emissions trading policy at best leads to the preservation of the status quo in air quality. This is demonstrated by the general requirement of ambient equivalence of transactions; in the framework of the offset policy, an over-compensation is necessary, but in practice a compensation rate of 1:1.1 is considered as sufficient so that the extent of improvement of air quality is small. There are two principal possibilities of putting the emissions trading policy more at the service of environmental policy:

- making the traditional command-and-control policy more dynamic by periodically reviewing emission standards, whereby their implementation would be facilitated by built-in flexibility in the form of the emissions trading policy;
- making the emissions trading policy itself more dynamic by fixing compensation rates that compel operators that want to use emission reduction credits to substantially over-compensate new emissions by credits (e.g., by a compensation rate of 1: 1.5 or 1:2).

In the absence of sufficient experience in the United States with the latter method it cannot be said that it is superior to the former. In German law, the requirement of over-compensation already is applicable in the framework of the compensation and clean-up clauses in nonattainment areas. An extension to existing source bubbles in such areas suggests itself. However, all told one may conclude that a targeted and controlled clean-up of existing sources on the basis of special existing source standards and supplemented by emissions trading might be superior to over-compensation which always depends on the contingency of voluntary transactions.

Footnotes (Chapter D)

1) For a comparative analysis of the US and W.German regulatory systems see Currie, 49 U. Chi. L. Rev. 355 (1982)

2) FECA § 48

3) 1. Allgemeine Verwaltungsvorschrift zum Bundes-Immissionsschutzgesetz - Technische Anleitung zur Reinhaltung der Luft - vom 28.8.1974, GMBl. S. 426, ber. 525 (Technical Guidelines for the Control of Air Pollution) No. 2.4

4) Amendment of the TA-Luft of 23.2. 1983 No. 2.5

5) OVG Lüneburg, GewA 1981, 341; VG Berlin, UPR 1982, 312

6) BVerwGE 55, 255 - Voerde; cf. Sellner, No. 57

7) FECA § 4; Vierte Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes - Verordnung über genehmigungsbedürftige Anlagen - vom 4.2.1975, BGBl. I S. 499, ber. S. 727, modified by Verordnung vom 27.6.1981, BGBl. I S. 772 (Regulation on Permit-Requiring Facilities)

8) FECA § 15

9) BVerwG, GewA 1964, 244

10) BVerwGE 6, 294; BVerwGE 50, 49 - Tunnelofen; BVerwG, DVBl. 1977, 770; Sellner, No. 300

11) VG Köln, GewA 1977, 34; Sellner, No. 295 et seq.

12) Feldhaus, § 17 Annot. 5; Sellner, No. 426, 431/432

13) Hoppe, Wirtschaftliche Vertretbarkeit, p. 75 et seq., 94 et seq.; Feldhaus, § 17 annot. 8. The criterium is a fictitious, healthy "standard" enterprise, not the statistical average enterprise; however, in practice these objective criteria have proven to be inapplicable; see Mayntz, p. 411. More differentiated criteria are proposed by: Soell, Der Grundsatz der wirtschaftlichen Vertretbarkeit im Bundes-Immissionsschutzgesetz, 1980, and R.-B. Schmidt, Wirtschaftswissenschaftliche Aspekte des Begriffs "Wirtschaftliche Vertretbarkeit" nach dem Bundes-Immissionsschutzgesetz, Berichte 4/82 des Umweltbundesamts, 1982. These opinions have not yet become relevant in the administrative practice.

14) TA-Luft No. 2.2.4.3

15) Cf. Mayntz, p. 395 et seq.; with respect to the legal requirement of equal treatment of comparable existing sources see Sellner, No. 434/435

15a) Bundestags-Drucksache 10/1862

16) Supra note 6

17) OVG Berlin, DVBl 1979, 159 - Bewag -; VGH Mannheim, GewA 1980, 197; TA-Luft 1974 No. 2.1.2.4; Landmann-Rohmer-Kutscheidt, Gewerberecht, vol. 3, Umweltrecht, § 1 annot. 7; Kutscheidt, in Salzwedel (ed), Grundzüge des Umweltrechts, 1982, p. 251/252, 269/270

18) OVG Berlin, supra note 17; VGH Mannheim, supra note 17; Landmann-Rohmer-Kutscheidt, supra note 17, § 3 annot. 3

19) BVerwG DVBl. 1984, 476 = UPR 1984, 202

20) FECA §§ 7, 48

21) TA-Luft 1974 No. 3.1.1.4; see also infra note 25

22) FECA §§ 5 No. 2, 6

23) See Mayntz, p. 404/405, 480

24) TA-Luft 1983 No. 2.2.4.2

25) 13. Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (Verordnung über Großfeuerungsanlagen) (Regulation on Major Fuel-Burning Facilities)

26) See v. Mutius, Bestandsschutz bei Altanlagen, unpublished paper 4.5.1982, Köln; Statement of the Arbeitskreis für Umweltrecht, Bonn, of 7.2.1983

27) TA-Luft No. 2.3.3.4, 2.3.4.3

28) TA-Luft 1983 No. 2.2.1.5, 2.3.5

29) Cf. Kutscheidt, in Salzwedel (ed), supra note 17, p. 263; Feldhaus, § 48 annot. 6, annot. to 1 BImSchVwV 2.3.3.4

30) TA-Luft 1974 No. 2.2.1.2-4

31) Supra note 6

32) FECA § 44 II

33) TA-Luft 1974 No. 2.4.3

34) TA-Luft 1983 No. 2.2.1.4

34a) The following text (III-V) corresponds to the relevant parts of the German language report with one major exception: the parts concerning a possible W.German policy on banking of credits ("reservation" of credits to the originator of the emission reduction) have been omitted due to their highly technical nature; see in the German report at DIII 5, IV 5 and V 6.

35) TA-Luft 1974 No. 2.2.1.2

36) Supra note 6

37) Supra note 6; in the same sense Jarass, § 5 annot. 16

34) TA-Luft 1983 No. 2.2.1.4

35) TA-Luft 1974 No. 2.2.1.2

36) Supra note 6

37) Supra note 6

38) See Mayntz, p. 438

39) TA-Luft 1983 No. 2.2.1.1, 2.2.1.2

40) See supra p. [X]

41) TA-Luft 1983 No. 2.2.1.1, b

42) TA-Luft 1983 No. 2.2.1.1, b, 2.2.1.2, d in conjunction with No. 2.2.1.3

43) TA-Luft 1983 No. 2.2.3.2

44) TA-Luft 1974 No. 2.2.1.4, TA-Luft 1983 No. 2.2.1.1, b, bb

45) BVerwG, DVBl 1977, 770

46) VG Berlin, UPR 1982, 312 (low additional emissions, substantial net reduction of emissions from several existing sources of the same operator; the decision has been appealed); Sendler, UPR 1983, 1, 3 and 5; Sellner, No. 54; Ule, BB 1976, 447; Dreißigacker/Surendorf/Weber, TA-Luft 1974, p. 35; Feldhaus, annot. to 1. BImSchVwV 2.2.1.3; contra only Bohne, Der informale Rechtsstaat, 1981, p. 181 et seq.; Jarass, § 5 annot. 16-17, § 6 annot. 6-7.

47) TA-Luft 1974 No. 2.2.1.3, No. 2.2.3.2

48) See Mayntz, p. 436/437

49) TA-Luft 1983, No. 2.2.3.2

50) Supra note 45

51) Sellner, No. 54; reserved with respect to the "clean-up clause" especially Jarass, § 6 annot. 7

52) Supra note 6

53) Kutscheidt, supra note 17, § 4 annot. 12, 19; Sellner, No. 14, 15 et seq.

54) VGH Mannheim, NVwZ 1983, 46, 47; OVG Münster, DVBl 1976, 790 - Voerde; Sellner, No. 18

55) Sellner, No. 19

56) BVerwGE 50, 49 - Tunnelofen (reversing OVG Münster, DÖV 1973, 822)

57) VG Hannover, DVBl 1976, 809; see also OVG Lüneburg, GewA 1975, 275

58) Kutscheidt, DÖV 1976, 663; Sellner, No. 10

59) Regulation on Permit-Requiring Facilities, supra note 7, § 2 No. 1; Regulation on Major Fuel-Burning Facilities, supra note 25, §§ 20 VII, 30; Sellner, No. 19; Kutscheidt, supra note 17, § 3 annot. 25

60) Verwaltungsvorschrift über Genehmigungsverfahren nach §§ 6, 15 Bundes-Immissionsschutzgesetz (BImSchG) für Mineralölraffinierien und petrochemische Anlagen zur Kohlenwasserstoffherstellung vom 14.4.1975, MBl. NW No. 65 vom 31.5.1975 (Refinery Directive), No. 1.1.1 b, 1.2.4 a

61) See authors cited supra note 59; Refinery Directive, supra note 60, No. 1.2.4 a

62) Regulation on Major Fuel-Burning Facilities § 30

63) See Mayntz, p. 432 et seq.

64) TA-Luft 1983 No. 2.2.4.1

65) Supra note 13

66) Draft Regulation on Major Fuel-Burning Facilities § 6 II 2,3

67) BVerwG supra note 19, affirming VGH Mannheim BWVBl. 1982, 176

67a) In a broader sense see Jarass, § 5 annot. 17, § 6 annot. 6. The compensation advocated by OVG Lüneburg, GewA 1980, 203, in the case of potentially cancerogenic substances is designed to ensure compliance with the prohibition of deterioration of air quality as an expression of the precautionary principle. Therefore it does not amount to a qualification of the precautionary principle. Structurally, it corresponds to the "Voerde doctrine" (offset).

68) BVerwG DVBl 1976, 614; OVG Münster, 13.3.1974, VII A 892/71 (unpublished); Sellner, No. 211/212; Feldhaus, § 3 annot. 3

69) Bundestags-Drucksache 8/2751 (1979) § 6 b

70) Hansmann, in: Umweltrecht mildern?, 1978, p. 116; Scharpf, in: Protokoll über die öffentliche Anhörung zum Entwurf eines zweiten Gesetzes zur Änderung des Bundes-Immissionsschutzgesetzes, Deutscher Bundestag, 8. Wahlperiode, Innenausschuß, Protokoll Nr. 98, p. 43/ 129/130; contra von Holleben in: Umweltrecht mildern?, supra p. 119; Vallendar, id., p. 120

71) Kutscheidt, in: Umweltrecht mildern?, supra p. 121, 167; Vogel, in: Anhörung id., p. 139/140; Scharpf, id., p. 43/44; Ziegler, id., p. 143

72) Scharpf supra p. 129; Ziegler supra p. 144

73) Bundesrat, Bundestags-Drucksache 8/2751, p. 12; Ziegler supra p. 143

74) Contra Sendler, UPR 1983, 1, 3

75) Scharpf supra p. 43, 129

76) The German version of the report also contains a short part on the possible transfer of the American emissions trading policy to water pollution and noise control. Since this part presumably is of less interest to the American reader, it has been omitted in the English language version.

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APPENDIX I

Glossary

Key terms, as used in this report, are defined below.

Actual Emissions

The level of air pollutants emitted by a source (per hour or per unit of activity). Actual emissions may differ from "allowable" emissions, which is the level specified in a source's permit or in the State Implementation Plan (SIP). Whether allowable or actual emissions are used in determining the baseline against which emissions reductions are measured will depend on the manner in which the SIP was developed.

Air Quality Control Regions (AQCRs)

Geographical areas defined by the U.S. Environmental Protection Agency (EPA). There are 247 air quality control regions for which the states must submit plans to attain and maintain National Ambient Air Quality Standards (NAAQS).

Air Quality Management Area (AQMA)

Subdivision of an Air Quality Control Region (AQCR)

Allowable Emissions

The level of emissions permitted by the terms of a source's permit or in the SIP.

Ambient Air Quality Standard

A standard establishing the maximum allowable concentration of a given pollutant in the ambient air.

Attainment Area (with respect to a given pollutant)

A geographical area (Air Quality Control Region on Air Quality Management Area) whose measured air quality meets the National Ambient Air Quality Standards (NAAQS) for a given pollutant.

Banking

See Emissions Reduction Banking.

Best Available Control Technology (BACT)

An emission limitation based on the maximum degree of emissic reduction achievable through the application of available methods of pollution control, taking into account energy, environmental, and economic impacts and other costs. The BACT determination is made on a case-by-case basis, but under no circumstances may the level of allowable emissions exceed tha permitted as the result of application of a New Source Perfor mance Standard (NSPS). The Clean Air Act requires the application of BACT in Prevention of Significant Deterioration (PSD) areas for new activities.

Bubble Policy

EPA's alternative emission reduction option which allows existing plants to reduce control requirements at one point by increasing controls correspondingly at another. The bubble can be applied both whithin a single plant and between different plants in the same area.

The bubble lets existing plants (or groups of plants) rearrange their SIP emission limits to control more where costs are low in exchange for less control at emission sources where costs are high. Bubbles must be equivalent to the original emission limits in terms of ambient impact and enforceability.

Clean Air Act (CAA)

The Clean Air Act of 1970 as amended in 1977 is the basic federal legislation that established National Ambient Air Quality Standards (NAAQSs) and set deadlines for the attainment of the standards.

Command and Control

A regulatory scheme based on rules which apply specific emission limits - generally based on known feasible control technology - or other technology-based requirements to every emission point within a regulated process.

Compliance

To be "in compliance" means that an activity has met the requirements of the relevant air quality control agency. However, su requirements vary from one-time installation of specified end-of-pipe measures to actual continuous compliance with all conditions of a permit.

Continuous Compliance

An activity is in continuous compliance if, on a day-to-day or hour-to-hour basis in some cases and/or with respect to some pollutants, the performance of the activity is within the limits specified in the permit, e.g., emissions of gaseous or liquid pollutants are within the limits specified, quality of raw material input or product output is within the limit specified.

Control Technique Guidelines (CTGs)

Guidelines issued by the EPA to assist state and local air quality control agencies in determining Reasonably Available Control Technology (RACT) for achieving and maintaining air quality standards through control of existing sources.

Each CTG contains recommendations to the states of what EPA calls the "presumptive norm" for RACT, based on EPA's current evaluation of the general capabilities and problems of the industry that is the subject of the CTG. EPA recommends that when they include RACT provisions in their SIP revisions state adopt requirements consistent with the presumptive norm level. Since the CTGs are based on a general evaluation of industry, a state may deviate from the EPA recommendations, because the general guidance may be inappropriate to particular facilities in the state. However, a state must justify its deviation to EPA.

Controlled Trading

See "Emissions Trading".

Criteria Pollutants

Any one of air pollutants for which National Ambient Air Quality Standards (NAAQSs) have been established by the EPA under sections 108 and 109 of the Clean Air Act Amendments of 1970 on the basis of criteria documents detailing health or welfare effects. These pollutants are: airborne lead, carbon monoxide (CO), hydrocarbons (HC), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), and total suspended particulate matter (TSP).

Discount Rate

The percentage reduction in the value of emission reduction credits (ERCs) at the time of their use, to satisfy ambient air quality requirements.

Effluent Fee (Charge)

A fee (charge) paid to the government for each pound of pollutan emitted into the atmosphere.

Emission Factor

The amount of a specific pollutant emitted from each type of polluting source in relation to a quantity of material handled, processed, or burned. By using the emission factor of a pollutant and specific data regarding quantities of material used by a given source, it is possible to compute emissions for that source - information necessary for an emission inventory.

Emission Inventory

A list of air pollutants emitted into an area's atmosphere, in amounts (commonly tons) per day or year, by type of source.

Emission Reduction Banking

"Banking" lets firms get credit for surplus emission reductions and store such emission reduction credits (ERCs) in a legally-protected manner. ERCs can be "banked" (stored) and used in bubble applications to meet control requirements for existing plants more flexibly and efficiently, as offsets to support economic growth in areas not meeting air quality standards, or in "netting" to exempt certain plant expansions or modern[illegible] zations from New Source Review. Banking rules can speed trade[illegible] between firms, expand opportunities for bubbles, and encourag[illegible] the production of cheap ERCs at optimal times. Banking system[illegible] also provide the certainty needed for firms to invest in ERCs when meeting other control requirements, creating a pool of readily available credits that makes trading easier and speed[illegible] permit issuance.

Emission Reduction Baseline

The level of emissions below which a source must reduce its emissions in order to qualify for an "emission reduction cred[illegible] (ERC). Generally, it is the more stringent requirement of act[illegible] or allowable emissions. But this will depend on how the State Implementation Plan was developed and on the specific policy [illegible] that state in satisfying the requirements of the Clean Air Act

Emission Reduction Credit (ERC)

A credit granted to a source operator for surplus emission reductions is "banked" (stored) and can later be used in bubble applications to meet control requirements for existing plants more flexibly and efficiently, as offsets to support economic growth in areas not meeting NAAQS, or in "netting" to exempt certain plant expansions or modernizations from New Source Review. ERCs are used by being converted back into physical pollution units, after being discounted (if necessary) to satisfy ambient air quality requirements.

Emission Standards

Any regulation specifying maximum allowable emissions of a given pollutant into the atmosphere (per hour or per unit of activity) and requiring the use of specific types of poll[illegible]on control equipment and/or fuel: these include New Source Performance Standards (NSPS), Lowest Achievable Emission Rate (LAER), Best Available Control Technology (BACT).

Emissions Trading (ET)

EPA has been implementing a series of regulatory reforms called Emissions Trading. These include the bubble policy, the offset policy, the netting policy and emissions banking and trading. These policies allow firms to substitute relatively cheap surplus reductions for expensive reductions at other emissions points, by overcontrolling where the marginal cost control is low in lieu of controls whose marginal cost is high. These trades are accomplished by a SIP revision. This condition is designed to maintain the SIP's integrity and assure enforceability of alternative emission limitations. Moreorver, under "generic" trading rules, states and industry can be exempted from case-by-case SIP revisions for many bubbles or other trades.

Environmental Protection Agency (EPA)

Established by President Richard M. Nixon, effective December 2, 1970, to administer the Clear Air Act as part of a comprehensive mandate for controlling environmental hazards.

Equivalent Ambient Impacts

Transactions in ERCs are constrained by the requirement to meet ambient impact tests. In nonattainment areas, transactions may not contribute to a violation of a standard or prevent the planned removal of an existing violation. In PSD areas, transactions may violate a PSD increment or a NAAQS. Varying degrees of air quality modeling are required for activities to demonstrate the ambient equivalence of transactions in ERCs.

Facility:

See "Source"

Generic Emissions Trading Rules

EPA approval of a State generic rule means that individual bubbles or other trades approved by that State under the rul need no longer be submitted as revisions to the State Impleme tation Plan (SIP). This reduces overlapping State and Federa Review, lets States become full partners in air pollution co avoids unnecessary paperwork and delays, and reduces uncerta and resource drains for State agencies and industry. Trades which can not be accomplished under a generic rule may still implemented as site-specific SIP revisions.

Hazardous Pollutants

Air pollutants regulated under section 112 of the Clean Air Amendments of 1970 governing pollutants hazardous to health which no ambient standard is applicable. Under a 1979 EPA policy, these emission standards are to reflect availab control technology with consideration of control costs.

Inspection and Maintenance

A congressionally mandated program for annual inspection of automobiles in areas that cannot meet national ambient air quality standards by 1982.

Lowest Achievable Emission Rate (LAER)

An emission limitation required for new sources in areas that have not yet attained National Ambient Air Quality Standards. Theoretically tougher than New Source Performance Standards, because cost considerations are to be minimized, LAER must reflect: (a) the most stringent emission limitation which is contained in the implementation plan of any state for a category of sources, unless a permit applica can demonstrate that such limitations are not achievable; or (b) the most stringent emission limitation which is achieved in practice within an industrial category, whichever is more stringent. LAER may not be less stringent than an applicable NSPS.

Major New Stationary Source

For purpose of implementing the Prevention of Significant Deterioration (PSD) provisions in the 1977 Clean Air Act Amendments, any source defined in any of 28 industry categories potentially emitting up to more than 100 tons/year of any pollutant, or any other source with emissions of more than 250 tons/year of any pollutant regulated under the Clean Air Act; for purposes of implementing the nonattainment provisions of the 1977 Amendments any source potentially emitting up to 100 or more tons/year of any pollutant covered under the Act. States are empowered to establish stricter thresholds and impose New Source Review requirements on sources that emit less the amounts set forth in the 1977 amendments.

Minor Source

A subcategory of sources with emissions below some threshold defined by states in their regulations or SIPs (e.g., 25 tons per year). This subcategory of sources is typically excluded from permit requirements, and thus lacks a baseline against which emission reductions can be ascertained.

Mixing Bowl

Refers to the reactivity of a given pollutant with other pollutants in the ambient air; the impact of the discharge on ambient concentrations of the pollutant is not affected by the location of the discharge within the region. This has been assumed to be valid for HC and NO_x. SO_2, TSP, and CO are considered to be non-reactive or "non-mixing bowl" pollutants. If a mixing bowl condition exists, the locations of activities do not have to be explicitly considered in the development of air qualit management strategies.

Monitoring

The measurement and recording of emissions that occur over time. The purpose of monitoring is both to obtain a measureme and to ensure the permanency of the required emission reducti Monitoring can involve in-stack devices which measure emissio or devices which measure input or output parameters.

National Ambient Air Quality Standards (NAAQS)

Standards governing maximum concentration of pollutants in th ambient air, typically stated as micrograms or milligrams of pollutant per cubic meter of air or as parts per million. Promulgated by EPA, these numerical standards are set at ve designed to protect human health, including that of the most sensitive people (primary standards), and visibility, aesthet materials, and plants and animals (secondary standards). NAAQS have been established for the seven criteria pollutants. Prim and secondary standards have been set for each pollutant. For CO, NO_2, O_3, HC, and Lead the primary standards are identical to the secondary standards (see Table). Secondary NAAQSs a more stringent for SO_2 and TSP.

Netting

A set of administrative procedures that exempts plants expanding or modernizing from new source review requirements long as the expansion or modernization does not produce a significant "net" increase in plant-wide emissions. Netting i accomplished by assuring that any emission increase is c pensated for by surplus reductions elsewhere within the plant By "netting out" of new source review the facility may be exempted from preconstruction permits and related requirement including preconstruction monitoring and ambient air modeling, installation of BACT control technology, the offset requirement, and applicable bans on new construction. The new source, however, must still meet applicable NSPS. The term "bubble" often is used synonymously for netting.

<u>New Source Performance Standards</u> (NSPS)

Emission standards promulgated by EPA, usually determined on an industry-by-industry basis, for abatement of pollution at new, modified, and reconstructed sources. The standards are intended to be technology-forcing and must achieve maximum abatement while taking into consideration costs, non-air quality health and environmental impacts, and energy use requirements.

<u>Nonattainment Area</u> (with respect to a given pollutant)

A geographic area not currently meeting a primary standard as defined in the NAAQS. Nonattainment can occur for any single pollutant and places an area under more strict emission control requirements. A major new or expanding source seeking to locate in a nonattainment area must arrange for sufficient offsets to ensure that Reasonable Further Progress toward attainment of NAAQS is achieved.

<u>New Source Review</u>

Administrative procedure applicable to major new sources and significant modifications of major existing sources that is designed to ensure that the ambient and technology-based requirements applicable to these sources are met. These requirements include preconstruction permits and related requirements, such as preconstruction monitoring and ambient air modelling, installation of NSPS and/or LAER or BACT control technology, the offset requirement and bans on new construction. See also <u>Permits</u>.

Offset Policy

A regulatory device designed to allow economic growth in an area where a National Ambient Air Quality Standard (NAAQS) has not been attained. The actual offset is obtained by securing a decrease in an existing source's emissions to more than compensate for emissions of a new source that seeks to locate or an existing source that seeks to expand in a nonattainment area.

Permit

The administrative decision that allows the construction and/or operation of a specific source and places emission restrictions on it. The permit may specify a specific emission limit, require a percentage removal of a pollutant, or require a particular work practice. Where possible, the permit conditions should be used.as the baseline for evaluating emission reductions.

Pollution Controls

The means by which an emission reduction is achieved. Generally this term is used in reference to the technological controls installed by a source - scrubbers, electrostatic precipitators, or other abatement equipment. However, it includes any measure taken to achieve emission reductions - shutdowns, production cutbacks, altered work practices, alteration of inputs or production processes, etc.

Prevention of Significant Deterioration (PSD)

Provisions of the 1977 Clean Air Act Amendments to prevent the deterioration of ambient air quality in clean areas. The Amendments establish three classes of areas where air quality meets or exceeds the national ambient air quality standa[illegible]. PSD areas are designated: Class I (large national parks and wilderness areas); Class II (very clean areas where moderate industrial growth is permitted); and Class III (Class II areas designated for industrial development). The purpose of the PSD program is to prevent existing ambient air quality with respect to sulfur oxides and total suspended particulate matter from deteriorating more than an established amount beyond baseline pollution concentration levels, called a PSD increment. With respect to other pollutants regulated under the Clean Air Act, no increments have been set; however, new and modernizing sources are subject to new source review requirements and must use BACT.

<u>Primary Standards</u> - See "NAAQS".

<u>Reasonable Further Progress</u> (RFP)

The requirement under the Clean Air Act that areas designated nonattainment achieve annual incremental steps toward satisfyin ambient air quality standards by the designated deadlines.

<u>Reasonably Available Control Technology</u> (RACT)

Required of existing sources in areas that have not achieved national ambient air quality standards. Refers to the lowest emission limit that a particular source is capable of meeting b the application of control technology that is reasonably available considering technological and economic feasibility. For many categories of sources, EPA provides guidance for technical definitions of RACT (See "Control Technique Guidelines").

<u>Secondary Standards</u> - See "NAAQS".

<u>Source</u>

Any building, structure, facility, or installation which emits any air pollutant. A source may include several specific emitti points, but is limited to those owned by a single legal entity.

the term may be defined differently for different air quality control programs.

State Implementation Plan (SIP)

The legal mechanism, subject to approval by EPA, by which a state proposes to achieve and maintain the ambient air quality requirements of the Clean Air Act. The SIP specifies emission reductions from stationary and mobile sources necessary to meet ambient air quality standards in an air quality control region. EPA may draft and promulgate a SIP or portions of a SIP if the state privisions are jedged by EPA to be inadequare. A "Conditionally approved SIP" is a SIP that has been approved by EPA with reservations as to additional measures that may be required to meet the NAAQS. An "accomodative SIP" imposes unequal emission reduction requirements on activities of the same category within a region.

Trade

The sale or other transfer of ERCs from one legal entity to another in some kind of market situation subject to review and approval by the competent air pollution control agency.

User Fee

Charges levied against sources that make use of the emission reduction banking system. The charges can be used to defray operating expenses or to fully fund the operation of the emission reduction banking program.

Variance

Temporary permission granted, under stated conditions, to a source operator to exceed the emission limits prescribed in a permit or regulation. Usually granted to allow time for engineering and fabrication of abatement equipment to bring the operation into compliance.

APPENDIX II

Federal Register Actions on Emissions Trading

Emission Offset Interpretative Ruling	Dec. 21., 1976	41 FR 55524
Revisions to Offset Ruling	Jan. 16., 1979	44 FR 3274
Bubble Policy	Dec. 11., 1979	44 FR 71779
Revisions to Offset Ruling	May 13., 1980	45 FR 31304
PSD, New Source Review and Offset Ruling Revisions	Aug. 7., 1980	45 FR 52676
Approval of New Jersey VOC Generic Bubble Rule	April 6., 1981	46 FR 20551
Federal Enforceability of Emission Limitations	July 15., 1981	46 FR 36695
Change in Definition of Source	Oct. 14., 1981	46 FR 50766
Emissions Trading Policy Statement	April 7., 1982	47 FR 15076
Emissions Trading Policy Statement	Aug. 31., 1983	48 FR 39580

APPENDIX III

federal register

Wednesday
April 7, 1982

Part III

Environmental Protection Agency

Emissions Trading Policy Statement; General Principles for Creation, Banking, and Use of Emission Reduction Credits

ENVIRONMENTAL PROTECTION AGENCY

[PRM-FRL-1994-5]

Emissions Trading Policy Statement; General Principles for Creation, Banking, and Use of Emission Reduction Credits

May 12, 1982.

AGENCY: Environmental Protection Agency.

ACTION: Proposed policy statement and accompanying technical issues document.

SUMMARY: It is the policy of EPA to encourage use of emissions trades to achieve more flexible, rapid and efficient attainment of national ambient air quality standards.

This Policy Statement describes emissions trading, sets out general principles EPA will use to evaluate emissions trades under the Clean Air Act, and expands opportunities for states and industry to use these less-costly control approaches. Emissions trading includes several alternatives to traditional regulation: bubbles, netting, and offsets, as well as banking (storage) of emission reduction credits (ERCs) for future use. These alternatives do not alter existing air quality requirements; they simply give states and industry more flexibility to meet these requirements. EPA endorses emissions trading and supports its accelerated use by states and industry to meet the goals of the Clean Air Act more quickly and inexpensively.

This Policy Statement replaces the original bubble policy (44 FR 71779, Dec. 11, 1979) and sets forth minimum legal requirements for creation, storage or use of emission reduction credits in any emissions trade. It also provides criteria for "generic" SIP rules under which states can approve bubble or other trades without case-by-case federal SIP review.

EPA encourages states to continue adopting generic trading rules and approving individual trades. Until EPA takes final action on this proposal, it will evaluate state actions under the principles set forth here and illustrated in the accompanying Technical Issues Document.

EFFECTIVE DATE: This Policy Statement is effective as interim guidance upon publication. The deadline for submitting written comments is July 6, 1982.

ADDRESSES: Comments should be sent in triplicate if possible to: Central Docket Section (A-130), U.S. Environmental Protection Agency, Washington, D.C. 20460. Attn: Doc. No. G-81-2.

DOCKET: EPA has established docket number G-81-2 for this action. This docket is an organized and complete file of all significant information submitted to or otherwise considered by EPA. The docket is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section. A reasonable fee may be charged for copying.

FURTHER INQUIRIES:

Ivan Tether, Regulatory Reform Staff (PM-223), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, (202) 382-2765.

or

Leo Stander, Office of Air Quality Planning and Standards (MD-15), Research Triangle Park, North Carolina 27711, (919) 541-5516.

SUPPLEMENTARY INFORMATION: Under Executive Order 12291, EPA must judge whether this action is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. This action is not major because it establishes policies that are voluntary and can substantially reduce costs of complying with the Clean Air Act. Furthermore, it can reduce administrative complexity by reducing the number of trades which must be approved by EPA, can stimulate innovation in pollution control, and can allow state and local pollution control agencies to conserve scarce resources.

This Policy Statement was submitted to the Office of Management and Budget for review. Any comments from OMB to EPA are available for public inspection in Docket G-81-2. Pursuant to 5 U.S.C. 605(b), I hereby certify that this action will not have a significant economic impact on a substantial number of small entities. As a policy designed to allow firms flexibility and to reduce administrative complexity, it will impose no burdens on either small or large entities.

I. Introduction: Components of Emissions Trading

This statement details EPA policy on emissions trading. It presents the minimum conditions EPA considers necessary for emissions trades to satisfy the Clean Air Act. It simplifies past requirements and expands opportunities to use these more efficient alternatives.

A. What Is Emissions Trading?

Emissions trading consists of bubbles, netting, emission offsets, and emission reduction banking. These alternatives involve the creation of surplus reductions at certain emission sources and use of these reductions to meet requirements applicable to other emission sources. Emission trades can provide more flexibility, and may therefore be used to reduce control costs, encourage faster compliance, and free scarce capital for industrial revitalization. Moreover, by developing "generic" trading rules (see section III below) states [1] and industry can be excused from SIP revisions, and attendant delay and uncertainty, for many individual bubbles or other trades.

B. The Bubble Policy and Today's Improvements

EPA's bubble policy lets *existing* plants (or groups of plants) decrease or be excused from pollution controls at one or more emissions sources in exchange for compensating increases in control at other emission sources. Bubbles give plant managers flexibility to develop less costly ways of meeting air quality requirements. Each bubble must be equivalent to the original emission limits in terms of ambient impact and enforceability. Bubbles cannot be used to meet technology-based requirements applicable to new sources.

This Policy Statement replaces the original bubble policy (Dec. 11, 1979; 44 FR 71779) and broadens opportunities for the bubble's use. Major changes include:

- Authorizing generic trading rules for all criteria pollutants;
- Extending use of the bubble to areas which lack approved demonstrations of attainment of the national ambient air quality standards;
- Expanding opportunities for use of bubbles as an alternative means of meeting reasonably available control technology (RACT) requirements;
- Reducing unnecessary requirements for detailed air quality modeling of the ambient impact of each trade;
- Reducing unnecessary constraints on trades involving open dust sources of particulate emissions;
- Allowing VOC and CO sources more time to implement bubbles under administrative compliance schedules, consistent with reasonable further progress and statutory deadlines for attaining ambient standards;
- Allowing sources to use the bubble to come into compliance, instead of having to be on a compliance schedule with original SIP limits to be eligible to bubble; and

[1] "States" includes any entity properly delegated authority to administer relevant parts of a State Implementation Plan (SIP) under the Clean Air Act.

• Allowing broader use of emission reductions from shutdowns.

These and other changes are explained below and in the accompanying Technical Issues Document.

C. Netting

Netting removes the burden of new source review requirements from plants expanding or modernizing in PSD and nonattainment areas, so long as any increase in plant-wide emissions is insignificant. By "netting out" of review the new facility may be exempted from preconstruction permits and associated requirements, including monitoring and modeling, installation of BACT or LAER control technology, the offset requirement, and applicable bans on new construction. The new facility must still meet emission limits established by new source performance standards (NSPS) under Section 111 of the Clean Air Act. Rules governing netting for sources in attainment (PSD) areas were published on August 7, 1980 (45 FR 52676) and rules for nonattainment areas were expanded on October 14, 1981 (46 FR 50766).

D. Emission Offsets

In nonattainment areas, new major stationary sources and modifications may be required to secure sufficient surplus emission reductions to more than "offset" their increased emissions. This requirement is designed to permit industrial growth in nonattainment areas while improving air quality. It is currently implemented by rules published at 40 CFR 51.18(j) and 51.18 (Appendix S), as amended by 45 FR 52676 (August 7, 1980) and 46 FR 50766 (October 14, 1981).

E. Emission Reduction Banking

Banking lets firms store qualified emission reductions for later use in bubble, netting or offset transactions. Banked emission reduction credits (ERCs) can also be sold to firms seeking alternate ways to meet regulatory requirements more quickly flexibly.

EPA's revised offset ruling (40 CFR 51.18, Appendix S) authorized states to establish banking rules as part of their SIPs. This Policy Statement and the Technical Issues Document are EPA's first detailed articulation of the necessary components of a complete state banking rule under the Clean Air Act.

F. Effect of This Policy Statement

Emissions trading is voluntary. States are free to adopt generic rules or let trades continue to be implemented as individual SIP revisions. They may adopt rules which incorporate all or any combination of these trading approaches.

EPA is issuing this Policy Statement as a proposal because elements of emissions trading, particularly banking, raise issues which have not yet been subject to public comment. EPA urges interest parties to address all relevant issues in their comments.

However, until final action the Agency intends to use the principles in this Statement to evaluate trading activities which become ripe for decision, including state adoption of generic bubble and banking rules. Many states are now implementing such rules and should continue to do so.

This Policy Statement is accompanied by a Technical Issues Document for use by states and industry in further understanding emissions trading. The Document offers more detail on minimum requirements and available options under the Clean Air Act. EPA also invites comment on any aspect of the Technical Issues Document.

This notice reflects the current Clean Air Act and existing regulations. A Policy Statement cannot legally alter such requirements. However, it establishes EPA policy in areas not governed by applicable regulations and sets out general principles which states and industry may use to apply those regulations in individual cases. Pending litigation or future rulemaking may alter the general principles outlined here and reflected in the Technical Issues Document. Future federal or state rulemaking, such as additional RACT requirements or changes in ambient standards, may also affect firms that have engaged in emissions trading activities.

II. Minimum Legal Requirements for Creating, Using, and Banking Emission Reduction Credits [3]

A. Creating Emission Reduction Credits

Emission reduction credits (ERCs) are the common currency of all trading activity. To assure that emissions trades do not contravene relevant requirements of the Clean Air Act, only reductions which are *surplus, enforceable, permanent,* and *quantifiable* can qualify as emission reduction credits and be banked or used in an emissions trade.

1. *Surplus:* Only emission reductions not currently required by law can be considered surplus. To define what is surplus, the state must first establish an appropriate emissions baseline against which surplus reductions can be calculated.

In nonattainment areas with approved demonstrations of attainment, the baseline must be consistent with assumptions used to develop the area's SIP. Only reductions not assumed in the area's demonstration of reasonable further progress and attainment can be considered surplus. This generally means that actual emissions must be the baseline where actual emissions were used for such demonstrations, and that allowable emissions may be the baseline where allowable emissions were used for such demonstrations.

In nonattainment areas lacking a demonstration of attainment, states may use a variety of baselines which do not jeopardize attainment by statutory deadlines. In general, states may use as baselines either actual emissions (with source commitment to future reductions if needed for attainment) or emission levels which reflect reasonably available control technology. However, where such areas must attain primary ambient air quality standards by December 1982, baselines reflecting reasonably available control technology for emission sources involved in the trade must be used.

In attainment areas, to be consistent with air quality requirements established in prevention of significant deterioration (PSD) programs under Section 110 and Part C of the Clean Air Act, actual emissions would normally be the baseline. States may use allowable emissions as the baseline, if proper consideration of increment consumption is assured.

2. *Enforceable:* To assure that Clean Air Act requirements are met, each transaction must be approved by the state and be enforceable. Enforceable emission limits may be created through SIP revisions (see Section IV), under generic trading rules (see Section III), through new source construction permits; or through state permits issued under 40 CFR 51.18, among other ways.

3. *Permanent:* Only permanent reductions in emissions can qualify for credit. Permanence can generally be assured by requiring changes in source permits to reflect a reduced level of permissible emissions.

4. *Quantifiable:* Emission reductions must be quantifiable in terms of both *measuring* the amount of the reduction

[3] Because this Policy Statement and accompanying Technical Issues Document reflect general Clean Air Act principles, states and individual sources are free to show that a general principle does not apply to particular circumstances or could be satisfied using approaches other than those described. States and sources have this option under current law, and nothing in this Policy Statement or the accompanying Technical Issues Document restricts their opportunity to make such showings.

and *charcterizing* that reduction for future use. Quantification may be based on emission factors, stack tests, monitored values, operating rates and averaging times, process or production inputs, modeling, or other reasonable measurement practices. The same method of calculating emissions should generally be used to quantify emission levels before and after the reduction.

B. Using Emission Reduction Credits

ERCs may be used by sources in bubble, netting, or offset transactions. The general principles below will assure that all uses of ERCs are consistent with ambient attainment and maintenance considerations under the Clean Air Act.

1. *Emissions trades must involve the same criteria pollutant.* An emission reduction may only be traded against an increase in the same criteria pollutant. For example, only reductions of particulates can be substituted for increases of particulates, reductions of VOCs for increases in VOCs.

2. *All uses of ERCs must satisfy applicable ambient tests.* the Clean Air Act requires that all areas throughout the country attain and maintain national ambient air quality standards. The ambient effect of a trade depends on the dispersion characteristics of the pollutant involved. Ambient considerations will generally not affect trades involving VOC or NO_x, whose impacts occur across broad geographic areas. For these pollutants "pound for pound" trades may be treated as equal in ambient effect. However, dispersion characteristics are important for bubble and offset trades of SO_x, TSP, or CO whose ambient impact may vary with where the emission increases and decreases occur. Trades of these pollutants must demonstrate equivalent ambient impact under the three-tiered modeling screen discussed in the Technical Issues Document or under a similar approach.

3. *Trades should not increase hazardous pollutants.* Except as may be specifically permitted by future national emission standards for hazardous air pollutants (NESHAPs), a source may not use a bubble to meet NESHAPs requirements or increase emissions beyond the levels they prescribe. Where a significant fraction of a criteria pollutant stream has been listed under Section 112 but not yet regulated, the hazardous emissions involved in the trade should either remain equal or should decrease (i.e., be traded down).

4. *Emission trades cannot be used to meet applicable technology-based requirements.* New or expanding sources cannot use ERCs to meet new source performance standards, best available control technology requirements in PSD areas, or lowest achievable emission rate control technology requirements in nonattainment areas.

5. *States may allow bubbles in areas without approved demonstrations of attainment.* States are authorized to approve bubbles in such areas, so long as timely attainment of air quality standards will not be jeopardized. (See Section II.A above and the Technical Issues Document).

6. *Sources may use the bubble to achieve compliance.* States may allow sources to use a bubble to achieve rapid compliance once applicable emission limits and deadlines are established as part of a bubble application. States need not require sources to develop and go forward with detailed plans (including ordering equipment) to meet original emission limits when new limits which will supercede them are pending under a bubble application.

7. *States may extend certain compliance schedules.* States may give sources more time to implement bubbles by granting compliance extensions as part of approvals under generic rules, where (i) the area has received an attainment extension under Section 172(a)(2) of the Clean Air Act (applicable to VOC or CO); and (ii) the total amount of reductions required to satisfy the state's reasonable further progress demonstration will not be reduced for each year in question. States may grant similar compliance extensions for VOC or CO bubbles approved as individual SIP revisions subject to (i) above, provided the extension is consistent with reasonable further progress requirements (See section IV below).

8. *States may approve bubbles involving open dust sources of particulate emissions, based on modeling demonstrations.* This action reduces past restrictions on trades involving open dust sources of particulate emissions. Such trades may be approved based on acceptable modeling and/or monitoring demonstrations, provided sources agree to post-approval monitoring to determine if predicted air quality results have been realized.

C. Banking Emission Reduction Credits

Only emission reductions that are surplus, permanent, enforceable, and quantifiable can be banked. To provide maximum protection for sources and avoid future legal problems, state banking rules should specify the ownership rights established, the types of sources eligible to bank ERCs, and any additional conditions placed on certifying, holding, or using banked ERCs.

As a legal minimum, state banking rules must establish ownership rights which are consistent with Clean Air requirements, including the requirem that SIPs provide for attainment and maintenance of ambient air quality standards "as expeditiously as practicable." States have considerab latitude in meeting this requirement. may guarantee banked ERCs against any ambient-based reduction in quantity, so long as that guarantee d not interfere with reasonable further progress and attainment should ambi standards change or additional emiss reductions be required.

In most states banking will be an extension of ongoing permit activitie The state or its designee will accept evaluate requests to certify an ERC, maintain a publicly available ERC registry or similar instrument describ the quantity and types of banked credits, and track transfers and withdrawals of ERCs.

III. State Generic Trading Rules

Use of emission reduction credits under state generic rules approved by EPA will not require individual SIP revisions. The Technical Issues Document explains acceptable generi rules and procedures which states ma adopt to reduce the need for individu SIP revisions.

Emissions trades can be approved without SIP revisions if evaluated und EPA-approved state procedures that assure no trade will interfere with timely attainment and maintenance o ambient standards. State generic rule are approvable only if their procedure are sufficiently replicable in operation meet this test. By approving the gener rule, EPA approves in advance an arr of acceptable emission limits, and no further case-by-case federal approval required for individual trades develop under the rule.

Any trade under a generic rule will involve emission increases at some sources and emission decreases at others. For trades to be approvable under a generic rule, the sum of these increases and decreases (i.e., applicab net baseline emissions) must be zero less. States may adopt generic rules which exempt from individual SIP revisions: (1) *de minimis* trades whose sum of the emission increases, looking only at the increasing sources, totals less than 100 tons per year after applicable control requirements: (2) trades involving VOC or NO_x emissio (3) trades between SO_x sources between CO sources, or bet TSP sources, provided those sources are located in the same immediate vicinity and emissions do not increase at the source with the lower effective plume height; and (4) other SO_x, CO or TSP trades which do not increase emissions and for which carefully defined use of a screening model predicts no significant increase in ambient concentrations. EPA encourages states to adopt such rules or develop alternative approaches that equally assure attainment and maintenance of ambient standards.

To the extent state procedures for rulemaking or permit changes do not assure reasonable public notice and opportunity for comment on proposed trades, states should incorporate such provisions as part of their generic rules.

IV. Trades Not Covered by Generic Rules

States and sources may continue to use the SIP revision process to implement trades which are not covered by a generic rule. Because the SIP revision process can take account of many more individual variations, trades which could not be accomplished under a generic rule may still be implemented as site-specific SIP revisions.

EPA will take action on generic rules and individual trades submitted as SIP revisions as quickly as possible after a state has adopted a SIP revision and submitted the action to EPA. EPA encourages "parallel processing" of such revisions, with EPA and the state conducting concurrent review so that both agencies can propose and take final action at roughly the same time. EPA will also publish noncontroversial SIP revisions as immediate final actions, converting them to proposals only if requests to submit comments are received within 30 days (see 46 FR 44477; Sept. 4, 1981).

V. Conclusion

This Policy Statement sets out basic principles for individual trades and approvable generic trading rules. EPA encourages states to use these principles as a framework and refer to the accompanying Technical Issues Document for further discussion and examples. States are encouraged to design other rules which satisfy these principles but meet their specific needs.

As a policy statement, this notice does not establish conclusively how EPA will resolve issues in individual cases. EPA will accept public comment on this proposal as well as on specific SIP changes submitted under it, and will review individually each generic rule and those emissions trades submitted as SIP revisions to determine their acceptability under the Clean Air Act. Interested parties will have full opportunity to scrutinize application of these general principles to specific cases, and to seek subsequent judicial review of such cases, when particular generic rules or individual trades are proposed and approved.

This Statement expands opportunities to use emissions trading. If implemented by states it can allow industry to use the bubble and other trading approaches in additional circumstances and geographic areas. The policy will also reduce adversary tensions, allow states to benefit from industrial knowledge, and encourage quicker compliance, while reducing unnecessary federal review. It represents important regulatory reform, for states as well as industry, by encouraging greater flexibility in meeting air quality goals.

Dated: April 2, 1982.

Anne M. Gorsuch,

Administrator.

Emissions Trading: Technical Issues Document

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Emissions Trading: Technical Issues Document

This Document offers more detail on technical issues for firms and pollution control agencies seeking to implement individual emission trades or generic trading rules that meet the principles in EPA's Emissions Trading Policy Statement.[1] It describes both the minimum legal requirements for emissions trades under the Clean Air Act, and a range of legal options which states [2] may consider. States and industry are encouraged to pursue other approaches consistent with those discussed here.

Emissions trading is voluntary. States may implement emissions trades on a case-by-case basis or develop generic trading rules covering one or more classes of transactions. Trades under approved generic rules will be exempt from individual SIP revisions. Such rules can also provide greater certainty by specifying which trades are quickly approvable.

Section I of this Document explains general legal principles governing all emissions trading. Section II explains principles governing state generic rules. Section III discusses special considerations for emission trades implemented as individual SIP revisions.

Because these sections reflect general Clean Air Act principles, states and individual sources remain free to show that a general principle does not apply to particular circumstances or can be satisfied using another approach. States and sources have this option under current law, and nothing in the Policy Statement or this Document restricts their opportunity to make such showings. (See Section III below).

[1] Emissions trading was formerly known as "controlled trading".

[2] "States" includes any entity properly delegated authority to administer relevant parts of a State Implementation Plan (SIP) under the Clean Air Act.

1. Components of Emissions Trading

The components of any emissions trade are the *creation* of an emission reduction credit (ERC), its *use* in a trade, and its possible *storage* in a bank.

A. Creating Emission Reduction Credits

States may grant credit only to those emission reductions that are *surplus, enforceable, permanent,* and *quantifiable.* Otherwise use of ERCs might degrade air quality, threaten the viability of the area's SIP, and result in more stringent controls.

1. *All Reductions Must Be Surplus.* Only surplus reductions not currently required by law can be substituted for required reduction as part of an emissions trade without jeopardizing air quality goals.

The first step in qualifying a reduction as "surplus" is to establish a level of baseline emissions. The baseline identifies the level of required emissions beyond which reductions must occur for a source to receive credit. It will generally be determined by whether the area is attainment or nonattainment, and by the way the state developed its SIP.

a. *Use of Actual or Allowable Emissions as the Baseline.* In *attainment areas* the baseline will generally be actual emissions—only reductions below a source's actual level of historical emissions can be considered surplus. Because current regulations specify actual air quality as the basis for determining increment consumption, these rules normally require that actual emissions be used for the area's maintenance strategy. (See 45 FR 52717; Aug. 7, 1980). However, allowable emissions may be used as the baseline if proper consideration is given to increment usage.

In *nonattainment areas* the baseline may be either maximum allowable emissions or actual historical emissions.[3] To determine which baseline is appropriate, the state should examine the assumptions used in developing its demonstration of attainment.

In *nonattainment areas which used allowable emissions as the basis for their attainment strategy,* sources can use their SIP allowable limits as the baseline for creating ERCs. Many states used allowable limits in developing their SO_2 and TSP attainment plans.

Other nonattainment areas used inventories that were either substantially deficient or based on actual emissions, or they relied on measured (and therefore "actual") ambient values as the primary basis for determining SIP emission limits needed to demonstrate attainment. Under current EPA regulations, in these areas some level of actual historical emissions would generally be the baseline. *However,* these areas may approve use of allowable emissions as the baseline on a case-by-case basis, where that use comports with reasonable further progress and the source shows it will neither create a new ambient violation nor prevent the planned removal of an existing violation. (See Section III)

b. *Surplus Reductions in Areas Lacking Approved Demonstrations.* In several jurisdictions demonstrations of attainment are not yet complete. Some of these jurisdictions are uncertain where to secure sufficient emission reductions; others have not yet adopted enforceable emission limits based on reasonably available control technology (RACT) for specific industrial processes. Additional emission controls on these or other sources generally are needed to reach attainment. The question is how "surplus" should be defined for sources lacking SIP-defined RACT emission limits in these areas. Where RACT is already defined in the SIP, it will of course be the baseline. Where RACT for relevant source categories has not been defined, credit for surplus reductions may be granted in at least two general ways which are consistent with Clean Air Act requirements for reasonable further progress and attainment.

(i) *Use of a RACT Baseline.* If RACT has not been defined in the SIP, the source may agree with the State and EPA to an acceptable RACT limit for the emission sources involved in the trade. A surplus would then consist of any emission reductions in excess of those required to meet RACT. Where sources voluntarily agree to such a RACT level, EPA encourages states not to reexamine the agreed-upon individual emission levels for a period of time consistent with the statutory deadlines for attainment, unless there is no other practical way to satisfy requirements of the Clean Air Act.

A RACT baseline is the only option in areas that will not attain the relevant primary ambient standard by December 1982 and have not received attainment extensions for such standard. Because of the extremely short time period remaining for attainment and the practical difficulty of securing further reductions prior to the December 1982 deadline, this limitation is necessary to assure that trades in these areas comport with the statutory deadline and the mandate for RACT "as expeditiously as practicable."

(ii) *Use of Actual Emissions Baseline.* Areas that will not attain the primary ozone or CO ambient standard by December 1982, but have received attainment extensions until 1987, as well as areas with plans that will attain the primary (but not the secondary) TSP or SO_2 ambient standard by December 1982, may use current actual emissions (or "old" Section 110 SIP limits if applicable) as the baseline. Under this option, sources in these areas could trade using individual emission sources not yet subject to RACT limits, so long as states clearly advise sources of their responsibility to find or produce reductions equivalent to future RACT requirements if and when the state imposes them and sources commit to meet these future requirements. This would give industry flexibility to create and use ERCs at the earliest date. It would also avoid having to negotiate individual RACT baselines through case-by-case SIP revisions.

States that choose not to rquire negotiated RACT baselines should be aware that their SIPs must still comply with Section 172(b)(2), which requires imposition of RACT "as expeditiously as practicable."

C. *No Double-Counting of Reductions.* To be considered surplus, an emission reduction cannot already have been included as part of the area's baseline emissions. Double-counting of reductions—granting credit for the same emission reduction, once to the state and a second time to a source for use in an emissions trade—must be addressed in the following situations.

(i) *Crediting Pre-Existing Emission Reductions.* In *nonattainment areas* credit generally cannot be granted for emission reductions made before monitoring data was collected for use in SIP planning. Because monitored ambient levels may have *already* reflected these emission decreases, they would have been assumed in calculating the reductions needed to attain ambient standards. States should clearly identify in their rules the date before which reductions will not qualify for credit. The earliest acceptable baseline date would normally be the year of the most recent emission inventory or monitoring data used in planning Part D SIP revisions under the Clean Air Act Amendments of 1977.

In *attainment areas* emission reductions that occurred before the PSD emissions baseline was established generally cannot qualify for credit. States have already assumed these reductions in their PSD baselines. If

[3] See. 45 FR 52728 (Aug. 7, 1980). Several aspects of EPA's August 7th regulations, including the definition of baseline, are currently under judicial review. Any rulemaking changes which result from that litigation may be controlling here.

credited and later used, they could undermine the area's strategy to maintain air quality.

(ii) *Crediting Reductions From Shutdowns.* In general, a state may credit reductions from shutdowns for *bubble trades* if the SIP has not already assumed credit for these reductions in its attainment strategy. So long as reductions from shutdowns have not already been counted in developing an area's attainment strategy, they are an appropriate source of surplus reductions for bubble trades.

Many SIPs assumed a set quantity of reductions from new plant openings and existing plants shutdowns. These SIPs incorporated into their attainment strategy a net "turnover" reduction in emissions because new sources are generally cleaner than those that shut down. Double-counting would occur if a specific source received credit for reductions from such a shutdown, since that reduction was already assumed in the SIP's demonstration of attainment.

States have at least three options to grant sources credit without this kind of double-counting. *First,* they may re-examine any "turnover" credits in their SIP and decide not to take credit for these reductions. *Alternatively,* they may allow credit only after the total quantity of shutdown reductions assumed in the SIP has occurred. *Finally,* they may allow credit for a percentage of the total emission reductions realized from a shutdown, if they can show that such credit is consistent with the SIP's demonstration of attainment and reasonable further progress.

d. *Multiple Use of ERCs.* Once surplus reductions are credited, states should guard against their multiple use. In general, the same ERCs must not be banked by two different entities or used to satisfy two different regulatory requirements at the same time. To prevent these results, states should adopt an ERC registry or equivalent means of accounting for the creation, banking, transfer, or use of all ERCs. (See Section I.C.5)

e. *Reductions from Uninventoried Sources.* Sources not included in an area's SIP emission inventory may apply for credit. In general, so long as granting credit for reductions from these sources will not jeopardize an area's demonstration of attainment or reasonable further progress, there are no legal restrictions on such credits.

In *attainment areas* all sources, regardless of whether they have been included in an inventory, may create ERCs using actual emissions as the baseline. Those emissions need only have been included in the area's PSD baseline.

In *nonattainment areas,* whether sources not on the inventory can create ERCs will turn on how the SIP's demonstration of attainment was designed.

Some areas first monitored ambient values to determine required SIP reductions, then required a proportionate reduction in emissions from certain source categories in order to attain. These areas may grant credit for reductions from uninventoried sources in at least three ways. *First,* they could required the source to use a RACT baseline and grant credit only for reductions below that baseline. *Alternatively,* they could require the same percentage reductions as imposed on inventoried sources, and grant credit only for reductions in excess of that amount. *Finally,* where no demonstration of attainment exists, they may use either a negotiated RACT baseline or (in appropriate circumstances) an actual emissions baseline. (See Section I.A.1.B above)

Other areas developed SIP demostrations based on ambient air quality models rather than area-wide proportionate reductions. To the extent these DIPs demonstrated ambient attainment through reductions required from inventoried sources, reductions from sources not on the inventory can be credited using actual emissions as the baseline.

2. *Alternative Emission Limits Must Be Enforceable. Each bubble, netting, offset or banking transaction must be enforceable and must approved by the state. Under current EPA regulations reductions used in bubble, offset and netting trades must be federally enforceable.*[4] This requirement for enforceability can generally be satisfied either through existing procedures (including individual SIP revisions or state permits issued under 40 CFR 51.18) or through generic rules, since any enforceable compliance instrument imposing emission limits within the scope of a generic rule is deemed part of the SIP.

Emission limits estalished by a trade maust also be incorporated in a compliance instrument which is legally binding and practicably enforceable. *Trades involving individual SIP revisions* automatically satisfy this requirement.

For *trades under generic rules,* a compliance instrument could take the form of an agreement between the source and state, and operating or preconstruction permit, or a consent decree. Many State permits and permit procedures may need revisions to assure that they provide adequate compliance information. However, such revisions need only occur on a case-by-case basis as individual trades are approved.

Compliance instruments should assure that enforcement officials do not have to test simultaneously every emission source involved in a trade. This generally means source-specific emission limits. However, states may use an overall emission limit that applies to a group of emission sources which can be monitored sumultaneously. This will generally require a reliable method of determining compliance through production records, input factors, or similar indirect means. (See 45 FR 80824; Dec. 8, 1980)

The compliance instrument should also specify applicable restrictions on hours of operation, production rates or input rates; enforceable test methods for determining compliance; and necessary recordkeeping or reporting requirements. To be enforceable, these limits must state the minimum time period over which they will be averaged (e.g., lbs/hour, lbs/MMBtu averaged over 24 hours, production rate/day).

3. *All Emission Reductions Must Be Permanent.* An emission reduction credit must be a permanent reduction in the level of pollution emitted by a source. Use of an ERC which is not permanent could adversely affect air quality by allowing increased emission from both the source creating the ERC and the source where it is used.[5]

To receive credit for reductions in operations (e.g., a reduction from 3 to 2 workshifts), a source must have its permit or other compliance instruction altered to reflect the curtailment in production. Future increases in production beyond the permit amount would generally require compensating emission reductions.

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[4] In July 1981 EPA administratively stayed certain rules relating to federal enforceability requirements for netting and offsets. 46 FR 36695 (July 15, 1981). This stay has expired and has not been renewed. Requirements of existing regulations accordingly remain applicable.

[5] As an alternative, states may allow trades whose emission increases and emissions decreases are equal in duration rather than strictly permanent. This is the minimum legal requirement under the Clean Air Act, but may require states to track trades over time to assure ambient equivalence.

Permanence may present special but resolvable problems for reductions from small sources not subject to permits, offset requirements, or production constraints. States which grant credit from these source categories should address the possibility that reductions from one source may be followed by equal or greater increases from similar sources in adjacent areas.

4. *All Reductions Must Be Quantifiable.* Before an emission reduction can be credited it must be quantified. This generally means the state must establish a reliable basis for *Measuring the amount and rate* of the reduction and *describing its characteristics.*

a. *Measuring the Reduction.* To quantify ERCs, emissions must be calculated both before and after the reduction. Although many different methods of calculation are available (e.g., emission factors, stack tests, monitored values, production or process inputs), the same method and averaging time should generally be used to quantify emissions before and after the reduction.

b. *Describing the Reduction.* If an ERC is to be used at the time of creation, only characteristics necessary to evaluate that proposed use need be described. Where the ERC is to be banked and its eventual use is not yet known, a more detailed description is advisable.

B. Using Emission Reduction Credits

This section explains the substantive and procedural principles applicable to use of ERCs in bubble, netting or offset transactions.

1. *Substantive Principles for Using ERCs.*

a. *Emissions Trades Must Involve the Same Pollutant.* The Clean Air Act requires states to develop separate plans to attain and maintain the national ambient air quality standard for *each* criteria pollutant. Thus, all individual bubble, netting or offset cases must involve the same pollutant. Only reductions of particulates can substitute for increases of particulates, reductions of SO_x for increases in SO_x, etc.

b. *All Uses of ERCs Must Satisfy Ambient Tests.* The Clean Air Act requires that all areas throughout the country attain and maintain ambient standards. In *nonattainment areas*, use of ERCs cannot create a new violation of an ambient standard or prevent the planned removal of an existing violation. In *attainment areas*, use of ERCs cannot violate an increment or ambient standard. The ambient effect of a trade generally depends on the dispersion characteristics of the pollutant involved.

VOC or NO_x Trades. Ambient considerations will not affect trades involving VOC or NO_x, whose impacts occur across broad geographic areas. Within such areas one ton of decreased emissions is generally equivalent in ambient effect to one ton of increased emissions, since the precise location of those increases and decreases ordinarily does not matter. For these pollutants, "pound for pound" trades may be treated as equal in ambient effect.

TSP, SO_x or CO Trades. Ambient considerations are critical for trades involving SO_x, particulates, or carbon monoxide, whose air quality impact may vary with where the emission increases and decreases occur. One hundred tons of ERCs for these pollutants created at one site may balance the ambient impact of a 100-ton increase at a site nearby, but may only balance the effect of an 80-ton increase at a site further away. In addition to distance between sources, plume parameters, pollutant characteristics, meterology, and topography will also affect the ambient impact of such a trade.

As a general principle, bubble applications must demonstrate ambient "equivalence" and offset transactions must demonstrate ambient progress. Such demonstrations have typically been made through mathematical dispersion modeling which predicts the ambient impact of various emissions.

This Document authorizes use of a three-tiered screen with the degree of required modeling linked to the likely ambient impact of the proposed trade. The following sections describe use of this modeling screen to approve many trades without full-scale ambient modeling. Use of this modeling screen to define the scope of generic rules is discussed in Section II below.

(i) *Level I:* In general no modeling is needed if the proposed TSP, SO_x or CO trade does not result in a net increase in applicable baseline emissions, the relevant emission sources are located in the same immediate vicinity, and no increase in emissions occurs at the source with the lower effective plume height. In such cases it can reasonably be assumed that "pound-for-pound" trades will produce ambient effects equivalent to what current modeling would predict, and modeling is not required.

(ii) *Level II:* Only limited modeling involving the specific emission sources in the trade is needed for trades not included in Level I, if there is no net increase in applicable baseline emissions and if emissions after the trade will not cause a significant air quality impact at the receptor of maximum predicted impact. In determining "significant" impact, states may use the significance levels established by EPA for determining when air quality monitoring is necessary for PSD cases: 10 $\mu g/m^3$ for the 24-hour standard for TSP; 13 $\mu g/m^3$ (24-hr) for SO_x; and 575 $\mu g/m^3$ (8-hr) for CO. (*See*, 45 FR 52709, Aug. 7, 1980). These levels appropriately identify trades whose potential ambient impact need not be further evaluated before approval.

(iii) *Level III:* Full dispersion modeling, considering all sources in the area of impact, is required if net applicable baseline emissions will increase as a result of the trade *or* if the trade will have a significant impact on air quality at the receptor showing maximum ambient impact.

This modeling screen will ensure that the air quality impact of trades is equivalent to the impact of the original SIP limits.

c. *Trades Should Not Increase Net Baseline Emissions in Nonattainment Areas.* Congress required *nonattainment areas* to demonstrate reasonable further progress (RFP) by reducing emissions each year in amounts sufficient to attain ambient standards by statutory deadlines. In general, RFP is measured by an areawide quantity of reduced emissions.

Trades in such areas which increase total emissions can generally occur only as individual SIP revisions in which the state either demonstrates that the trade is consistent with RFP or revises RFP as part of the proposed SIP revision. EPA will approve such revisions as amendments to the SIP, provided they comport with ambient air quality standards and reasonable further progress.

However, such trades may occur under generic rules where existing sources were required to reduce emissions beyond the amount required to bring the area into attainment. In such cases a growth margin was created which may be used at the discretion of the state to compensate for any increases in emissions without violating reasonable further progress requirements.

In attainment areas trades increasing total emissions could generally be permitted, but may consume some or all of the increment, trigger PSD review, or both.

d. *Emissions Trades Should Not Increase Hazardous Pollutants.* Under the Clean Air Act all sources must meet applicable Section 112 (NESHAPs) regulations for hazardous air pollutants. Except as may be specifically permitted in future Section 112 regulations, a source may neither use a bubble to meet these requirements, nor increase emissions beyond the levels they prescribe.

Where pollutants have been listed under Section 112, but are not yet subject to specific regulations, states may allow trades consisting of equivalent increases and decreases of the same listed pollutant at reasonably close emission points. States may also approve trades in which reductions in hazardous emissions compensate for increases in non-hazardous emissions. For example, a source may trade benzene for any non-hazardous VOC, if the benzene emissions are decreased (i.e., "traded down").

e. *Emissions Trades Cannot Be Used to Meet Technology-Based Requirements.* The Clean Air Act specifically requires new or expanding sources to meet technology-based new source performance standards (NSPS), regardless of the attainment status of the area in which they are located. This requirement prohibits use of bubbles to meet or avoid NSPS, and has been interpreted to bar use of such a bubble to meet new source review requirements for best available control technology (BACT) in PSD areas, or lowest achievable emission rate control technology (LAER) in nonattainment areas. Thus, new emissions sources subject to new source review cannot use ERCs from existing sources to satisfy these requirements.

Expanding or modernizing sources can, however, use *internal* emission reductions from within the same plant to "net out" of new source review. Such sources still must meet NSPS, but are not subject to BACT in attainment areas (45 FR 52676; Aug. 7, 1980) or LAER in nonattainment areas (46 FR 50766; Oct. 14, 1981), since they are not considered new sources under Parts C and D of the Clean Air Act.

f. *Trades Involving Open Dust Emissions.* Trades involving open dust sources of particulate emissions may be approved based on modelled demonstrations of ambient equivalence. Sources proposing such trades should be required to undertake a post-approval monitoring program to evaluate the impact of their control efforts. If the results of monitoring indicate that initial open dust controls do not produce the predicted air quality impact, further enforceable reductions may be required. States must either require sources to acknowledge their responsibility for further reductions, or deem trading applications to be such an acknowledgment, as a condition of approval.

2. *Procedural Steps for Using ERCS.* Emission trades may be implemented through individual SIP revisions or state generic rules. This section describes principles applicable to either procedure. General principles for generic rules are discussed in Section II below. Special considerations for trades which still require individual SIP revisions are discussed in Section III.

a. *Bubbles Can Be Used to Achieve Compliance.* The bubble policy required that sources be subject to binding compliance schedules based on original SIP emission limits before being eligible to apply for bubbles. This requirement threatened sources with tight milestones for the purchase of conventional control equipment and tended to discourage both rapid compliance and flexibility. Under today's Policy Statement states may promote rapid compliance by allowing sources to agree to emission limits established as part of their bubble application, instead of requiring sources to agree to compliance plans based on their original SIP limits before an application can be filed.

b. *Extensions of Compliance Deadlines.* States may extend compliance deadlines for VOC or CO sources on a case-by-case basis as part of bubble approvals. The Clean Air Act limits such extensions to sources which are located in areas that have received VOC or CO attainment extensions until 1987, and whose bubble will be consistent with reasonable further progress requirements. Because this will usually require a revision of the state's reasonable further progress demonstration, such extensions must generally be submitted as SIP revisions.

However, states may also grant compliance extensions without case-by-case SIP revisions as part of bubble approvals under a generic rule. The rule should provide that: (1) Extensions may only be granted in areas which have received attainment extensions to 1987; and (2) the total amount of reductions claimed in the state's approved RFP demonstration will not be reduced for each year in question. For example, if a source wishes to defer 100 tons per year of reductions from 1982 to 1985, then as part of the bubble approval, the state must show that an additional 100 tons per year of reductions has already occurred in 1982, or that provisions for such additional reductions already exist.

c. *Pending Enforcement Actions.* A bubble cannot be approved for an individual emission source which is presently the subject of a federal enforcement action or outstanding enforcement order unless EPA (and where necessary the appropriate court) approves the proposal and the compliance schedule it contains. This applies to civil actions filed under Clean Air Act Section 113(b), criminal actions filed under Section 113(c), a notice imposing noncompliance penalties issued under Section 120, administrative orders issued under Section 113(a), or a citizen suit filed under Section 304 where EPA has intervened.

This requirement need not preclude bubble approvals under generic rules, provided an appropriate mechanism for securing and recording EPA approval is used. Sources should, however, be aware that such approvals cannot be finally effective until approved by the appropriate court.

C. Banking Emission Reduction Credits

State SIP rules may include a banking provision which addresses ownership and holding of ERCs over time. Without such a provision, firms risk losing surplus reductions should a major SIP revision or new set of control requirements be instituted. Generic banking rules can afford such ERCs substantial protection consistent with the Act's mandate to attain and maintain ambient standards.

The bank can accept and evaluate requests to certify an ERC, serve as a clearinghouse for credits on deposit, and account for transfers and withdrawals of ERCs. These roles will generally be performed by the state as part of its normal permitting activities.

The following sections address both minimum legal requirements for state banking rules and issues states should consider. States may adopt other approaches which produce equivalent results.

1. *Banking Rules Must Designate an Administering Agency.* Banking rules must identify the entity responsible for specific functions. While the state will ordinarily be responsbile for verifying and processing ERC requests, all or part of this responsibility may be delegated to other organizations. Such organization(s) must possess the resources and legal authority to implement delegated activities.

2. *Only ERCs May be Banked.* Banked emission reductions msut be *surplus, permanent, quantifiable* and *enforceable.* This generally means that such reductions must be made at the time they are deposited in the bank as ERCs. *However,* if a firm commits to produce a specific reduction in the future, a state may allow a conditional deposit to be made. In all cases the reduction must actually be achieved before it can be used in an emissions trade.

3. *Procedures for Banking ERCs Should be Defined.* To speed approval of trades and provide greater cerainty for potential ERC creators and users, state banking rules should clearly identify which proposed emission reductions can qualify to be credited and banked, the information required of sources to substantiate their claim for credit, and any required application forms.

4. *Banking Rules Must Establish Ownership Rights.* To prevent two entities from claiming the same ERCs, state banking rules must specify who can own ERCs. For example, while the source creating the ERC will generally be its owner, the state could, as part of its rule, reserve ownership of certain classes of ERCs to itself or local governments.

5. *Banking Rules Must Establish an ERC Registry or Its Equivalent.* An ERC registry or equivalent instrument lets states track ownership, use, and transfer of all banked ERCs. Banking rules must provide that no transfer of title to a banked ERC will take effect until the transaction is reflected in the registry. This tracking system is important to minimize disputes over ownership and provide a central list of certified ERCs which may be available. It can also provide useful information for quickly evaluating any proposed use of a banked ERC.

Information which may help evaluate proposed use of a banked ERC should be recorded at the time of its creation and entered as part of its banking record. This information should include the location of the source creating the ERCs, its stack parameters, the temperature and velocity of its plume, particle size, the existence of any hazardous pollutants, daily and seasonal emission rates, and any other data which might reasonably be necessary to evaluate future use.

To perform these tracking and clearinghouse functions the ERC registry must be accessible to the public. Subject to confidentiality considerations, states should make copies of the ERC registry available at convenient locations and times, and may want to publish a periodic summary of banked ERCs.

6. *Possible Adjustments to ERCs Based on Enforcement Considerations.* To avoid legal problems, banking rules should clearly state what, if any, changes may occur to ERCs after they have been banked. Once an ERC has been used by another source to meet a permit requirement, any violation of the conditions under which that ERC was created should result in enforcement against the source *producing* that emission reduction and not the source *using* the ERCs. If a state attempted to enforce against the source using purchased ERCs, a complex set of third-party lawsuits would ensue. This would likely discourage sources from purchasing ERCs in the Future.

7. *Possible Adjustments to ERCs Based on Ambient Attainment Considerations.* To assure the validity of its demonstration(s) of attainment, a state with a banking rule should assume that all banked emissions will ultimately be used. Thus, in evaluating their ability to attain national standards, states should add to their inventory or measured ambient value, all unused banked reductions at the site at which they were created.

Additional emission reductions may be required from sources because of their area's failure to attain ambient standards, because of an increment violation, or because new RACT requirements are being imposed under a SIP schedule. The existence of banked ERCs must not interfere with states' ability to obtain these additional reductions. For this reason state banking rules should specifically address how ERCs will be treated if additional reductions are required. Available options include:

a. *ERCs Are Absolutely Guaranteed Against Adjustment.* The state would determine the required quantity of reductions and assess necessary controls on the inventory. Sources with banked ERCs would not be exempt from any requirement for additional reductions, but could satisfy that requirement by using their banked ERCs, by reducing emissions elsewhere, or by purchasing equivalent ERCs.

To effectively implement this option, it would be particularly important to state new control requirements in terms of "RACT-equivalent" reductions.

b. *Current ERCs Are Fully Preserved,* but either their use *or* future ERC deposits are suspended until the SIP has committed to secure reductions sufficient to reestablish reasonable further progress or cure an increment violation. Use of either type moratorium would be consistent with air quality objectives while allowing sources to retain or use their entire quantity of banked ERCs. However, this option may be undesirable because of uncertainty regarding the moratorium's start, duration, or potential interference with user planning.

c. *Across-the-Board Discounting.* Under this option, all ERCs in the bank would be discounted by the same factor. For example, if a 10% additional reduction is required from a category of sources for the SIP's new demonstration of attainment, the state would discount all banked ERCs from those types of sources by 10%. Although the quantity of ERCs held by a firm will be reduced, the overall supply of ERCs will decrease, while demand will increase. Therefore, the overall value of remaining ERCs is likely, at minimum, to remain the same. Indeed, other sources may purchase banked ERCs to meet the 10% reductions required of them.

This option is relatively straightforward for VOC or NO_x, SO_2 or TSP more detailed, source-specific modeling would generally be required to allocate the discount necessary to demonstrate attainment.

States may adopt any of these methods of accommodating possible additional reductions. They may also adopt any equivalent method which achieves the same objectives.

II. Trades Covered by State Generic Rules

This section explains expanded opportunities for states to develop generic rules under which certain classes of emissions trades will be exempt from individual SIP revision.

A. General Principles for Evaluating Generic Rules

A generic rule is approvable if it assures that (1) applicable net baseline emissions will not increase; (2) emissions trades otherwise requiring SIP revisions under §§ 110(i) and 110(a)(3) of the Clean Air Act will be evaluated under procedures that are sufficiently replicable in operation; and (3) emission limits produced under the rule will not interfere with ambient attainment and maintenance. Replicability generally means that specific modeling procedures are prescribed and that states have appropriately defined their choice of models, model inputs, and modeling techniques in applying these procedures to specific trades. Thus, these trades should not create new ambient violations or interfere with the planned removal of existing violations. By approving such generic rules EPA approves in advance an array of acceptable SIP emission limits, and no further case-by-case EPA approval is required.[6]

B. Scope of Generic Rules

States may use a range of mechanisms to exempt trades from EPA review as individual SIP revisions. While several mechanisms are explained below, states may submit other generic rules that satisfy these basic principles.

1. *De Minimis Trades.* Trades in which net baseline emissions do not increase and in which the sum of the emission increases, looking only at the increasing sources, totals less than 100 tons per year after applicable control requirements may proceed without a

[6] Replicability more generally means a high likelihood that two decision-makers applying the rule to a given trade would reach the same conclusion. For one example of a generic [illegible] incorporating a very simple formula that [illegible] the test of replicability, see 46 FR 20551 (Apr. 6, 1981).

SIP revision. Such trades will have at most a *de minimis* impact on local air quality because only minor quantities of emissions are involved. Moreover, because only trades which produce no net increase in emissions can be exempt, overall air quality will not suffer. The Federal resources required to evaluate these trades could best be used to evaluate actions that have a potential impact on air Quality.[7]

2. *VOC or NO_x* Trades. All VOC or NO_x trades under a generic rule that assures no net increase in applicable baseline emissions may occur without individual SIP revisions.

The ambient impacts of VOC and NO_x emissions are area-wide rather than source-specific. All such emissions within a broad area are considered comparable, regardless of plume height, topography or related factors. Thus, the ambient impact of trades involving VOC or NO_x will by definition be equivalent to that of the sum of the SIP emission limits for the emission sources involved in the trade. As long as the sum of these emission limits is not exceeded, the limits for each specific emission source can be reallocated without adversely affecting air quality. This essentially arithmetical task is so mechanical that VOC or NO_x trades developed in this manner cannot reasonably interfere with ambient attainment and maintenance.

3. *SO_x* CO, or TSP Trades. For trades involving SO_x CO, or TSP it is more difficult, but by no means impractical, to develop a generic rule which assures that valid ERC uses cannot reasonably interfere with attainment and maintenance.

The ambient impact of these pollutants depends on site-specific factors such as topography and plume height which are ordinarily evaluated by ambient modeling. However, if the emission sources are located in the same immediate vicinity and emissions decrease at the source with the lower effective plume height, therefore minimizing localized ambient impact, equal increases and decreases in emissions from these sources will ordinarily produce equivalent ambient effects (See Level I of the Modeling Screen). As a result, trades involving emission sources within Level I may be treated in the same manner as trades involving VOC or NO_x and may be exempted from individual SIP revisions.

EPA will normally approve generic rules that define "same immediate vicinity" as up to 250 meters between the individual emission sources involved in a trade. *However*, where such trades involve areas with complex terrain, some modeling might still be required to assure that ambient impact is properly considered. Generic rules should specify criteria for identifying such circumstances and for defining what modeling will be required.

4. *Other Mechanisms for Exempting TSP, SO_x, or CO Trades from Individual SIP Revisions.* Other TSP, SO_x or CO trades can be exempted from individual SIP revisions if they occur under state generic rules which satisfy the replicability and air quality requirements stated above.

Possible generic approaches include:

(a) Developing SIP rules which allow identified sources to meet an array of specific emission limits consistent with ambient attainment and maintenance. For example, states could approve a modeled formula for two or more specific emisson sources which would both satisfy ambient concerns and let firms determine particular permit limits at each emission source. This formula would have to be adopted as part of the SIP.[8]

(b) Developing criteria for use of simplified Level II modeling (see section I.B.1.b. above) for specified trades. This approach would exempt trades which (1) produce no net increase in applicable baseline emissions, (2) can routinely be modeled in a predescribed manner, and (3) will not have significant ambient impact. The generic rule must specify either the particular model that will be employed in a given situation, or criteria for selecting models in specified circumstances. To limit variability in modeling results the rule must also specify procedures for selecting input data (e.g., wind speed, stability class, source emission rate) which are sufficiently definite to meet the test of replicability. To determine whether a trade will have significant ambient impact these procedures should assess whether the change in emissions after the trade from the increasing source has the potential to cause an increase of more than 10 $\mu g/m^3$ over at 24-hour period for TSP, 13 $\mu g/m^3$ (24 hours) for SO_x, or 575 $\mu g/m^3$ (8 hours) for CO at the receptor of maximum predicted impact.

C. Applicability of Generic Rules To Process Fugitive and Open Dust Emissions Trades

Trade involving *process fugitive emissions of VOC or NO_x* may routinely be approved under generic rules. However, because of their dispersion characteristics, it is more difficult to define generic rules that can be applied in a sufficiently replicable fashion to trades involving process fugitive or open dust TSP emissions.

In general *TSP trades involving process fugitive emissions* can be approved under generic rules if: (1) process fugitive emissions are traded against similar sources of process fugitive emissions, or (2) emissions from point sources are traded against process fugitive emissions which can reasonably be represented by a point-source dispersion pattern. This means that relevant parameters such as emission release height must be readily determinable. Unless such trades fall within Level I of the modeling screen or are *de minimis*, only processes whose fugitive emissions can be adequately represented by the dispersion model(s) specified in an approved generic rule can be included in a trade under that rule.

For *TSP trades involving open dust emissions* states should be aware that approvable generic rules which appropriately limit the choice of screening models and relevant inputs (including acceptable emission factors) will currently be difficult to formulate. Accordingly, open dust trades generally will have to be submitted as individual SIP revisions.

D. Enforcing Emission Limits Under Generic Rules

Alternative emission limits approved under generic rules are considered by EPA to be federally enforceable. Generic rules should specify that such alternative limits become applicable requirements of the SIP for purposes of §§ 113 and 304 of the Clean Air Act and are enforceable in the same manner as other SIP requirements. To assure that EPA and citizens know what emission limits apply, generic rules should also specify that EPA be informed of applicable emission limits before and after the trade, following approval of the trade by the state.

E. EPA Oversight of Trades of Under Generic Rules

The Clean Air Act requires EPA to monitor administration of SIPs, including generic rules. *See* § 110(a)(2)(H). EPA will audit the information supplied for each trade and

[7] Although states may exempt *de minimis* trades from federal SIP revisions, these trades are still subject to ambient tests. They should accordingly be evaluated by the state under the modeling screen (See Section I.B.1.b. above) or an equivalent approach.

[8] For example, the emission limits for the four stacks at the Stuart Power Plant in Adams County, Ohio are 3.16 pounds of SO_x per million BTU at each stack, or at the plant's choice (after notification to EPA), any limit in pounds per BTU which satisfies the following equation: *0.0791 ($EL_1 + EL_2 + EL_3 + EL_4$)<1*. See 40 CFR 5.1881(11).

may request additional relevant information. Should EPA determine that approved trades are substantially inconsistent with generic rules in the SIP, it will notify the state and specify any necessary remedial measures.[9]

F. Public Comment

For trades occuring under generic rules, existing state statutes or regulations will generally provide reasonably adequate notice and comment opportunities. If these opportunities are not provided generic rules should explicitly address this issue.

To ensure public awareness consistent with § 304 of the Clean Air Act, states should also, at a minimum, publish any changes to emission limits which result from trades approved under a generic rule (see 46 FR 20554; April 6, 1981).

III. Trades Not Covered by State Generic Rules

In the absence of a generic rule, states and sources may continue to use SIP revisions to effect bubble or external offset trades. Individual trades may also fall outside the scope of an approved generic rule and still be implemented as individual SIP revisions. The principles described in the Policy Statement and this Document will generally be used to evaluate these emission trades.

Because of the ability of the SIP revision process to take account of individual variations, many trades which could not be accomplished under a generic rule may be acceptable use individual SIP revisions. For example, proposed bubles which produce a net increase in baseline emissions could nevertheless be approved through a SIP revision showing that requirements for attainment and maintenance were satisfied. In submitting such a bubble application, the state would have to revise its reasonable further progress demonstration to account for the increase in emissions and EPA would review the proposal to determine if the demonstration of attainment and RFP were satisfactor. Without such a SIP revision, trades increasing net baseline emissions would generally be acceptable only if compensating additional controls were already required in the SIP.

Through the SIP revision process, states and sources may also demonstrate that a general principle discussed in Section I above does not apply to their particular circumstances, or that such a principle may be satisfied in other ways. For example, they may show that a RACT baseline is unnecessary for a particular source because resulting reductions are not needed for attainment; that despite general requirements for use of an actual emissions baseline, an allowable baseline is acceptable in a particular situation based on air quality modeling; or that reductions from specific shutdowns or uninventoried sources can be fully credited without interfering with reasonable further progress and attainment.

EPA will make reasonable efforts to take prompt action on SIP trading proposals after a state has ruled on an individual application and submitted it to the Agency. EPA will encourage "parallel processing" of proposals, with EPA and state officials conducting concurrent review so that both agencies can give public notice of proposed action at roughly the same time. EPA can then take prompt final action after the state completes its proceedings, provided the state does not substantially alter the proposal after public no EPA will also publish non-controversial SIP revisions as immediate final actions, converting them to proposals only if adverse comments are received within 30 days (see generally 46 FR 44477; Sept. 4, 1981).

Appendix.—Regional EPA Emissions Trading Coordinators

Region I: Marcia Spink, Stationary Source Section, Air Programs Branch, John F. Kennedy Federal Building, Boston, Massachusetts 02203, (617) 223–4448; FTS 223–4448

Region II: Linda Comerci, Permits Administration Branch, Planning and Management Division, 26 Federal Plaza, New York, New York 10007, (212) 264–4333; FTS 264–4333

Region III: David Arnold, Air Programs Branch, 6th and Walnut Streets, Philadelphia, Pennsylvania 19102, (215) 597–7936; FTS 597–7936

Region IV: Archie Lee, Air Programs Branch, 345 Courtland Street, N.E., Atlanta, Georgia 30308, (404) 257–3286; FTS 257–3286

Region V: Dick Dalton, Mary Ryan, Air Programs Breoch, 230 South Dearborn Street, Chicago, Illinois 60604, (312) 886–6053; FTS 886–6053

Region VI: Michael Mendias, Air Programs Branch, First International Building, 1201 Elm Street, Dallas, Texas 75270, (2 –2734; FTS 729–2734

Region VII: Charles Whitmore, Air Support Branch, 324 East 11th Street, Kansas City, Missouri 64106, (816) 374–6525; FTS 758–6525

Region VIII: Dale Wells, Air Programs Branch, 1860 Lincoln Street, Denver, Colorado 80296, (303) 837–3763; FTS 327–3763

Region IX: Wally Woo, Air and Hazardous Materials Section, 215 Freemont Street, San Francisco, California 94105, (415) 974–8210; FTS 454–8210

Region X: Dave Bray, Air Programs Branch, 1200 6th Avenue, Seattle, Washington 98101, (206) 442–1352; FTS 399–1352

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[9] A trade which does not meet the requirements of a generic SIP rule is not part of an SIP and by defintion cannot replace prior valid emission limits in the SIP. (See 46 FR 20554–& April 7, 1981). In these cases EPA must reserve the right to take remedial action to assure attainment and maintenance, including as a last resort enforcement of the original SIP limits.

APPENDIX IV

federal register

Wednesday
August 31, 1983

Part IV

Environmental Protection Agency

Emissions Trading Policy Statement; General Principles for Creation, Banking and Use of Emission Reduction Credits

ENVIRONMENTAL PROTECTION AGENCY

[PRM-FRL-2361-3]

Emissions Trading Policy Statement; General Principles for Creation, Banking, and Use of Emission Reduction Credits

AGENCY: Environmental Protection Agency.

ACTION: Request for further comment on specific issues from previous policy statement and technical issues document, proposed April 7, 1982.

SUMMARY: EPA has received and reviewed numerous formal comments on its interim Emissions Trading Policy (47 FR 15076, April 7, 1982). EPA today requests additional public comment on specific alternatives that could further respond to concerns raised. Alternatives address: (1) The extent to which states may allow emission reduction credits (ERCs) from shutdowns to be used in *existing-source* bubble trades, particularly in nonattainment areas requiring but lacking demonstrations of attainment, and (2) whether and under what conditions *existing-source* bubble trades should be allowed in such areas, as well as in areas required to attain by December 31, 1982 which may ultimately be found not to have attained by that statutory deadline. For easy reference this notice generally addresses such issues *first* within the context and structure of the April 7 Policy, which was drafted long before expiration of the 1982 attainment deadlines (see Sections II and III below), and *second* with respect to areas where such deadlines have expired (see Section IV below). It does *not* address the use of credits from shutdowns for new source offsets in any such areas.

EPA further requests comment on (1) appropriate methods for determining whether and to what extent State Implementation Plans rely on reductions from anticipated shutdowns for their demonstrations of attainment or reasonable further progress, and on (2) what level of reduced operations should constitute a shutdown for emissions trading purposes.

This notice additionally discusses current emissions trading policy regarding all the above. It should be construed in light of the entire April 7 Policy Statement and Technical Issues Document.

DATES: The deadline for submitting written comments is September 30, 1983.

ADDRESSES: Comments should be sent in triplicate if possible to: Central Docket Section (A-130), U.S. Environmental Protection Agency, Washington, D.C. 20460, Attn: Doc. No. G-81-2.

Docket: EPA has established docket number G-81-2 for this action. This docket is an organized and complete file of all significant information submitted to or otherwise considered by EPA. The docket is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Ivan Tether, Regulatory Reform Staff (PM-223), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, (202) 382-2765, or Brock Nicholson, Office of Air Quality Planning and Standards (MD-15), Research Triangle Park, North Carolina 27711, (919) 541-5516.

SUPPLEMENTARY INFORMATION: Under Executive Order 12291, EPA must judge whether this action is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. This action is not major because it merely requests further comment on policies that are voluntary and can substantially reduce costs of complying with the Clean Air Act.

This Notice was submitted to the Office of Management and Budget for review. Any comments from OMB to EPA are available for public inspection in Docket G-81-2. Pursuant to 5 U.S.C. 605(b), I hereby certify that this action will not have a significant economic impact on a substantial number of small entities. As a request for further comment on specific issues raised by a previously-issued policy designed to allow firms flexibility and to reduce administrative complexity, it will impose no burdens on either small or large entities.

Format of This Notice

I. Background—The Interim (April 7th) Emissions Trading Policy

EPA's April 7 Emissions Trading Policy Statement and accompanying Technical Issues Document set forth the Agency's interpretation of minimum legal requirements that states [1] and sources must meet to utilize trading consistent with the Clean Air Act. Under this Policy, states could grant credit for emission reductions that were "surplus," "enforceable," "permanent," and "quantifiable." Reductions from shutdowns were generally considered surplus if the state showed they were not "double-counted" and an appropriate baseline had been applied. This generally meant that: *First*, emissions from the shutdown facility must have been included in the inventory used to develop the State Implementation Plan (SIP), so that the facility's emissions were among the pool from which reductions were or would be calculated to produce an approvable SIP. *Second*, the state must not have already taken credit for the shutdown, directly or indirectly, as part of its plan.

Third, like other emission reductions, shutdowns were only considered surplus to the extent the reduction went beyond the required reduction level or baseline. Where an area was to have attained *by December 1982* but lacked a required demonstration of ambient attainment, this baseline was to consist of either a reduced level of emissions reflecting Reasonably Available Control Technology (RACT) as defined in the SIP, or an agreed-upon "negotiated RACT" level if RACT for the particular source or source category had not been defined in the SIP. Where credit was sought for a pollutant for which the area had received an attainment extension *beyond December 1982* under section 172(a)(2) of the Clean Air Act, states could instead use a baseline consisting of actual emissions, provided the source committed to find or produce additional reductions equivalent to RACT, if and when RACT were subsequently defined in the SIP for that source. See generally 47 FR 15077, 15080-81 (April 7, 1982).[2]

[1] "States" includes local air pollution agencies or any other entity properly delegated authority to administer relevant parts of a State Implementation Plan (SIP) under the Clean Air Act.

[2] Expiration of the July 1982 deadline for submittal of plans demonstrating attainment for such extension areas has generally limited the option of an actual emissions baseline to extension areas for which EPA has approved follow-up ozone SIPs and, within those areas, to VOC sources in source categories which EPA has identified in "Group III" Control Technique Guidelines (CTGs)

Subject to these requirements the April Policy allowed, and currently allows, reductions from shutdowns to be used in existing source bubbles in the same manner as any other emission reduction credit.[3]

II. Discussion of April Policy: Formal Comments, NRDC v. Gorsuch, and Additional Rationales

EPA is re-examining emissions trading with respect to shutdowns, in light of formal comments on the April 7 Policy; the *NRDC* v. *Gorsuch* decision (685 F. 2d 718 (D.C. Cir. 1982), cert. granted, No. 82-1591, May 31, 1983); and the need to further articulate the Policy's approach in this area. Many comments focussed on ways states can avoid double-counting and on whether reductions from shutdowns should be treated differently than other types of reductions for use in existing-source bubbles. The possibility of different treatment, if adopted, would make precise definition of "shutdown" important.

A. Avoiding Double-Counting. The April 7th Policy and accompanying Technical Issues Document noted that under the Clean Air Act states had at least three options to grant credit for shutdowns without double-counting. Where SIPs assumed a fixed quantity of net "turnover" reductions (more reductions from shutdowns than emissions from new plant openings), and took credit for these reductions as part of their approved demonstration of reasonable further progress of attainment, states could: (1) "Re-examine any 'turnover' credits in their SIP, decide not take credit for these reductions," and revise their attainment and maintenance plans accordingly; (2) "allow credit only after the total quantity of shutdown reductions assumed in the SIP has occurred"; or (3) "allow credit for a percentage of the total emission reduction realized from a shutdown, if they can show that such credit is consistent with the SIP's demonstration of attainment and reasonable further progress." 47 FR 15081.

Comments. Concerned commenters found these options either too loose or too restrictive. An environmental group asserted that despite the options, it was not possible "to identify what quantity of shutdowns are above and beyond those assumed in the plan." Other commenters, including an industry and a utility group, asserted that credit should be denied only for shutdowns specifically identified in the plan. EPA Regions also pointed out that a number of SIPs use "OBERS" projections of economic growth, developed by the U.S. Department of Commerce, as a basis for projecting emissions growth. Since such projections reflect net *economic* growth which these SIPs appear to translate directly into *emissions* growth, there seems no straightforward way to disaggregate the projection into shutdowns and new plant openings. Therefore, there seems no straightforward way to determine the extent to which a SIP using "OBERS" projections relies on shutdowns.

If this conclusion is accurate it may be difficult or impossible for states whose SIPs rest on OBERS projections to grant credit from shutdowns for use in existing-source bubble trades, consistent with the Clean Air Act.

B. Use of ERCs From Shutdowns for Bubble Trades in Nonattainment Areas Requiring but Lacking Demonstrations of Attainment.

Comments. A number of comments questioned the extent to which states can allow use of shutdown credits in existing-source bubbles in any area, consistent with the Clean Air Act. A large percentage of comments on this issue supported the Policy authorizing shutdown credits to be used in existing-source bubbles, so long as shutdowns were not double-counted and were measured against appropriate baselines. Other commenters, however, includng some environmental groups and pollution control agencies, raised concerns. These commenters noted that shutdowns can hasten attainment, and suggested that EPA's shutdown policy might not be consistent with the Act's requirement for attainment "as expeditiously as practicable." Several of these commenters maintained that credit should generally be granted only for shutdowns undertaken solely to obtain credit, and then only for the period before which the source would otherwise have shut down.

Adverse comments were most critical about use of ERCs from shutdowns for bubbles in areas requiring but lacking approved demonstrations of attainment. Several commenters said that no reduction can be surplus without a demonstration. Accordingly, they would not grant credit for any reductions in nonattainment areas lacking demonstrations of attainment, including reductions produced by extra pollution controls or less-polluting process changes.

NRDC v. Gorsuch. The recent Circuit Court decision in *NRDC* v. *Gorsuch* raises similar issues indirectly. The Court decided only the narrow issue of the validity of EPA's plant-wide definition of "source" for New Source Review purposes in nonattainment areas (i.e., nonattainment area "netting"), and ruled that definition invalid.[4] It reaffirmend the validity of the plant-wide definition for PSD review. Moreover, the case did not consider the validity of existing-source bubbles in nonattainment areas, and the Court did not decide this issue. The decision does, however, contain language which might be read to suggest that all emissions trades in nonattainment areas must, in and of themselves, produce progress toward attainment *beyond the progress currently mandated by applicable SIPs.* The implied issue for existing-source bubbles is whether some additional net benefit beyond the current requirement of air quality equivalence to applicable SIP limits (e.g., a substantial net air quality benefit from each bubble trade) might be required by the Clean Air Act.

Discussion—Nonattainment Areas With Demonstrations of Attainment. EPA does not currently believe the concerns discussed above warrant any change in the April Policy's treatment of shutdowns or surplus reductions for bubble trades in nonattainment areas which are required to have *and do have* approved demonstrations of attainment.[5]

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and which States are required to control in their 1982 Plans, but for which EPA has not yet issued final CTGs. See Alternative ONE, Section III. B. below.

In this notice EPA also requests comments (see *part IV. B below*) on continued trading in areas that may be found not to have attained despite approved SIP demonstrations of attainment, as well as in areas that require but lack such demonstrations.

[3] Use of *post* shutdowns for new source *offsets* is generally limited to replacements (See 40 CFR Part 51, Appendix S (138)). The latter restriction is being re-examined in implementing the settlement agreement in *Chemical Manufacturers Association v. EPA* (D.C. Circuit, No. 79-1112), and is not otherwise discussed here.

For purposes of this notice, "existing-source bubbles" means trades to meet applicable emission limitations between sources subject neither to Federal New Source Review Requirements nor to any Federal New Source Performance Standard promulgated under Section 111 of the Clean Air Act.

[4] EPA does not agree with this ruling. On March 25, 1983 the Solicitor General filed a Petition for Certiorari asking the U.S. Supreme Court to review the decision. On May 31, 1983 the Supreme Court granted the Government's petition, *Ruckelshaus* v. *NRDC*, Nos. 82-1591 et al.

[5] This includes current ozone or CO extension areas, as well as other nonattainment areas subject to December 31, 1982 deadlines until such time as approved SIPs for the later areas may be determined by EPA to be inadequate to attain relevant ambient standards.

Sources in such areas should be aware, however, that future determinations of SIP inadequacy may require their states to impose additional reduction requirements, and that some states may impose requirements which adversely affect some prior trades. See, e.g., 47 FR 15077, but cf. n. 18 below

Once a state had demonstrated it will attain ambient standards by the applicable deadline, subsequent emissions trades amount to fairly routine SIP revisions, which EPA will approve (either directly or through a generic rule) as long as these are enforceable and do not undermine the demonstration. The state has discretion to make and maintain its demonstration through any combination of emission reductions, including shutdowns, so long as these are adequate for attainment, and cannot be required to do more than demonstrate timely attainment and maintain ambient standards. See, e.g., *Train* v. *NRDC*, 421 U.S 60, 79–80 (1975); *Union Electric Co.* v. *EPA*, 427 U.S. 246 (1976). This is true even where EPA may suspect that a previously-approved demonstration is no longer adequate to assure attainment. Until EPA makes a formal finding of inadequacy, based on record evidence, the approved demonstration controls. See Clean Air Act sections 110(a)(2)(H), 110(c)(1).

In short, under the Clean Air Act an approved attainment demonstration is a legal and logical stopping point. Since the state has shown it will attain with the reductions required by its current SIP, there is no ground to deny use of shutdown credits in bubble trades which meet those SIP requirements, so long as the demonstration is protected by assurance that these credits are not doublecounted, that a baseline consistent with the demonstration is applied, and that tests of air quality equivalence are met. See 47 FR 15077, 15080–81 (April 7, 1982). So long as there is an approved attainment demonstration, there seems no reason to treat such shutdowns differently from other sources of credit, since they share the same legal basis supporting use of any surplus emission reductions, whether from positive controls, process changes or other means.

Under this interpretation it follows that all such reductions from shutdowns will be in excess of those currently required by law and need to attain. Moreover, under current policy their use will not compromise the state's ability to secure further reductions, should such steps eventually be necessary to restore progress or maintain attainment. See, e.g., 47 FR 15077, 15080, 15084 (April 7, 1982). Indeed, availability of such reductions for use in bubble trades may encourage faster compliance with applicable SIP limits by reducing the cost of compliance and the time needed to comply.

Discussion—Nonattainment Areas Which Lack Demonstrations of Attainment. The situation differs, however, for nonattainment areas which require *but lack* demonstrations of attainment.[6] In order to attain, such areas will need more reductions than their SIPs currently require. Moreover, the extent of thos additional reductions, and the sources from which those reductions will come, are presently unclear. Finally, the state that lacks a required demonstration of attaintment may have more limited flexibility to choose where to secure needed reductions (and consequently to substitute alternative reductions through emissions trading), since it has not yet fulfilled its Clean Air Act responsibilities. Cf. Clean Air Act sections 110(a)(2)(A) and (c)(1), 172.

Nevertheless, to bar existing-source bubbles in such areas could elimnate useful partial solution to their air quality problems. Regulated firms may often be reluctant to disclose information that may be used to require retrofits against them. Even where such emissions information is obtained, it may not be sufficiently precise with respect to, e.g., source-receptor relationships, to allow EPA and the state to resolve remaining ambient problems. While one possible response could be a more aggressive government search for potential retrofits, that response is likely to collide with the very information barriers that discouraged a demonstration of attainment in the first place. EPA believes the bubble can help break such deadlocks by allowing sources to substitute more cost-effective reductions for required ones, subject to conditions—especially use of a RACT baseline—which enhance the state's ability to secure both improvements now and further reductions later, if such further reductions are found necessary for attainment.[7]

Given these conditions, reasons apply which are similar to those that justify use of surplus reductions in nonattainment areas which possess approved demonstrations. Where both the source which seeks to created ERCs and the source which seeks to use them are *already* subject (in an incomplete SIP) to RACT requirements, the creating source must reduce emissions below RACT control levels in order to secure credit, and the difference between current SIP emissions and RACT is not available for credit. That difference goes directly to speed SIP implementation in the short-run. Over the longer run the net reductions produced by the bubble will be at least equal to what RACT would have yield under traditional regulations. The state and public may also benefit by reductions which can be more rapid than under traditional regulation, since sources have a financial motive to surpass RACT quickly in order to trade.

Environmental progress may be accelerated still further where the source which seeks to create ERCs is *not* subject either to RACT levels defined in the SIP or to other SIP emission limits. These sources must also reduce emissions below acceptable, EPA-approved RACT levels to receive credit for surplus reductions, and the larger difference between uncontrolled emissions and RACT is again not available for credit. The state may secure faster RACT definitions, since sources have a strong incentive to agree upon RACT in order to use a bubble. The possibility of credit may also encourage such sources to come forward and request regulation, in order to establish the quantifiable and enforceable emission limits on which credit must be based.[8]

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[6] Some ozone attainment areas do not require full demonstrations of attainment because their pollution problems are primarily caused by sources outside the area. Under long-standing EPA policy, for example, so-called "rural zone nonattainment areas" (whose ambient problem is cause by upwind urban emitters outside the air quality control region) need only show that they have required RACT controls for all major sources for which EPA has issued RACT guidance. Upon such a showing these areas have long been deemed to satify Part D requirements, since they must ultimately rely on reductions from adjacent areas to cure their pollution problem. See 44 FR 20372, 20376 and n. 22 (April 4, 1979).

[7] EPA is considering a requirement (in its final Emissions Trading Policy) that all bubble trades in those areas will be a RACT baseline, whether or not RACT guidance has been issued for the sources in question. That requirement could help assure that the contribution of these areas towards solving their ozone problem remains current. However, since such areas do not require demonstrations of attainment, they are beyond the scope of discussion here.

[7] Where trades of TSP, SO_2 or CO in significant amounts or over significant distances are involved, modelled demonstrations of ambient equvalence to traditional RACT reductions may also produce better data on source-receptor relationships than conventional regulation would yield. E.g., 47 FR 15078, 15082, 15084–85 (April 17, 1982); "Emissions Trading Policy—Technical Clarifications," memorandum from Sheldon Meyers, Director, Office of Air Quality Planning and Standards, U.S. EPA, to Directors, Air Management Divisions, EPA Regions I–X (Feb. 17, 1983).

Under the April 7 Policy states with attainment extensions until 1987 for relevant pollutants could authorize creation of ERCs using an actual emissions baseline, provided the source committed to "find or produce reductions equivalent to future RACT requirements if and when the state imposes them." 47 FR 15080 (April 7, 1982). To EPA's knowledge no state has elected this alternative approach, and as noted in Section I above, expiration of the 1982 deadline for submittal of extension-area attainment SIPs has substantially limited its applicability.

[8] It has been asserted that some sources will have greater incentive to press for less stringent "negotiated RACT" limits in these circumstances. However, this incentive does not appear to vary

Thus the bubble may create an incentive for faster compliance, because sources must do better than comply with RACT to secure ERCs and because compliance costs may be reduced by control strategies the source can tailor to its operations. The bubble may also improve air quality planning by encouraging plant managers to submit data on emissions, modeling and unregulated or uninventoried emission sources in order to create usable ERCs. It may help states develop new RACT regulations *for categories of sources*, both because of improved information and because opportunity for trading reduces those rules' potential cost. It may help states secure additional reductions from existing sources, which comprise over 95% of most nonattainment area emissions.[9]

The Dupont Chambers Works bubble for emissions for volatile organic compounds (VOCs) illustrates several of these points. New Jersey approved this bubble in Deepwater, NJ under its "generic" emissions trading rule. 46 FR 20551 (Apr. 6, 1981). As part of that rule, New Jersey imposed uniform RACT reduction requirements (generally 85% control) on broad categories of sources, including Dupont's 7 large stacks and 112 smaller fugitive sources (See Administrative Code of New Jersey, Title 7, Chapter 27, Subchapter 16 (1981).) The opportunity to meet these uniform requirements through bubbles helped New Jersey avoid both legal challenge by regulated industries and the laborious task of developing process-by-process regulations. Dupont complied by controlling its 7 large stacks to over 99%, enough to meet RACT requirements for all 119 emission sources while producing over 2000 tons per year of extra reductions.

For such reasons EPA continues to believe that in general its April 7 Policy approximately authorizes trading in furtherance of the Act's mandate that nonattainment areas requires RACT "at a minimum" and achieve "reasonable further progress" toward attainment. Clean Air Act sections 171(1), 172(b)(2)–(4).

Notwithstanding these considerations, while bubble trades in such areas may yield progress towards attainment, the area may fall short of "reasonable further progress and attainment as expeditiously as practicable." Clean Air Act sections 171–172. In these circumstances EPA is authorized to promulgate a Federally-developed SIP which does demonstrate attainment.[10]

However, EPA could also take less drastic steps designed to accelerate ambient progress and enhance the state's ability to develop a complete SIP. For example, EPA could mandate that pending a demonstration of attainment, each existing-source bubble produce a substantial net air quality improvement. A substantial net reduction in emissions could be a surrogate for such improvement.[11] Properly structured, such a requirement should not discourage environmentally-beneficial trading activity to a significant degree.

Indeed, requiring a net air quality improvement, beyond the current requirements of no double-counting and application of appropriate baselines, could produce additional environmental benefits. While it might inhibit some trades, such a requirement would assure that every existing-source bubble makes a direct and immediate contribution towards attainment, beyond what the state has required thus far. It could compensate for other SIP uncertainties and further assure that "surplus" designations comport with the Act. Finally, it could increase the stability of the existing Policy, with minimal disruption of current or planned trading activities. This conclusion seems supported by the fact that nearly two-thirds of the existing source bubbles already approved or proposed for approval by EPA will produce extra emission reductions.[12]

Requiring a net air quality improvement might be particularly appropriate where trades involve *use of ERCs from shutdowns for existing-source bubbles in areas which require but lack demonstrations of attainment.*[13] Unlike surplus reductions from additional pollution control or less polluting process changes, shutdowns produce a total reduction of emissions, 100% of which might benefit air quality if credit were not allowed. Granting full or partial credit for their use in existing-source bubbles might reduce that benefit, slow progress, and be inconsistent with the Act's mandate that such areas attain as expeditiously as practicable, *at least where the source would have shut down anyway.* This reasoning (reflecting a desire to avoid granting credit for reductions that may not be "surplus" because they would have occurred in any event) underlies

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from that present in any rulemaking expected to result in new reduction requirements under the Act. Moreover, in all such cases EPA must still approve the agreed-upon baseline as equivalent to RACT, before the trade may be finally approved and implemented. See, e.g., 47 FR 15080 at A.1.b. (i) and (ii) (April 7, 1982).

[9] See, e.g., C[illegible]lany, *Issues Related to the Source Definition for New Source Review in Nonattainment Areas*, September 1982 ([illegible] data). See generally, Domenici, "Emissions Trading: The Subtle Hersey," *Environmental Forum*, Vol I, No. 8 (Dec. 1982), pp. 18–24, reprinted in *Congressional Record* (daily ed.), (December 15, 1982), pp. S14765–68 (remarks of Majority Leader Baker).

[10] Clean Air Act section 110(c)(1). The Agency has had difficulty acquiring the detailed knowledge of local conditions needed to promulgate such SIPs. One EPA attempt to promulgate a full Federal SIP took over four years to complete. See, e.g., 37 FR 10842 (1972) (Ohio SO_2 SIP: proposal); 41 FR 36324 (1976) (last part of the final rule).

[11] EPA's Emission Offset Interpretive Ruling (40 CFR Part 51, Appendix S) has since 1979 declared net emission reductions an acceptable surrogate for the required positive net air quality benefit for several classes of new source offsets. Similar flexibility, intended "to avoid unnecessary consumption of limited, costly and time consuming modeling resources," has also been incorporated into the Emissions Trading Policy. For example, pound-for-pound trades of VOC or NO_x may be treated as equal in ambient effect across broad geographic areas. See 47 FR at 15084 (April 7, 1982).

EPA requests comment on the extent to which a substantial emission reduction could assure a substantial air quality improvement under Section III, Alternatives 3 and 4 below. Comment is specifically requested on the extent to which, once a bubble trade's air quality equivalence is established under the Policy's ambient tests, air quality improvement for all pollutants may be assumed based on substantial additional emission reductions. To the extent this emissions surrogate for ambient improvement may not be warranted, further comment is requested on how currently-required modeling might be modified to define and evaluate substantial air quality improvement. For example, one alternative to a surrogate approach could be a direct ambient demonstration in which some form of dispersion modeling is required to show an actual air quality improvement produced by the emissions trade. Comment is requested on this or other possible alternatives.

[12] For example, of the 34 bubbles approved or proposed by EPA directly through January 1983, 21 or nearly two-thirds are producing or would produce more reductions than required by applicable regulations. Of these 21, VOC bubbles produced an average extra reduction of 191 tons per year (TPY), SO_2 bubbles an average extra reduction of 2825 TPY, and TSP bubbles an average extra reduction of 907 TPY (one group) and 15.8 lb./hr. (another group).

A few jurisdictions (e.g., Jefferson County (Louisville, Ky.)) already require existing-source bubbles to produce significant net reductions in overall emissions. All such bubbles must continue to meet ambient tests as well. See, e.g., 47 FR at 15078, 15082 (April 7, 1982).

[13] The following discussion does not affect the established availability of shutdown credits for offsets or other trading activities to facilitate construction of *new* major sources or major modifications. See, e.g., 44 FR 3284–85 (Jan. 16, 1979).

some commenters' suggestions that credit be allowed only if credit availability were a sole or principal reason for the shutdown, and only then for the remaining useful life of the shutdown facility.

Unfortunately the issue is not this simple. So long as it has not beeen double-counted and a proper RACT baseline is applied, the shutdown does contribute to air quality progress, since much less than 100% credit will be granted.[14] Moreover, the opportunity for credit may improve air quality by encouraging early shutdown of high-polluting facilities that might otherwise be kept running, either because replacement is too expensive or to preserve credit for future plant expansion.

In addition, despite their logical appeal these comments' suggestion of a test based on subjective motive appears administratively unworkable. EPA and states would find it exceedingly difficult to evaluate or rebut source evidence that a shutdown was motivated by credit and that the shutdown facility would otherwise have operated for twenty or forty years.[15] Thus this approach would likely result in either *de facto* approval of all such credits (undermining the reason for the test), or a burden of proof so stringent that none would be approved (penalizing sources whose shutdowns were elicited by trading). More straightforward approaches might either ban shutdown bubbles until a demonstration of attainment, or acknowledge their uncertain nature by applying a margin of safety—e.g., a requirement that such bubbles produce substantial air quality improvement—sufficient to compensate for any uncertainties and protect the integrity of current or future SIPs.

C. Definition of "shutdown." The April Policy and accompanying Technical Issues Document do not explicitly define "shutdown," since credits from shutdowns for use in existing-source bubbles are treated no differently than credits produced by other means of emission reduction. For example, the Policy's discussion of double-counting focusses only on determining the extent to which a particular shutdown is surplus, a requirement for all credits. Under the April Policy, so long as the reduction from a shutdown is enforceable, quantifiable and permanent, as well as surplus, it is eligible for credit.

More precise definition is needed only if shutdowns are to be subject to special requirements for use in existing-source bubbles. Issues raised by that potential approach include whether "shutdowns" should cover all production cutbacks or curtailments; whether the shutdown must be of an entire plant or only identifiable pieces of process equipment; and whether credit should turn on surrender of operating permits or some other action. Such distinctions could have major functional significance, since a broader definition would subject more bubble trades to special requirements. Thus, the definition offers one potential way of balancing possible environmental benefits from special treatment of shutdown credits for bubbles, against the administrative difficulties and negative environmental effects (e.g., discouraging beneficial trades) which might result from such special treatment.

To help evaluate the potential effects of adopting any special treatment of shutdowns, this notice requests comment on the appropriate definition of a "shutdown." See Section III.C. below.

D. Conclusions. EPA wishes both to strengthen emissions trading and to minimize any uncertainty which alterations to the April 7 Policy might create. The Policy set out minimum legal requirements for trading in the belief that this approach comported with the broad primary discretion accorded states to design and implement SIPs. E.g., Clean Air Act section 101(a)(3). EPA sees merit, however, in the concerns raised by commenters and wishes to consider alternatives which might increase the environmental benefits of individual trades.

III. Requests for Comment

A. Avoiding "Double-Counting." Before emissions trading, use of OBERS or similar "turnover" projections had relatively little impact on the integrity of SIP development. Expanded trading has heightened concern over the extent to which SIPs may already have taken credit for shutdowns in their attainment demonstrations. EPA accordingly requests assistance in determining *specifically* how particular SIPs take shutdowns into account either directly or indirectly, especially through use of "OBERS" projections or similar means. EPA further requests suggestions on how to improve its options for avoiding double-counting of shutdown credits in ways which are administratively workable for state agencies and which adequately address these concerns. Commenters should be aware that failure satisfactorily to resolve this issue may endanger continued use of shutdown credits for existing-source bubble trades under all SIPs relying on OBERS (or similar) projections, even in nonattainment areas for which demonstrations of attainment have been or may eventually be approved.

B. Alternatives: Bubble Trades and Use of ERCs from Shutdowns or Other Actions for Bubble Trades in Nonattainment Areas Requiring But Lacking Demonstrations. EPA requests comment on the specific alternatives outlined below or on other alternatives for resolving concerns addressed here. Comments will be most useful where they are based on specific examples from actual experience in pollution control and focus on the extent to which these or other alternatives might adversely affect overall environmental quality as well as specific planned bubble activities. Commenters should feel free to suggest combinations or variations of these alternatives, which should all be considered in addition to the current Policy's requirements.

1. Where RACT has not already been defined in the SIP, require a "negotiated RACT" baseline before shutdowns can receive bubble credit in any nonattainment areas requiring but lacking complete demonstrations of attainment—even areas with approved attainment extensions beyond 1982.

Discussion: For areas which received attainment extensions past 1982, the April 7 Policy allowed states and sources to use either a negotiated RACT baseline or an actual emissions baseline. States using "actuals" baselines could then regulate source categories other than those involved in a trade, or could seek further reductions from categories including trading sources, where future reductions were needed to assure attainment and maintenance. This option rested on the fact that follow-up SIPs incorporating sufficient additional controls to demonstrate post-1982 attainment "as expeditiously as practicable" would have to be developed for such areas before the end of 1982. Clean Air Act Section 172. These follow-up SIPs

[14] This can readily be seen from the fact that most state VOC RACT regulations require between 80% and 85% control of uncontrolled emissions. See, e.g., 46 FR 20551, 20553 (April 6, 1981) (New Jersey: 85% control for sources emitting VOC is RACT). Thus, even under the April Policy only 15% to 20% of the reductions produced by a shutdown would ordinarily be available as a credit for use in bubbles; the remaining 80% to 85% will contribute directly to air quality progress. Even less credit would generally be available for shutdowns involving other pollutants such as TSP, where required RACT reductions are often substantially greater than 85%.

[15] This is especially true because current economic conditions have resulted in plants operating much longer than might have been predicted at their time of construction. Thus, any attempt to credit shutdowns on this basis would require difficult determinations of fact that could frequently demand judicial resolution.

generally required to incorporate or commit to incorporate (a) RACT level controls for all categories of VOC sources for which EPA had issued Control Techniques Guidelines (CTGs), and (b) RACT-level controls for all other 100-ton VOC sources to the extent prior SIPs had not required such controls. See 46 FR 7182 (Jan. 22, 1981).

EPA believes that expiration of the 1982 deadline for submittal of such extension-area attainment SIPs has effectively limited this option under the Clean Air Act. Generally, "actuals" baselines are now appropriate only in extension areas for which EPA has approved follow-up ozone SIPs and, within those areas, only for VOC sources which fall within identified "Group III" Control Techniques Guideline (CTG) categories but for which EPA has not yet issued a CTG.[16] Under the April 7 Policy, states could still authorize such sources to trade using either a "negotiated RACT" baseline, or an actual emissions baseline with a commitment to find or produce further RACT-level reductions when required.

However, where sources in these categories shut down and seek to secure credit based on actual emissions before becoming subject to RACT-level requirements, their future regulation will plainly be more difficult than obtaining enforceable reductions from sources still in operation. The source is no longer in existence, and "revisiting" its former operator or quantifying what additional reductions it might have produced may be impractical. This alternative would better insure enforceability, SIP integrity and ambient progress by assuming that all such shutdown sources in nonattainment areas with approved demonstrations lacking complete RACT requirements would eventually have been subject to RACT if they continued in operation. It would accordingly require a RACT baseline as a precondition to credit for such shutdowns in any bubble trade.

2. Where RACT has not already been defined in the SIP, require a "negotiated RACT" baseline for *all* bubble trades in nonattainment areas requiring but lacking complete demonstrations of attainment—even areas with approved attainment extensions beyond 1982. No special requirement for bubbles using shutdown credits.

Discussion: Certain states may never have had an approved demonstration, or may have received an extension which is not confirmed by an approved 1982 SIP incorporating such a demonstration. Other states may ultimately be found not to have attained despite the presence of an approved demonstration. For all such areas RACT-level control at minimum appears required under the Clean Air Act. Use of a RACT baseline for all sources seeking to use bubble trades in such areas would better effectuate the statutory design by securing immediate RACT-level emission reductions while strengthening the state's ability to attain. This alternative would accordingly confirm application of the April Policy's requirement of a RACT baseline for bubble trades in non-demonstration areas required to attain relevant ambient air quality standards by December 31, 1982, to bubble trades in all areas which require but do not currently possess approved demonstrations of attainment. It would also extend that RACT-baseline requirement to certain additional bubble trades in nonattainment areas with approved but incomplete follow-up SIPs—i.e., even trades involving "Group III" sources which are not being shut down.

3. Require a substantial air quality improvement, beyond a RACT baseline, from each bubble using shutdown credits in nonattainment areas requiring but lacking demonstrations of attainment. *E.g., require each* such bubble to produce a 20% net reduction in emissions beyond RACT equivalence.

Discussion: This alternative would secure additional air quality progress from bubbles using shutdown credits in areas requiring but lacking attainment demonstrations. Requiring substantial progress from each bubble using shutdowns could accelerate momentum toward attainment, directly improve air quality through each trade, and provide an objective margin of safety against uncertainties associated with some individual shutdowns, while leaving to the state the task of final SIP development.[17] It would also maintain the incentives within the April Policy for industry to shut down high-polluting, economically-marginal sources.

Comment is specifically requested on the extent to which a substantial emission reduction, beyond that required to demonstrate ambient equivalence, could be accepted for substantial air quality improvement. See Footnote 11 above.

In addition to comments on this alternatative, EPA requests specific information on the extent to which particular firms or types of industrial operations have prolonged, or can realistically prolong, the minimal operations of such economically-marginal facilities (e.g., by placing them on "hot idle") in order to preserve credit for future modernization or expansion.

4. Require a substantial air quality benefit, beyond a RACT baseline, from *all bubbles* in nonattainment areas requiring but lacking demonstrations of attainment. No additional requirement for bubbles using shutdown credits.

Discussion: Essentially the same as for *3* above. The more each existing-source bubble contributes directly to accelerated air quality progress, the stronger the justification for authorizing creation and use of surplus reductions for such bubbles in the absence of a demonstration. Moreover, requiring all bubbles to produce a substantial air quality improvement, beyond RACT baselines and RACT equivalence, could provide a margin of safety sufficient to make special treatment of shutdowns unnecessary. Since many bubbles are already producing substantial net reductions in overall emissions, it is not believed that this alternative will significantly reduce bubble opportunities. Indeed, it may be the most rational and reliable way to authorize continued trading in such areas. See Section IV.B. below. Comment is requested on the use of substantial net emission reductions to demonstrate substantial air quality improvement. See Footnote 11 above.

5. For bubbles *using shutdown credits* in nonattainment areas requiring but lacking demonstrations of attainment, require a substantial air quality improvement, beyond RACT baselines, and define that improvement by the severity of the area's pollution problem. For example, require each shutdown bubble to produce net reductions proportional to the extent by which the SIP's design value exceeds the relevant

[16] Where EPA has approved a 1982 extension plan, all other sources regulated by the SIP will by definition be subject to RACT-level or attainment-level requirements. Their "RACT baseline" will accordingly be defined in the SIP, and the option is no longer open. The option may, however, remain open to certain minor VOC sources which neither fall within designated "Group III" categories nor emit 100 tons per year, since these sources may not be "regulated by the SIP."

Where EPA has not approved a 1982 follow-up SIP, all sources involved in bubble trades appear required to use an EPA-approved RACT baseline. See Alternative 2 and Section IV.B. below.

[17] In light of some comments it is important to reiterate that if further reductions are later required, trading presents no bar to the state's obtaining them from these or similar sources. Current policy simply suggests that the state look first to other potential reductions in the area before revisiting individual sources or source categories which have voluntarily done more than required by agreeing early to "negotiated-RACT," and that if the state does engage in such revisiting, it structure additional requirements so they too may be met through trades.

ambient standard at the time of the trade. Other bubble trades in such areas would simply have to produce a net air quality improvement.

Discussion: This alternative would acknowledge that shutdowns may present special problems absent a demonstration, due to difficulties of determining whether they would have occurred anyway or how much earlier they occurred because of the opportunity to trade. It would continue to authorize use of shutdown credits in existing-source bubble trades, but would require that such bubbles contribute a proportional share of the surplus reduction to attainment. One potential problem with this alternative is that it may require sources to solve a nonattainment problem which is largely not of their making, merely because they have found ways to meet applicable requirements less expensively. Another potential problem is the difficulty of establishing a workable, objective ratio of emission reductions to ambient concentrations. EPA accordingly requests specific suggestions, pollutant-by-pollutant, on how to define a reasonable and legally defensible relationship between an area's general pollution problem and the cleanup responsibility of a particular source engaged in a trade.

6. Prohibit use of shutdown credits for existing-source bubbles in nonattainment areas requiring but lacking demonstrations of attainment.

Discussion: Shutdowns produce a total reduction of source emissions. Prohibiting use of shutdowns for bubble trades in areas where demonstrations are required but lacking would preserve this total reduction, except as shutdowns were used (or "preserved" by continued source operation) to facilitate new source growth. It might also provide additional incentives for states to complete their attainment demonstrations.

This approach would obviate questions of motive or duration regarding shutdowns. However, it might also sacrifice any incentive for early, environmentally-beneficial shutdown of high-polluting marginal facilities.

C. Definition of "Shutdown". EPA requests comment both on the need for further definition of "shutdown," in light of the range of alternatives suggested in III.B above, and on what an appropriate definition might be. Comments will be most helpful if they address the specific economic, administrative and trading consequences of defining "shutdown" for use in bubbles as any reduction created by partly or totally reduced operations. The specific economic, administrative and trading consequences of any other suggested definitions should also be addressed.

IV. Effect of This Notice

A. *On Current Trading in General.* EPA's Emissions Trading Policy was proposed April 7, 1982 but made effective immediately as interim guidance. It was meant to be used "to evaluate trading activities which become ripe for decision [before issuance of a final Policy Statement], including state adoption of generic bubble and banking rules." 47 FR 15076, 15077. This Notice does not change the Policy or alter that intent.[18] If EPA concludes, based on comments and further analysis, that changes in the Policy are warranted, it intends to make such changes effective from the date of issuance of a final Emissions Trading Policy. EPA also intends to apply any such changes prospectively (i.e., not to actions which *already* been approved) and will give careful consideration to *pending* regulatory actions in which a state or source has invested significant resources in good-faith reliance on the April Policy and its accompanying Technical Issues Document. EPA solicits comment on whether and on what bases it might "grandfather" such actions.

B. On Trading Where 1982 Attainment Deadlines Have Expired. On January 31, 1983 EPA announced a general policy (the "Sanctions Policy") for areas that were required to but may not have attained the SO_2, TSP, O_3, CO or NO_x ambient air quality standards by December 31, 1982. The same day EPA proposed to make specific findings of nonattainment status for such areas. 48 FR 4972 (Feb. 3, 1983).

These actions do not affect current emissions trading activities in these areas or the ability of states to continue approving transactions under the April 7 Policy. After comment and careful Agency review some areas which were required to but did not demonstrate attainment by December 31, 1982 may nevertheless be found to have attained the relevant NAAQS. Other areas which demonstrated attainment may ultimately be found not to have attained. In the interim the effect of the December deadlines on either class of area cannot be foretold. Moreover, since the "Sanctions Policy" merely proposed to find certain SIPs deficient because the did not provide for attainment by December 31, 1982, it had no legal effe on areas which possessed an EPA-approved demonstration, even though they may eventually be found not to have attained by that date.[19]

Accordingly, pending final determination of their attainment statu areas which had or did not require approved demonstrations of attainmen by December 31, 1982 may continue to approve bubbles or other emissions trades under the April Policy, using the appropriate SIP baseline. Areas which required but lacked demonstrations of attainment by December 31, 1982 may continue to approve bubbles or other emissions trades based on RACT as defined in their SIPs or as negotiated among the source, the state and EPA. Comment is requested on the determinations in these paragraphs.

To the extent certain alternatives proposed for comment in III.B. above fo bubble trades in areas which require bu lack demonstrations of attainm may also be generally appropriate f bbl trades in areas which are ultimat y found not to have attained by Decembe 31, 1982 (e.g., Alternatives 4 or 5 above) commenters should address the effects of such additional applications. Commenters should also address whether—or under what other conditions—existing-source trades should be authorized at all in such areas. Any changes in current practice which result from these comments will also be incorporated in the final Emissions Trading Policy. EPA intends to apply any such changes prospectively (i.e., not to actions which have *already* been approved) and will give careful consideration to *pending* regulatory actions in which a state or source has invested insignificant resources in good-faith reliance on the April Policy and its accompanying Technical Issues Document. EPA solicit comment on whether and on what base it might "grandfather" such actions.

Dated: August 25, 1983.

William D. Ruckelshaus,

Administrator.

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[18] As noted above, however, submittal of extension-area attainment SIPs may have independently restricted one option offered by the April 7th Policy. *See* Alternative *1*, Section III.B. above.

[19] On June 16, 1983 EPA agreed to de new sanctions policy which departs from the ary 3 1983 Notice. Generally, the new policy will impose sanctions only where a state is not making reasonable efforts to submit a SIP, correct deficiencies or implement SIP provisions.

APPENDIX V

The United States
LAW WEEK

Supreme Court
Opinions

June 26, 1984 • THE BUREAU OF NATIONAL AFFAIRS, INC., WASHINGTON, D.C. • Volume 52, No. 50

OPINIONS ANNOUNCED JUNE 25, 1984

The Supreme Court decided:

ENVIRONMENT AND CONSERVATION—*Air*

Environmental Protection Agency's Clean Air Act "bubble concept" regulations, which allow states that have not attained national air quality standards to treat all pollution-emitting devices within existing plant as "stationary source" of air pollution, thus allowing installation or modification of such devices without meeting stringent permit conditions required by §173 of Act as long as alteration does not increase total plant emissions, is permissible construction of statutory term "stationary source." (Chevron U.S.A Inc. v. Natural Resources Defense Council, Inc. Nos. 82-1005, 82-1247, & 82-1591) ... Page 48-5

Full Text of Opinions

Nos. 82-1005, 82-1247 AND 82-1591

CHEVRON, U. S. A., INC., PETITIONER
82-1005 *v.*
NATURAL RESOURCES DEFENSE COUNCIL, INC., ET AL.

AMERICAN IRON AND STEEL INSTITUTE, ET AL., PETITIONERS
82-1247 *v.*
NATURAL RESOURCES DEFENSE COUNCIL, INC., ET AL.

WILLIAM D. RUCKELSHAUS, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY, PETITIONER
82-1591 *v.*
NATURAL RESOURCES DEFENSE COUNCIL, INC., ET AL.

ON WRITS OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

Syllabus

No. 82-1005. Argued February 29, 1984—Decided June 25, 1984*

The Clean Air Act Amendments of 1977 impose certain requirements on States that have not achieved the national air quality standards established by the Environmental Protection Agency (EPA) pursuant to earlier legislation, including the requirement that such "nonattainment"

*Together with No. 82-1247, *American Iron & Steel Institute et al. v. Natural Resources Defense Council, Inc., et al.*, and No. 82-1591, *Ruckelshaus, Administrator, Environmental Protection Agency v. Natural Resources Defense Council, Inc., et al.*, also on certiorari to the same court.

States establish a permit program regulating "new or modified major stationary sources" of air pollution. Generally, a permit may not be issued for such sources unless stringent conditions are met. EPA regulations promulgated in 1981 to implement the permit requirement allow a State to adopt a plantwide definition of the term "stationary source," under which an existing plant that contains several pollution-emitting devices may install or modify one piece of equipment without meeting the permit conditions if the alteration will not increase the total emissions from the plant, thus allowing a State to treat all of the pollution-emitting devices within the same industrial grouping as though they were encased within a single "bubble." Respondents filed a petition for review in the Court of Appeals, which set aside the regulations embodying the "bubble concept" as contrary to law. Although recognizing that the amended Clean Air Act does not explicitly define what Congress envisioned as a "stationary source" to which the permit program should apply, and that the issue was not squarely addressed in the legislative history, the court concluded that, in view of the purpose of the nonattainment program to improve rather than merely maintain air quality, a plantwide definition was "inappropriate," while stating it was mandatory in programs designed to maintain existing air quality.

Held: The EPA's plantwide definition is a permissible construction of the statutory term "stationary source."

(a) With regard to judicial review of an agency's construction of the statute which it administers, if Congress has not directly spoken to the precise question at issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute.

(b) Examination of the legislation and its history supports the Court of Appeals' conclusion that Congress did not have a specific intention as to the applicability of the "bubble concept" in these cases.

(c) The legislative history of the portion of the 1977 Amendments dealing with nonattainment areas plainly discloses that in the permit program Congress sought to accommodate the conflict between the economic interest in permitting capital improvements to continue and the environmental interest in improving air quality.

(d) Prior to the 1977 Amendments, the EPA had used a plantwide definition of the term "source," but in 1980 the EPA ultimately adopted a regulation that, in essence, applied the basic reasoning of the Court of Appeals here, precluding use of the "bubble concept" in nonattainment States' programs designed to enhance air quality. However, when a new administration took office 1981, the EPA, in promulgating the regulations involved here, reevaluated the various arguments that had been advanced in connection with the proper definition of the term "source" and concluded that the term should be given the plantwide definition in nonattainment areas.

(e) Parsing the general terms in the text of the amended Clean Air Act—particularly the provisions of §§ 302(j) and 111(a)(3) pertaining to the definition of "source"—does not reveal any actual intent of Congress as to the issue in these cases. To the extent any congressional "intent" can be discerned from the statutory language, it would appear that the listing of overlapping, illustrative terms was intended to enlarge, rather than to confine, the scope of the EPA's power to regulate particular sources in order to effectuate the policies of the Clean Air Act. Similarly, the legislative history is consistent with the view that the EPA should have broad discretion in implementing the policies of the 1977 Amendments. The plantwide definition is fully consistent with the policy of allowing reasonable economic growth, and the EPA has advanced a reasonable explanation for its conclusion that the regulations serve environmental objectives as well. The fact that the EPA has from time to time changed its interpretation of the term "source" does not lead to the conclusion that no deference should be accorded the EPA's interpretation of the statute. An agency, to engage in informed rulemaking, must consider varying interpretations and the wisdom of its policy on a continuing basis. Policy arguments concerning the "bubble concept" should be addressed to legislators or administrators, not to judges. The EPA's interpretation of the statute here represents a reasonable accommodation of manifestly competing interests and is entitled to deference.

222 U. S. App. D. C. 268, 685 F. 2d 718, reversed.

STEVENS, J., delivered the opinion of the Court, in which BURGER, C. J., and BRENNAN, WHITE, BLACKMUN, and POWELL, JJ., joined. MARSHALL and REHNQUIST, JJ., took no part in the consideration or decision of the cases. O'CONNOR, J., took no part in the decision of the cases.

JUSTICE STEVENS delivered the opinion of the Court.

In the Clean Air Act Amendments of 1977, Pub. L. 95-95, 91 Stat. 685, Congress enacted certain requirements applicable to States that had not achieved the national air quality standards established by the Environmental Pr[illegible]on Agency (EPA) pursuant to earlier legislation. The a[illegible]ed Clean Air Act required these "nonattainment" States to establish a permit program regulating "new or modified major stationary sources" of air pollution. Generally, a permit may not be issued for a new or modified major stationary source unless several stringent conditions are met.[1] The EPA regulation promulgated to implement this permit requirement allows a State to adopt a plantwide definition of the term "stationary source."[2] Under this definition, an existing plant that contains several pollution-emitting devices may install or modify one piece of equipment without meeting the permit conditions if the alteration will not increase the total emissions from the plant. The question presented by this case is whether EPA's decision to allow States to treat all of the pollution-emitting devices within the same industrial grouping as though they were encased within a single "bubble" is based on a reasonable construction of the statutory term "stationary source."

I

The EPA regulations containing the plantwide definition of the term stationary source were promulgated on October 14, 1981. 46 Fed. Reg. 50766. Respondents[3] filed a timely petition for review in the United States Court of Appeals for the District of Columbia Circuit pursuant to 42 U. S. C. § 7607(b)(1).[4] The Court of Appeals set aside the regulations. *National Resources Defense Council, Inc.* v. *Gorsuch*, 222 U. S. App. D. C. 268, 685 F. 2d 718 (1982).

The court observed that the relevant part of the a[illegible]d Clean Air Act "does not explicitly define what Congress [illegible]visioned as a 'stationary source, to which the permit program . . . should apply," and further stated that the precise issue was not "squarely addressed in the legislative history." *Id.*, at 273, 685 F. 2d, at 723. In light of its conclusion that the legislative history bearing on the question was "at best contradictory," it reasoned that "the purposes of the nonattainment program should guide our decision here." *Id.*, at 276, n. 39, 685 F. 2d, at 726, n. 39.[5] Based on two of its precedents concerning the applicability of the bubble concept to certain Clean Air Act programs,[6] the court stated

[1] Section 172(b)(6), 42 U. S. C. § 7502(b)(6), provides:

"The plan provisions required by subsection (a) shall—

. . . . .

"(6) require permits for the construction and operation of new or modified major stationary sources in accordance with section 173 (relating to permit requirements)." 91 Stat. 747.

[2] "(i) 'Stationary source' means any building, structure, facility, or installation which emits or may emit any air pollutant subject to regulation under the Act.

"(ii) 'Building, structure, facility, or installation' means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) except the activities of any vessel." 40 CFR § 51.18(j)(1)(i) and (ii) (1983).

[3] National Resources Defense Council, Inc., Citizens for a Better Environment, Inc., and North Western Ohio Lung Association, Inc.

[4] Petitioners, Chevron U. S. A. Inc., American Iron and Steel Institute, American Petroleum Institute, Chemical Manufacturers Association, Inc., General Motors Corporation, and Rubber Manufacturers Association were granted leave to intervene and argue in support of the regulation[illegible]

[5] The court remarked in this regard:

"We regret, of course, that Congress did not advert specificially to [illegible] bubble concept's application to various Clean Air Act programs, and note that a further clarifying statutory directive would facilitate the work of the agency and of the court in their endeavors to serve the legislators' will." 222 U. S. App. D. C., at 276, n. 39, 685 F. 2d, at 726, n. 39.

[6] *Alabama Power Co.* v. *Costle*, 204 U. S. App. D. C. 51, 636 F. 2d 323 (1979); *ASARCO Inc.* v. *EPA*, 188 U. S. App. D. C. 77, 578 F. 2d 319 (1978).

that the bubble concept was "mandatory" in programs designed merely to maintain existing air quality, but held that it was "inappropriate" in programs enacted to improve air quality. *Id.*, at 276, 685 F. 2d, at 726. Since the purpose of the permit program—its "*raison d'etre*," in the court's view—was to improve air quality, the court held that the bubble concept was inapplicable in this case under its prior precedents. *Ibid.* It therefore set aside the regulations embodying the bubble concept as contrary to law. We granted certiorari to review that judgment, 461 U. S. —— (1983), and we now reverse.

The basic legal error of the Court of Appeals was to adopt a static judicial definition of the term stationary source when it had decided that Congress itself had not commanded that definition. Respondents do not defend the legal reasoning of the Court of Appeals.[7] Nevertheless, since this Court reviews judgments, not opinions,[8] we must determine whether the Court of Appeals' legal error resulted in an erroneous judgment on the validity of the regulations.

II

When a court reviews an agency's construction of the statute which it administers, it is confronted with two questions. First, always, is the question whether Congress has directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.[9] If, however, the court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute,[10] as would be necessary in the absense of an administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute.[11]

[7] Respondents argued below that that EPA's plantwide definition of stationary source is contrary to the terms, legislative history, and purposes of the amended Clear Air Act. The court below rejected respondents' arguments based on the language and legislative history of the Act. It did agree with respondents contention that the regulations were inconsistent with the purposes of the Act, but did not adopt the construction of the statute advanced by respondents here. Respondents rely on the arguments rejected by the Court of Appeals in support of the judgment, and may rely on any ground that finds support in the record. See *Ryerson* v. *United States*, 312 U. S. 405, 408 (1941); *LeTulle* v. *Scofield*, 308 U. S. 415, 421 (1940); *Langnes* v. *Green*, 282 U. S. 531, 533–539 (1931).

[8] *E. g.*, *Black* v. *Cutter Laboratories*, 351 U. S. 292, 297 (1956); *J. E. Riley Investment Co.* v. *Commissioner*, 311 U. S. 55, 59 (1940); *Williams* v. *Norris*, 12 Wheat. 117, 120 (1827); *McClung* v. *Silliman*, 6 Wheat. 598, 603 (1821).

[9] The judiciary is the final authority on issues of statutory construction and must reject administrative constructions which are contrary to clear congressional intent. See, *e. g.*, *FEC* v. *Democratic Senatorial Campaign Committee*, 454 U. S. 27, 32 (1981); *SEC* v. *Sloan*, 436 U. S. 103, 117–118 (1978); *FMC* v. *Seatrain Lines, Inc.*, 411 U. S. 726, 745–746 (1973); *Volkswagenwerk* v. *FMC*, 390 U. S. 261, 272 (1968); *NLRB* v. *Brown*, 380 U. S. 278, 291 (1965); *FTC* v. *Colgate-Palmolive Co.*, 380 U. S. 374, 385 (1965); *Social Security Board* v. *Nierotko*, 327 U. S. 358, 369 (1946); *Burnet* v. *Chicago Portrait Co.*, 285 U. S. 1, 16 (1932); *Webster* v. *Luther*, 163 U. S. 331, 342 (1896). If a court, employing traditional tools of statutory construction, ascertains that Congress had an intention on the precise question at issue, that intention is the law and must be given effect.

[10] See generally, R. Pound, The Spirit of the Common Law 174–175 (1921).

[11] The court need not conclude that the agency construction was the only one it permissibly could have adopted to uphold the construction, or even the reading the court would have reached if the question initially had arisen in a judicial proceeding. *FEC* v. *Democratic Senatorial Campaign Committee*, 454 U. S., at 39; *Zenith Radio Corp.* v. *United States*, 437 U. S. 443, 450 (1978); *Train* v. *Natural Resources Defense Council, Inc.*, 421 U. S. 60, 75 (1975); *Udall* v. *Tallman*, 380 U. S. 1, 16 (1965); *Unemployment Compensation Comm'n* v. *Aragon*, 329 U. S. 143, 153 (1946); *McLaren* v. *Fleischer*, 256 U. S. 477, 480–481 (1921).

"The power of an administrative agency to administer a congressionally created . . . program necessarily requires the formulation of policy and the making of rules to fill any gap left, implicitly or explicitly, by Congress." *Morton* v. *Ruiz*, 415 U. S. 199, 231 (1974). If Congress has explicitly left a gap for the agency to fill, there is an express delegation of authority to the agency to elucidate a specific provision of the statute by regulation. Such legislative regulations are given controlling weight unless they are arbitrary, capricious, or manifestly contrary to the statute.[12] Sometimes the legislative delegation to an agency on a particular question is implicit rather than explicit. In such a case, a court may not substitute its own construction of a statutory provison for a reasonable interpretation made by the administrator of an agency.[13]

We have long recognized that considerable weight should be accorded to an executive department's construction of a statutory scheme it is entrusted to administer,[14] and the principle of deference to administrative interpretations

> "has been consistently followed by this Court whenever decision as to the meaning or reach of a statute has involved reconciling conflicting policies, and a full understanding of the force of the statutory policy in the given situation has depended upon more than ordinary knowledge respecting the matters subjected to agency regulations. See, *e. g.*, *National Broadcasting Co.* v. *United States*, 319 U. S. 190; *Labor Board* v. *Hearst Publications, Inc.*, 322 U. S. 111; *Republic Aviation Corp.* v. *Labor Board*, 324 U. S. 793; *Securities & Exchange Comm'n* v. *Chenery Corp.*, 322 U. S. 194; *Labor Board* v. *Seven-Up Bottling Co.*, 344 U. S. 344.
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> ". . . If this choice represents a reasonable accommodation of conflicting policies that were committed to the agency's care by the statute, we should not disturb it unless it appears from the statute or its legislative history that the accommodation is not one that Congress would have sanctioned." *United States* v. *Shimer*, 367 U. S. 374, 382, 383 (1961). *Accord Capital Cities Cable, Inc.* v. *Crisp*, 467 U. S. ——, —— - —— (1984) (slip op. at 6–7).

In light of these well-settled principles it is clear that the Court of Appeals misconceived the nature of its role in reviewing the regulations at issue. Once it determined, after its own examination of the legislation, that Congress did not actually have an intent regarding the applicability of the bubble concept to the permit program, the question before it was not whether in its view the concept is "inappropriate" in the general context of a program designed to improve air quality, but whether the Administrator's view that it is appropriate in the context of this particular program is a reasonable one. Based on the examination of the legislation and its history

[12] See, *e. g.*, *United States* v. *Morton*, —— U. S. ——, —— - —— (1984) (slip op. at 11–12); *Schweiker* v. *Gray Panthers*, 453 U. S. 34, 44 (1981); *Batterton* v. *Francis*, 432 U. S. 416, 424–426 (1977); *American Telephone & Telegraph Co.* v. *United States*, 299 U. S. 232, 235–237 (1936).

[13] *E. g.*, *INS* v. *Jong Ha Wang*, 450 U. S. 139, 144 (1981); *Train* v. *Natural Resources Defense Council, Inc.*, 421 U. S., at 87.

[14] *Aluminum Co. of America* v. *Central Lincoln Peoples' Util. Dist.*, 467 U. S. ——, —— (1984) (slip op. at 9); *Blum* v. *Bacon*, 457 U. S. 132, 141 (1982); *Union Electric Co.* v. *EPA*, 427 U. S. 246, 256 (1976); *Investment Company Institute* v. *Camp*, 401 U. S. 617, 626–627 (1971); *Unemployment Compensation Commission* v. *Aragon*, 329 U. S., at 153–154; *NLRB* v. *Hearst Publications, Inc.*, 322 U. S. 111, 131 (1944); *McLaren* v. *Fleischer*, 256 U. S., at 480–481; *Webster* v. *Luther*, 163 U. S., at 342; *Brown* v. *United States*, 113 U. S. 568, 570–571 (1885); *United States* v. *Moore*, 95 U. S. 760, 763 (1878); *Edwards' Lessee* v. *Darby*, 12 Wheat. 206, 210 (1827).

which follows, we agree with the Court of Appeals that Congress did not have a specific intention on the applicability of the bubble concept in these cases, and conclude that the EPA's use of that concept here is a reasonable policy choice for the agency to make.

III

In the 1950's and the 1960's Congress enacted a series of statutes designed to encourage and to assist the States in curtailing air pollution. See generally *Train* v. *Natural Resources Defense Council, Inc.*, 421 U. S. 60, 63–64 (1975). The Clean Air Amendments of 1970, Pub. L. 91–604, 84 Stat. 1676, "sharply increased federal authority and responsibility in the continuing effort to combat air pollution," 421 U. S., at 64, but continued to assign "primary responsibility for assuring air quality" to the several States, 84 Stat. 1678. Section 109 of the 1970 Amendments directed the EPA to promulgate National Ambient Air Quality Standards (NAAQS's)[15] and § 110 directed the States to develop plans (SIP's) to implement the standards within specified deadlines. In addition, § 111 provided that major new sources of pollution would be required to conform to technology-based performance standards; the EPA was directed to publish a list of categories of sources of pollution and to establish new source performance standards (NSPS) for each. Section 111(e) prohibited the operation of any new source in violation of a performance standard.

Section 111(a) defined the terms that are to be used in setting and enforcing standards of performance for new stationary sources. It provided:

> "For purposes of this section:
>
> . . . . .
>
> "(3) The term 'stationary source' means any building, structure, facility, or installation which emits or may emit any air pollutant." 84 Stat. 1683.

In the 1970 Amendments that definition was not only applicable to the NSPS program required by § 111, but also was made applicable to a requirement of § 110 that each state implementation plan contain a procedure for reviewing the location of any proposed new source and preventing its construction if it would preclude the attainment or maintenance of national air quality standards.[16]

In due course, the EPA promulgated NAAQS's, approved SIP's, and adopted detailed regulations governing NSPS's for various categories of equipment. In one of its programs, the EPA used a plantwide definition of the term "stationary source." In 1974, it issued NSPS's for the nonferrous smelting industry that provided that the standards would not apply to the modification of major smelting units if their increased emissions were offset by reductions in other portions of the same plant.[17]

Nonattainment

The 1970 legislation provided for the attainment of primary NAAQS's by 1975. In many areas of the country, particularly the most industrialized States, the statutory goals were not attained.[18] In 1976, the 94th Congress was confronted with this fundamental problem, as well as many others respecting pollution control. As always in this area, the legislative struggle was basically between interests seeking strict schemes to reduce pollution rapidly to eliminate its social costs and interests advancing the economic concern that strict schemes would retard industrial development with attendant social costs. The 94th Congress, confronting these competing interests, was unable to agree on what response was in the public interest: legislative proposals to deal with nonattainment failed to command the necessary consensus.[19]

In light of this situation, the EPA published an Emissions Offset Interpretative Ruling in December 1976, see 41 Fed. Reg. 55524, to "fill the gap," as respondents put it, until Congress acted. The Ruling stated that it was intended to address "the issue of whether and to what extent national air quality standards established under the Clean Air Act may restrict or prohibit growth of major new or expanded stationary air pollution sources." *Id.*, at 55524–55525. In general, the ruling provided "that a major new source may locate in an area with air quality worse than a national standard only if stringent conditions can be met." *Id.*, at 55525. The Ruling gave primary emphasis to the rapid attainment of the statute's environmental goals.[20] Consistent with that emphasis, the construction of every new source in nonattainment areas had to meet the "lowest achievable emission rate" under the current state of the art for that type of facility. See *Ibid.* The 1976 Ruling did not, however, explicitly adopt or reject the "bubble concept."[21]

IV

The Clean Air Act Amendments of 1977 are a lengthy, detailed, technical, complex, and comprehensive response to a major social issue. A small portion of the statute—91 Stat. 745–751 (Part D of Title I of the amended Act, 42 U. S. C. § 7501–7508)—expressly deals with nonattainment areas. The focal point of this controversy is one phrase in that portion of the Amendments.[22]

Basically, the statute required each State in a nonattainment area to prepare and obtain approval of a new SIP by July 1, 1979. In the interim those States were required to comply with the EPA's interpretative Ruling of De-

[15] Primary standards were defined as those whose attainment and maintenance were necessary to protect the public health and secondary standards were intended to specify a level of air quality that would protect the public welfare.

[16] See §§ 110(a)(2)(D) and 110(a)(4).

[17] The Court of Appeals ultimately held that this plantwide approach was prohibited by the 1970 Act, see *ASARCO Inc.*, 188 U. S. App. D. C., at 83–84, 578 F. 2d, at 325–327. This decision was rendered after enactment of the 1977 Amendments, and hence the standard was in effect when Congress enacted the 1977 Amendments.

[18] See Report of the National Commission on Air Quality, To Breathe Clean Air, pp. 3.3–20 thru 3.3–33 (1981).

[19] Comprehensive bills did pass both chambers of Congress; the Conference Report was rejected in the Senate. 122 Cong. Rec. 34375–34403, 34405–34418 (1976).

[20] For example, it stated:

"Particularly with regard to the primary NAAQS's, Congress and the Courts have made clear that economic considerations must be subordinated to NAAQS achievement and maintenance. While the ruling allows for some growth in areas violating a NAAQS if the net effect is to insure further progress toward NAAQS achievement, the Act does not allow economic growth to be accommodated at the expense of the public health." 41 Fed. Reg. 55527 (1976).

[21] In January 1979, the EPA noted that the 1976 Ruling was ambiguous concerning this issue:

"A number of commenters indicated the need for a more explicit definition of 'source.' Some readers found that it was unclear under the 1976 Ruling whether a plant with a number of different processes and emission points would be considered a single source. The changes set forth below define a source as 'any structure, building, facility, equipment, installation or operation (or combination thereof) which is located on one or more contiguous or adjacent properties and which is owned or operated by the same person (or by persons under common control).' This definition precludes a large plant from being separated into individual production lines for purposes of determining applicability of the offset requirements." 44 Fed. Reg. 3276.

[22] Specifically, the controversy in this case involves the meaning of the term "major stationary sources" in § 172(b)(6) of the Act, 42 U. S. C. § 7502(b)(6). The meaning of the term "proposed source" in § 173(2) of the Act, 42 U. S. C. § 7503(2), is not at issue.

cember 21, 1976. 91 Stat. 745. The deadline for attainment of the primary NAAQS's was extended until December 31, 1982, and in some cases until December 31, 1987, but the SIP's were required to contain a number of provisions designed to achieve the goals as expeditiously as possible.[23]

Most significantly for our purposes, the statute provided that each plan shall:

> "(6) require permits for the construction and operation of new or modified major stationary sources in accordance with section 173 . . . ." 91 Stat. 747.

Before issuing a permit, § 173 requires the state agency to determine that (1) there will be sufficient emissions reductions in the region to offset the emissions from the new source and also to allow for reasonable further progress toward attainment, or that the increased emissions will not exceed an allowance for growth established pursuant to § 172(b)(5); (2) the applicant must certify that his other sources in the State are in compliance with the SIP, (3) the agency must determine that the applicable SIP is otherwise being implemented, and (4) the proposed source complies with the lowest achievable emission rate (LAER).[24]

The 1977 Amendments contain no specific reference to the "bubble concept." Nor do they contain a specific definition of the term "stationary source," though they did not disturb the definition of "stationary source" contained in § 111(a)(3), applicable by the terms of the Act to the NSPS program. Section 302(j), however, defines the term "major stationary source" as follows:

> "(j) Except as otherwise expressly provided, the terms 'major stationary source' and 'major emitting facility' mean any stationary facility or source of air pollutants which directly emits, or has the potential to emit, one hundred tons per year or more of any air pollutant (including any major emitting facility or source of fugitive emissions of any such pollutant, as determined by rule by the Administrator)." 91 Stat. 770.

V

The legislative history of the portion of the 1977 Amendments dealing with nonattainment areas does not contain any specific comment on the "bubble concept" or the question whether a plantwide definition of a stationary source is permissible under the permit program. It does, however, plainly disclose that in the permit program Congress sought to accommodate the conflict between the economic interest in permitting capital improvements to continue and the environmental interest in improving air quality. Indeed, the House Committee Report identified the economic interest as one of the "two main purposes" of this section of the bill. It stated:

> "Section 117 of the bill, adopted during full committee markup establishes a new section 127 of the Clean Air Act. The section has two main purposes: (1) to allow reasonable economic growth to continue in an area while making reasonable further progress to assure attainment of the standards by a fixed date; and (2) to allow States greater flexibility for the former purpose than EPA's present interpretative regulations afford.
>
> "The new provision allows States with nonattainment areas to pursue one of two options. First, the State may proceed under EPA's present 'tradeoff' or 'offset' ruling. The Administrator is authorized, moreover, to modify or amend that ruling in accordance with the intent and purposes of this section.
>
> "The State's second option would be to revise its implementation plan in accordance with this new provision." H. R. Rep. No. 95-294, p. 211 (1977).[25]

The portion of the Senate Committe Report dealing with nonattainment areas states generally that it was intended to "supersede the EPA administrative approach," and that expansion should be permitted if a State could "demonstrate that these facilities can be accommodated within its overall plan to provide for attainment of air quality standards." S. Rep. 95-127, p. 55 (1977). The Senate Report notes the value of "case-by-case review of each new or modified major source of pollution that seeks to locate in a region exceeding an ambient standard," explaining that such a review "requires matching reductions from existing sources against emissions expected from the new source in order to assure that introduction of the new source will not prevent attain-

[23] Thus, among other requirements, § 172(b) provided that the SIP's shall—

"(3) require, in the interim, reasonable further progress (as defined in section 171(1)) including such reduction in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology;

"(4) *include a comprehensive, accurate, current inventory of actual* emissions from all sources (as provided by rule of the Administrator) of each such pollutant for each such area which is revised and resubmitted as frequently as may be necessary to assure that the requirements of paragraph (3) are met and to assess the need for additonal reductions to assure attainment of each standard by the date required under paragraph (1);

"(5) expressly identify and quantify the emissions, if any, of any such pollutant which will be allowed to result from the construction and operation of major new or modified stationary sources for each such area; . . .

. . . . .

"(8) contain emission limitations, schedules of compliance and such other *measures as may be necessary to meet the requirements of this section.*" 91 Stat. 747.

Section 171(1) provided:

"(1) The term 'reasonable further progress' means annual incremental reductions in emissions of the applicable air pollutant (including substantial reductions in the early years following approval or promulgation of plan provisions under this part and section 110(a)(2)(I) and regular reductions thereafter) which are sufficient in the judgment of the Administrator, to provide for attainment of the applicable national ambient air quality standard by the date required in section 172(a)." *Id.*, at 746.

[24] Section 171(3) provides:

"(3) The term 'lowest achievable emission rate' means for any source, that rate of emissions which reflects—

"(A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or

"(B) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent.

"In no event shall the application of this term permit a proposed new or modified source to emit any pollutant in excess of the amount allowable under applicable new source standards of performance." *Ibid.*

The LAER requirement is defined in terms that make it even more stringent than the applicable new source performance standard developed under § 111 of the 1970 statute.

[25] During the floor debates Congressman Waxman remarked that the legislation struck

"a proper balance between environmental controls and economic growth in the dirty air areas of America. . . . There is no other single issue which more clearly poses the conflict between pollution control and new jobs. We have determined that neither need be compromised. . . .

"This is a fair and balanced approach, which will not undermine our economic vitality, or impede achievement of our ultimate environmental objectives." 123 Cong. Rec. 27076 (1977).

The second "main purpose" of the provision—allowing the States "greater flexibility" than the EPA's interpretative ruling—as well as the reference to the EPA's authority to amend its ruling in accordance with the intent of the section, is entirely consistent with the view that Congress did not intend to freeze the definition of source contained in the existing regulation into a rigid statutory requirement.

ment of the applicable standard by the statutory deadline." *Ibid.* This description of a case-by-case approach to plant additions, which emphasizes the net consequences of the construction or modification of a new source, as well as its impact on the overall achievement of the national standards, was not, however, addressed to the precise issue raised by this case.

Senator Muskie made the following remarks:

> "I should note that the test for determining whether a new or modified source is subject to the EPA interpretative regulation [the Offset Ruling]—and to the permit requirements of the revised implementation plans under the conference bill—is whether the source will emit a pollutant into an area which is exceeding a national ambient air quality standard for that pollutant—or precursor. Thus, a new source is still subject to such requirements as 'lowest achievable emission rate' even if it is constructed as a replacement for an older facility resulting in a net reduction from previous emission levels.
>
> "A source—including an existing facility ordered to convert to coal—is subject to all the nonattainment requirements as a modified source if it makes any physical change which increases the amount of any air pollutant for the standards in the area are exceeded." 123 Cong. Rec. 26847 (1977).

VI

As previously noted, prior to the 1977 Amendments, the EPA had adhered to a plantwide definition of the term "source" under a NSPS program. After adoption of the 1977 Amendments, proposals for a plantwide definition were considered in at least three formal proceedings.

In January 1979, the EPA considered the question whether the same restriction on new construction in nonattaiment areas that had been included in its December 1976 ruling should be required in the revised SIP's that were scheduled to go into effect in July 1979. After noting that the 1976 ruling was ambiguous on the question "whether a plant with a number of different processes and emission points would be considered a single source," 44 Fed. Reg. 3276 (1979), the EPA, in effect, provided a bifurcated answer to that question. In those areas that did not have a revised SIP in effect by July 1979, the EPA rejected the plantwide definition; on the other hand, it expressly concluded that the plantwide approach would be permissible in certain circumstances if authorized by an approved SIP. It stated:

> "Where a state implementation plan is revised and implemented to satisfy the requirements of Part D, including the reasonable further progress requirement, the plan requirements for major modifications may exempt modifications of existing facilities that are accompanied by intrasource offsets so that there is no net increase in emissions. The agency endorses such exemptions, which would provide greater flexibility to sources to effectively manage their air emissions at least cost." *Ibid.*[*]

In April, and again in September 1979, the EPA publis[hed] additional comments in which it indicated that revised S[IPs] could adopt the plant-wide definition of source [in] nonattainment areas in certain circumstances. See *id.*, at 20372, 20379, 51951, 51924, 51958. On the latter occasion, the EPA made a formal rulemaking proposal that would have permitted the use of the "bubble concept" for new installations within a plant as well as for modifications of existing units. It explained:

> "'*Bubble' Exemption*: The use of offsets inside the same source is called the 'bubble.' EPA proposes use of the definition of 'source' (see above) to limit the use of the bubble under nonattainment requirements in the following respects:
>
> "i. Part D SIPs that include all requirements needed to assure reasonable further progress and attainment by the deadline under section 172 and that are being carried out need not restrict the use of a plantwide bubble, the same as under the PSD proposal.
>
> "ii. Part D SIPs that do not meet the requirements specified must limit use of the bubble by including a definition of 'installation' as an identifiable piece of process equipment.'"[*]

Significantly, the EPA expressly noted that the word "source" might be given a plantwide definition for some purposes and a narrower definition for other purposes. It wrote:

> "Source means any building structure, facility, or installation which emits or may emit any regulated pollutant. 'Building, structure, facility or installation' means p[...] in PSD areas and in nonattainment areas except w[...] the growth prohibitions would apply or where no adequate SIP exists or is being carried out." *Id.*, at 51925.[*]

The EPA's summary of its proposed ruling discloses a flexible rather than rigid definition of the term "source" to implement various policies and programs:

> "In summary, EPA is proposing two different ways to define source for different kinds of NSR programs:
>
> "(1) For PSD and complete Part D SIPs, review would apply only to plants, with an unrestricted plantwide bubble.
>
> "(2) For the offset ruling, restrictions on construction, and incomplete Part D SIPs, review would apply to both plants and individual pieces of process equipment, causing the plant-wide bubble not to apply for new and modified major pieces of equipment.

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[*] In the same ruling, the EPA added:

"The above exemption is permitted under the SIP because, to be approved under Part D, plan revisions due by January 1979 must contain adopted measures assuring that reasonable further progress will be made. Furthermore, in most circumstances, the measures adopted by January 1979 must be sufficient to actually provide for attainment of the standards by the dates required under the Act, and in all circumstances measures adopted by 1982 must provide for attainment. See Section 172 of the Act and 43 21673–21677 (May 19, 1978). Also, Congress intended under Section 173 of the Act that States would have some latitude to depart from the strict requirements of this Ruling when the State plan is revised and is being carried out in accordance with Part D. Under a Part D plan, therefore, there is less need to subject a modification of an existing facility to LAER and other stringent requirements if the modification is accompanied by sufficient intrasource offsets so that there is no net increase in emissions." 44 Fed. Reg. 3277 (1979).

[*] *Id.*, at 51926. Later in that ruling, the EPA added:

"However, EPA believes that complete Part D SIPs, which contain adopted and enforceable requirements sufficient to assure attainment, may apply the approach proposed above for PSD, with plant-wide review but no review of individual pieces of equipment. Use of only a plant-wide definition of source will permit plant-wide offsets for avoiding NSR of new or modified pieces of equipment. However, this is only appropriate once a SIP is adopted that will assure the reductions in existing emissions necessary for attainment. *See* 44 FR 3276 col. 3 (January 16, 1979). If the level of emissions allowed in the SIP is low enough to assure reas[onable] further progress and attainment, new contruction or modification[s with] enough offset credit to prevent an emission increase should not jeopar[dize] attainment." *Id.*, at 51933.

[*] In its explanation of why the use of the bubble concept was especially appropriate in preventing significant deterioration (PSD) in clean air areas, the EPA stated: "In addition, application of the bubble on a plant-wide basis encourages voluntary upgrading of equipment, and growth in productive capacity." *Id.*, at 51932.

"In addition, for the restrictions on construction, EPA is proposing to define 'major modification' so as to prohibit the bubble entirely. Finally, an alternative discussed but not favored is to have only pieces of process equipment reviewed, resulting in no plant-wide bubble and allowing minor pieces of equipment to escape NSR regardless of whether they are within a major plant." *Id.*, at 51934.

In August 1980, however, the EPA adopted a regulation that, in essence, applied the basic reasoning of the Court of Appeals in this case. The EPA took particular note of the two then-recent Court of Appeals decisions, which had created the bright-line rule that the bubble concept should be employed in a program designed to maintain air quality but not in one designed to enhance air quality. Relying heavily on those cases,[28] EPA adopted a dual definition of "source" for nonattainment areas that required a permit whenever a change in either the entire plant, or one of its components, would result in a significant increase in emissions even if the increase was completely offset by reductions elsewhere in the plant. The EPA expressed the opinion that this interpretation was "more consistent with congressional intent" than the plantwide definition because it "would bring in more sources or modifications for review" 45 Fed. Reg. 52697 (1980), but its primary legal analysis was predicated on the two Court of Appeals decisions.

In 1981 a new administration took office and initiated a "Government-wide reexamination of regulatory burdens and complexities." 46 Fed. Reg. 16281. In the context of that review, the EPA reevaluated the various arguments that had been advanced in connection with the proper definition of the term "source" and concluded that the term should be given the same definition in both nonattainment areas and PSD areas

In explaining its conclusion, the EPA first noted that the definitional issue was not squarely addressed in either the statute or its legislative history and therefore that the issue involved an agency "judgment as how to best carry out the Act." *Ibid.* It then set forth several reasons for concluding that the plantwide definition was more appropriate. It pointed out that the dual definition "can act as a disincentive to new investment and modernization by discouraging modifications to existing facilities" and "can actually retard progress in air pollution control by discouraging replacement of older, dirtier processes or pieces of equipment with new, cleaner ones." *Ibid.* Moreover, the new definition "would simplify EPA's rules by using the same definition of 'source' for PSD, nonattainment new source review and the construction moratorium. This reduces confusion and inconsistency." *Ibid.* Finally, the agency explained that additional requirements that remained in place would accomplish the fundamental purposes of achieving attainment with NAAQ's as expeditiously as possible.[29] These conclusions were expresed in a proposed rulemaking in August 1981 that was formally promulgated in October. See *id.*, at 50766.

VII

In this Court respondents expressly reject the basic rationale of the Court of Appeals' decision. That court viewed the statutory definition of the term "source" as sufficiently flexible to cover either a plantwide definition, a narrower definition covering each unit within a plant, or a dual definition that could apply to both the entire "bubble" and its components. It interpreted the policies of the statute, however, to mandate the plantwide definition in programs designed to maintain clean air and to forbid it in programs designed to improve air quality. Respondents place a fundamentally different construction on the statute. They contend that the text of the Act requires the EPA to use a dual definition—if either a component of a plant, or the plant as a whole, emits over 100 tons of pollutant, it is a major stationary source. They thus contend that the EPA rules adopted in 1980, insofar as they apply to the maintenance of the quality of clean air, as well as the 1981 rules which apply to nonattainment areas, violate the statute.[30]

Statutory Language

The definition of the term stationary source in § 111(a)(3) refers to "any building, structure, facility, or installation" which emits air pollution. See *supra*, at 8. This definition is applicable only to the NSPS program by the express terms of the statute; the text of the statute does not make this definition applicable to the permit program. Petitioners therefore maintain that there is no statutory language even relevant to ascertaining the meaning of stationary source in the permit program aside from § 302(j), which defines the term major stationary source. See *supra*, at 12. We disagree with petitioners on this point.

The definition in § 302(j) tells us what the word "major" means—a source must emit at least 100 tons of pollution to qualify—but it sheds virtually no light on the meaning of the term "stationary source." It does equate a source with a facility—a "major emitting facility" and a "major stationary source" are synonymous under § 302(j). The ordinary meaning of the term facility is some collection of integrated elements which has been designed and constructed to achieve some purpose. Moreover, it is certainly no affront to common English usage to take a reference to a major facility or a major source to connote an entire plant as opposed to its constituent parts. Basically, however, the language of § 302(j) simply does not compel any given interpretation of the term source.

Respondents recognize that, and hence point to § 111(a)(3). Although the definition in that section is not literally appli-

[28] "The dual definition also is consistent with *Alabama Power* and *ASARCO*. *Alabama Power* held that EPA had broad discretion to define the constituent terms of 'source' so as best to effectuate the purposes of the statute. Different definitions of 'source' can therefore be used for different sections of the statute. . . .

"Moreover, *Alabama Power* and *ASARCO* taken together suggest that there is a distinction between Clean Air Act programs designed to *enhance* air quality and those designed only to *maintain* air quality. . . .

. . . . .

"Promulgation of the dual definition follows the mandate of *Alabama Power*, which held that, while EPA could not define 'source' as a combination of sources, EPA had broad discretion to define 'building,' 'structure,' 'facility,' and 'installation' so as to best accomplish the purposes of the Act." 45 Fed. Reg. 52697 (1980).

[29] It stated:

"5. States will remain subject to the requirement that for all nonattainment areas they demonstrate attainment of NAAQS as expeditiously as practicable and show reasonable further progress toward such attainment. Thus, the proposed change in the mandatory scope of nonattainment new source review should not interfere with the fundamental purpose of Part D of the Act.

"6. New Source Performance Standards (NSPS) will continue to apply to many new or modified facilities and will assure use of the most up-to-date pollution control techniques regardless of the applicability of nonattainment area new source review.

"7. In order to avoid nonattainment area new source review, a major plant undergoing modification must show that it will not experience a significant net increase in emissions. Where overall emissions increase significantly, review will continue to be required." 46 Fed. Reg. 16281 (1981).

[30] "What EPA may not do, however, is define all four terms to mean *only* plants. In the 1980 PSD rules, EPA did just that. EPA compounded the mistake in the 1981 rules here under review, in which it abandoned the dual definition." Brief for Respondents 29, n. 56.

cable to the permit program, it sheds as much light on the meaning of the word source as anything in the statute.[*] As respondents point out, use of the words "building, structure, facility, or installation," as the definition of source, could be read to impose the permit conditions on an individual building that is a part of a plant.[*] A "word may have a character of its own not to be submerged by its association." *Russell Motor Car Co.* v. *United States*, 261 U. S. 514, 519 (1923). On the other hand, the meaning of a word must be ascertained in the context of achieving particular objectives, and the words associated with it may indicate that the true meaning of the series is to convey a common idea. The language may reasonably be interpreted to impose the requirement on any discrete, but integrated, operation which pollutes. This gives meaning to all of the terms—a single building, not part of a larger operation, would be covered if it emits more than 100 tons of pollution, as would any facility, structure, or installation. Indeed, the language itself implies a bubble concept of sorts: each enumerated item would seem to be treated as if it were encased in a bubble. While respondents insist that each of these terms must be given a discrete meaning, they also argue that § 111(a)(3) defines "source" as that term is used in § 302(j). The latter section, however, equates a source with a facility, whereas the former defines source as a facility, among other items.

We are not persuaded that parsing of general terms in the text of the statute will reveal an actual intent of Congress.[*] We know full well that this language is not dispositive; the terms are overlapping and the language is not precisely directed to the question of the applicability of a given term in the context of a larger operation. To the extent any congressional "intent" can be discerned from this language, it would appear that the listing of overlapping, illustrative terms was intended to enlarge, rather than to confine, the scope of the agency's power to regulate particular sources in order to effectuate the policies of the Act.

Legislative History

In addition, respondents argue that the legislative history and policies of the Act foreclose the plantwide definition, and that the EPA's interpretation is not entitled to deference because it represents a sharp break with prior interpretations of the Act.

Based on our examination of the legislative history, we agree with the Court of Appeals that it is unilluminating. The general remarks pointed to by respondents "were obviously not made with this narrow issue in mind and they cannot be said to deomonstrate a Congressional desire . . . ." *Jewel Ridge Coal Corp.* v. *Mine Workers*, 325 U. S. 161, 168–169 (1945). Respondents' argument based on the legislative history relies heavily on Senator Muskie's observation that a new source is subject to the LAER requirement.[*] But the full statement is ambiguous and like the text of § 173 itself, this comment does not tell us what a new source is, much less that it is to have an inflexible definition. We find that the legislative history as a whole is silent on the precise issue before us. It is, however, consistent with the view that the EPA should have broad discretion in implementing the policies of the 1977 Amendments.

More importantly, that history plainly identifies the policy concerns that motivated the enactment; the plantwide definition is fully consistent with one of those concerns—the allowance of reasonable economic growth—and, whether or not we believe it most effectively implements the other, we must recognize that the EPA has advanced a reasonable explanation for its conclusion that the regulations serve the environmental objectives as well. See *supra*, at 19–20, and n. 29; see also *supra*, at 17, n. 27. Indeed, its reasoning is supported by the public record developed in the rulemaking process,[*] as well as by certain private studies.[*]

Our review of the EPA's varying interpretations of the word "source"—both before and after the 1977 Amendments—convince us that the agency primarily responsible for administering this important legislation has consistently interpreted it flexibly—not in a sterile textual vacuum, but in the context of implementing policy decisions in a technical and complex arena. The fact that the agency has from time to time changed its interpretation of the term source does not, as respondents argue, lead us to conclude that no deference should be accorded the agency's interpretation of the statute. An initial agency interpretation is not instantly carved in stone. On the contrary, the agency, to engage in informed rulemaking, must consider varying interpretations and the wisdom of its policy on a continuing basis. Moreover, the fact that the agency has adopted different definitions in different contexts adds force to the argument that the definition itself is flexible, particularly since Congress has never indicated any disapproval of a flexible reading of the statute.

Significantly, it was not the agency in 1980, but rather the Court of Appeals that read the statute inflexibly to command a plantwide definition for programs designed to maintain clean air and to forbid such a definition for programs designed to improve air quality. The distinction the court drew may well be a sensible one, but our labored review of the problem has surely disclosed that it is not a distinction

[*] We note that the EPA in fact adopted the language of that definition in its regulations under the permit program. 40 CFR § 51.18(j)(1)(i)–(ii) (1983).

[*] Since the regulations give the States the option to define an individual unit as a source, see 40 CFR § 51.18(j)(1), petitioners do not dispute that the terms can be read as respondents suggest.

[*] The argument based on the text of § 173, which defines the permit requirements for nonattainment areas, is a classic example of circular reasoning. One of the permit requirements is that "the proposed source is required to comply with the lowest achievable emission rate" (LAER). Although a State may submit a revised SIP that provides for the waiver of another requirement—the "offset condition"—the SIP may not provide for a waiver of the LAER condition for any proposed source. Respondents argue that the plant-wide definition of the term "source" makes it unnecessary for newly constructed units within the plant to satisfy the LAER requirement if their emissions are offset by the reductions achieved by the retirement of older equipment. Thus, according to respondents, the plant-wide definition allows what the statute explicitly prohibits—the waiver of the LAER requirement for the newly constructed units. But this argument proves nothing because the statute does not prohibit the waiver unless the proposed new unit is indeed subject to the permit program. If it is not, the statute does not impose the LAER requirement at all and there is no need to reach any waiver question. In other words, § 173 of the statute merely deals with the consequences of the definition of the term "source" and does not define the term.

[*] See *supra*, at ——. We note that Senator Muskie was not critical of the EPA's use of the bubble concept in one NSPS program prior to the 1977 amendments. See *supra*, at ——.

[*] See, for example, the statement of the New York State Department of Environmental Conservation, pointing out that denying a source owner flexibility in selecting options made it "simpler and cheaper to operate old, more polluting sources than to trade up. . . ." App. 128–129.

[*] "Economists have proposed that economic incentives be substituted for the cumbersome administrative-legal framework. The objective is to make the profit and cost incentives that work so well in the marketplace work for pollution control. . . . [The 'bubble' or 'netting' concept] is a first attempt in this direction. By giving a plant manager flexibility to find the places and processes within a plant that control emissions most cheaply, pollution control can be achieved more quickly and cheaply." L. Lave & G. Omenn, Cleaning the Air: Reforming the Clean Air Act 28 (1981) (footnote omitted).

that Congress ever articulated itself, or one that the EPA found in the statute before the courts began to review the legislative work product. We conclude that it was the Court of Appeals, rather than Congress or any of the decisionmakers who are authorized by Congress to administer this legislation, that was primarily responsible for the 1980 position taken by the agency.

Policy

The arguments over policy that are advanced in the parties' briefs create the impression that respondents are now waging in a judicial forum a specific policy battle which they ultimately lost in the agency and in the 32 jurisdictions opting for the bubble concept, but one which was never waged in the Congress. Such policy arguments are more properly addressed to legislators or administrators, not to judges.[38]

In this case, the Administrator's interpretation represents a reasonable accommodation of manifestly competing interests and is entitled to deference: the regulatory scheme is technical and complex,[39] the agency considered the matter in a detailed and reasoned fashion,[40] and the decision involves reconciling conflicting policies.[41] Congress intended to accommodate both interests, but did not do so itself on the level of specificity presented by this case. Perhaps that body consciously desired the Administrator to strike the balance at this level, thinking that those with great expertise and charged with responsibility for administering the provision would be in a better position to do so; perhaps it simply did not consider the question at this level; and perhaps Congress was unable to forge a coalition on either side of the question, and those on each side decided to take their chances with the scheme devised by the agency. For judicial purposes, it matters not which of these things occurred.

Judges are not experts in the field, and are not part of either political branch of the Government. Courts must, in some cases, reconcile competing political interests, but not on the basis of the judges' personal policy preferences. In contrast, an agency to which Congress has delegated policymaking responsibilities may, within the limits of that delegation, properly rely upon the incumbent administration's views of wise policy to inform its judgments. While agencies are not directly accountable to the people, the Chief Executive is, and it is entirely appropriate for this political branch of the Government to make such policy choices—resolving the competing interests which Congress itself either inadvertently did not resolve, or intentionally left to be resolved by the agency charged with the administration of the statute in light of everyday realities.

When a challenge to an agency construction of a statutory provision, fairly conceptualized, really centers on the wisdom of the agency's policy, rather than whether it is a reasonable choice within a gap left open by Congress, the challenge must fail. In such a case, federal judges—who have no constituency—have a duty to respect legitimate policy choices made by those who do. The responsibilities for assessing the widsom of such policy choices and resolving the struggle between competing views of the public interest are not judicial ones: "Our Constitution vests such responsibilities in the political branches." *TVA* v. *Hill*, 437 U. S. 153, 195 (1978).

We hold that the EPA's definition of the term "source" is a permissible construction of the statute which seeks to accommodate progress in reducing air pollution with economic growth. "The Regulations which the Adminstrator has adopted provide what the agency could allowably view as . . . [an] effective reconciliation of these twofold ends . . . ." *United States* v. *Shimer*, 367 U. S., at 383.

The judgment of the Court of Appeals is reversed.

It is so ordered.

JUSTICE MARSHALL and JUSTICE REHNQUIST did not participate in the consideration or decision of these cases.

JUSTICE O'CONNOR did not participate in the decision of these cases.

PAUL M. BATOR, Deputy Solicitor General, Washington, D.C. (REX E. LEE, Sol. Gen., F. HENRY HABICHT II, Acting Asst. Atty. Gen., MARY L. WALKER, Dpty. Asst. Atty. Gen., MARK I. LEVY, Asst. to the Sol. Gen., JOSE A. ALLEN, ANNE S. ALMY, NANCY S. BRYSON, Justice Dept. attys., A. JAMES BARNES, WILLIAM F. PEDERSEN, and CHARLES S. CARTER, EPA attys., with him on the brief) for petitioner; DAVID D. DONIGER, for respondents.

No. 83-185

SYLVIA COOPER, ET AL., PETITIONERS *v.* FEDERAL RESERVE BANK OF RICHMOND

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FOURTH CIRCUIT

Syllabus

No. 83-185. Argued March 19, 1984—Decided June 25, 1984

The Equal Employment Opportunity Commission brought an action in Federal District Court against respondent Federal Reserve Bank, alleging that one of respondent's branches (the Bank) violated § 703(a) of Title VII of the Civil Rights Act of 1964 by engaging in employment discrimination based on race during a specified time period. Subsequently, four of the Bank's employees (the Cooper petitioners) were allowed to intervene as plaintiffs, and they alleged that the Bank's employment practices violated 42 U. S. C. § 1981, as well as Title VII, and that they could adequately represent a class of black employees against whom the Bank had discriminated. The District Court then certified the class pursuant to Federal Rules of Civil Procedure 23(b)(2) and (3), and ordered that notice be given to the class members. Among the recipients of the notice were the Baxter petitioners. At the trial both the Cooper petitioners and the Baxter petitioners testified, and the District Court held that the Bank had engaged in a pattern and practice of racial discrimination with respect to employees in certain specified pay grades but not with respect to employees above those grades, and found that the Bank had discriminated against two of the Cooper petitioners but not against the others. Thereafter, the Baxter petitioners moved to intervene, but the District Court denied the motion on the ground, as to one petitioner, that since she was a member of the class to which relief had been ordered, her rights would be protected in the later relief stage of the proceedings, and, as to the other petitioners, on the ground that they were employed in jobs above the specified grades for which relief would be granted. These latter Baxter petitioners then filed a separate action against the Bank in the District Court, alleging that each of them had been denied a promotion because of their race in violation of 42 U. S. C. § 1981. The District Court denied the Bank's motion to dismiss but certified its order for interlocutory appeal, which was then consolidated with the Bank's pending appeal in the class action. The Court of Appeals reversed on the merits in the class action, holding that there was insufficient evidence to establish a pattern or practice of racial discrimination in the specified grades, and that none of the Cooper petition-

[38] Respondents point out if a brand new factory that will emit over 100 tons of pollutants is constructed in a nonattainment area, that plant must obtain a permit pursuant to § 172(b)(6) and in order to do so, it must satisfy the § 173 conditions, including the LAER requirement. Respondents argue if an old plant containing several large emitting units is to be modernized by the replacement of one or more units emitting over 100 tons of pollutant with a new unit emitting less—but still more than 100 tons—the result should be no different simply because "it happens to be built not at a new site, but within a *pre-existing plant.*" Brief for Respondents 4.

[39] See e. g., *Aluminum Co. of America* v. *Central Lincoln Peoples' Util. Dist.*, 467 U. S., at —— (1984) (slip op. at 8).

[40] See *SEC* v. *Sloan*, 436 U. S., at 117 *Adamo Wrecking Co.* v. *United States*, 434 U. S. 275, 287, n. 5 (1978); *Skidmore* v. *Swift & Co.*, 323 U. S. 134, 140 (1944).

[41] See *Capital Cities Cable, Inc.* v. *Crisp*, 467 U. S. ——, —— - —— (1984) (slip op., at 6–7); *United States* v. *Shimer*, 367 U. S. 374, 382 (1961).

APPENDIX VI

STATE/LOCAL EMISSIONS TRADING PROGRAMS

Area	Type of Rule	Pollutant	Status As of 4/7/83
Connecticut	Generic Bubble	VOC	EPA approved 6/7/82
Maine	Emission Trading: Bubble and Banking	VOC, SO2, & TSP	EPA proposed approval on 6/8/81
Massachusetts	Generic Bubble for surface coating	VOC	EPA approved 3/29/82
Massachusetts	Generic Bubble	VOC	EPA proposed approval 2/3/83
New Hampshire	Generic Bubble	VOC	Under consideration
Rhode Island	Generic Bubble for Surface Coating	VOC	Proposed approval on 2/3/83
Rhode Island	Emissions Banking	VOC	Proposed approval on 2/3/83
New Jersey (Middlesex Co.)	Banking	VOC, TSP, SO2, CO, & NOx	Under development
New Jersey	Generic Bubble	SO2	EPA proposed approval 2/3/82
New Jersey	Generic Bubble	VOC	EPA approved 4/6/81
Maryland	Emission Trading: Bubble and Banking	VOC, SO2, & TSP	Being reviewed by Region
Pennsylvania (Allegheny Co.)	Banking	VOC, SO2, TSP, CO, & NOx	Adopted by County
Pennsylvania	Generic Bubble for Two Source Types	VOC	EPA approval 1/19/83
Virginia	Generic Bubble	VOC, TSP, & SO2	Under consideration
Alabama	Generic Bubble	VOC, TSP, SO2, NOx, & CO	Under development
Georgia	Generic Bubble	VOC, SO2, TSP, NOx, & CO	Under development
Kentucky	Generic Bubble and Banking Rule	VOC, TSP, SO2, & CO	EPA proposed approval 6/28/82 Final being reviewed by EPA
Kentucky (Jefferson Co.)	Banking	VOC, SO2, TSP	Active Program. Generic bubble rule also under development

Area	Type of Rule	Pollutant	Status
North Carolina	Generic Bubble	VOC	EPA approved 7/26/82
South Carolina	Generic Bubble	VOC, SO2, TSP, CO, & Pb	EPA approved 9/3/82
Tennesee	Generic Bubble	VOC	Under development
Illinois	Generic Bubble	VOC, SO2, TSP, CO, & NOx	Adopted by State Being reviewed by EPA
Indiana	Generic Bubble	VOC, SO2, TSP, CO, & NOx	Being reviewed by EPA
Michigan	Generic Bubble (interim compliance)	VOC	Under development
Wisconsin	Generic Bubble	VOC	Under consideration
Louisiana	Generic Bubble	VOC	Being redrafted
Oklahoma	Generic Bubble	VOC	Under development
Indiana	Generic Bubble	VOC, TSP, SO2, & NOx	Public hearing held
Kansas	Generic Bubble	VOC, TSP, SO2	Under development Being reviewed by EPA
Missouri	Generic Bubble	VOC	Under development
Arizona (Pima County)	Banking	VOC, SO2, TSP, CO, & NOx	Adopted by county
California (Kings)	Banking	VOC, TSP, SO2 CO, & NOx	Under development
California (Kern)	Banking	VOC, TSP, SO2 CO, & NOx	Under development
California San Francisco	Banking	VOC, SO2, & TSP	Program in place
California (Ventura)	Banking	VOC, TSP, SO2 CO, & NOx	Adopted by county
California (San Diego)	Banking	VOC, TSP, SO2 CO, & NOx	Under development
California South Coast, LA	Banking	VOC, TSP, SO2 CO, & NOx	Adopted by county
California (Monterey)	Banking	VOC, TSP, SO2 CO, & NOx	Adopted by county

Area	Type of Rule	Pollutant	Status
Oregon	Emission Trading: Bubble and Banking	VOC, SO2, & TSP	EPA approved 8/13/82
Washington	Emission Trading: Bubble and Banking	VOC, SO2, & TSP	Rule being drafted
Washington Seattle/Tacoma	Banking	VOC, SO2, & TSP	Active program; numerous "deposits", no withdrawls" yet

APPENDIX VII

COMPARISON OF SELECTED STATE GENERIC
COMPREHENSIVE EMISSIONS TRADING RULES

August 3, 1982

Prepared by Leslie Sue Ritts, Timothy
Henderson, & Alysia Watanabe

Environmental Law Institute

Washington DC

ISSIONS TRADING ISSUE	EPA EMISSIONS TRADING POLICY	MASSACHUSETTS RULE	NEW JERSEY RULE	OREGON RULE	MARYLAND RULE
GENERAL INFORMATION					
1. Status of Regulation	Emissions trading policy proposed 47 Fed. Reg. 15076 (April 7, 1982). Policy pertains to the creation, transfer, and storage of emission reduction credits and replaces the 1979 Bubble Policy.	Submitted offset regulation on 6/1/82 to U.S. EPA Region 1. VOC generic bubble rule to be submitted on 7/1/82 with '82 SIP revisions. Banking regulations in draft VOC rule (2/8/82) are not included with '82 SIP revisions.	Offset banking regulations approved June, 1979; amended July 8, 1980. N.J. Admin. Code Secs. 7:27-18.1 *et seq*. N.J. VOS generic bubble rule effective March, 1982. N.J.Admin. Code Secs.7:27-16.5,16.6. EPA proposed approval of N.J.'s SO_2 bubble, 47 Fed. Reg. 5014 (Feb. 3, 1982). N.J. Admin. Code Sec. 7:27-9.4.	Adopted in state regulations Aug. 28, 1981. Banking Rule Sec. 340-20-265; Bubble Rule Sec. 340-20-315 Oregon Admin. Rules. EPA proposed approval of Oregon's consolidated generic regulations. 47 Fed. Reg. 18004 (Apr. 27, 1982).	Md. Dept. of Health & Mental Hygiene Internal Draft. Feb. 22, 1982. New Regulation: 10.18.06.16; New Chapter: 10.18.19; Amendments to Regulations 10.18.01.01.H. 10.18.06.11 Rules being developed jointly with Md. Dept. of Economic and Community Development. Some unresolved issues are not reflected in this summary.
2. Administering Authority	State or other local agency with authority for administering Clean Air Act programs.	Massachusetts Department of Environmental Quality Engineering	New Jersey Department of Environmental Protection Sec. 7:27-9.4.	Oregon Department of Environmental Quality.	Maryland State Department of Health and Mental Hygiene.
3. Scope of Rule	Applies to any pollutant category requested under the Clean Air Act or State Law.	Applies to VOC only. (Original draft contained provisions for TSP & SO_2 but their coverage was omitted in successive drafts).	Offset rules apply to any criteria air contaminant regulated under the Clean Air Act. Sec. 7:27-18.2(a). Generic bubble rules apply to VOS and SO_2 only.	Applicable to any pollutant for which NAAQS are set and any other pollutants that are regulated by the Dept. (*See generally*, Sec. 340-20-220 *et seq*.)	Applies to PM, SO_x and VOC emissions. Sec. 10.18.19.02.
II. CREATION OF EMISSION REDUCTION CREDITS (ERCs)					
1. Method of Application for ERCs	Optional; however, EPA recommends the use of application forms.	Application form supplied by the Department. Sec. 6(c)(1).	Letter to Division of Air Quality with general information about emission reduction. Sec. 7:27-18.7. Application form to be developed by DEP.	No special form but the Department must receive a "request" to bank emission reduction credits. Data to be included by a source is specified at Sec. 340-20-265(7).	Application form prepared by the Department. Extensive source data information requirements indicated in rule at Sec. 10.18.19.04.

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2. Time Limitations for Filing Applications to Create ERCs	In nonattainment areas no application may be submitted for reductions which occurred prior to monitoring or inventory that was basis of most recent SIP. Applications for reductions occurring between that date and the effective date of the chapter must be submitted within a reasonable time after the effective date. Applications for reductions occurring after the effective date of the chapter must be submitted within a reasonable time after their creation, e.g., 1 year.	For reductions achieved after the effective date of this regulation, applications must be submitted prior to, or within one year of the reduction. Applications for credit from reductions occurring prior to the effective date of regulations and after July 1, 1979 must be submitted within 6 months of the effective date. Reductions occurring before July 1, 1979 are not eligible for credit. Sec. 6(c)(2).	Requests for ERCs to be used as offsets in nonattainment areas must be submitted within 6 months after the reduction occurs. Sec. 7:27-18.7. No time limit on banking ERCs to be used in bubbles since only operating sources (no shutdowns) may be included in bubbles.	Requests must be submitted to the Department prior to, or within one year following the actual emissions reduction. Sec. 340-20-265(8).	Applications must be submitted prior to or within one year of reductions. Application for credit from reductions occuring after December 30, 1980 and before the effective date of the regulations must be filed within 180 days of the effective date of the regulations. Sec. 10.18.19.04(C).
3. Measures for Creating Eligible Emissions Reductions (generally)	Any measure which reduces emissions in accordance with the requirements that a reduction be surplus, permanent, enforceable and quantifiable.	Not specified in Mass. rule, although it is implied that any reduction that is permanent, enforceable and surplus may be eligible for credit. Sec. 6(d).	Installing air pollution control equipment, applying fugitive emission controls, reducing production rates or operating hours (shutdowns), establishing and supporting employer business travel control measures and employee commuter travel, and any other means approved by DEP reducing actual emissions to less than allowable emissions. Sec. 7:27-18.4.	More stringent controls than required by the source's permit or by the SIP. Sec. 340-20-265.	Any means which yields reductions in emissions, excluding the installation of RACT, that reduces emissions below the applicable baseline, provided the reduction meets the requirements of Secs. 10.18.19.03(B), 05(A).
a. Do shutdowns qualify for emission reduction credit?	Yes; however source must demonstrate that proposed decrease will not be negated by emissions increases from similar sources in the same area. In nonattainment areas, shutdown must have occurred since most recent monitoring or inventory that was basis of SIP. Credit for offsets currently limited to contemporaneous (5 yrs. or less) replacements by same owner.	Yes; however, must demonstrate that the proposed decrease will not be negated by corresponding emissions increases from similar sources in the same area and affected employees are notified. Sec. 6(d)(1)(d).	Yes; however credit from shutdowns cannot be used in bubbles. Secs.7:27-18.4(c); 16.6(c)(5)(iv).	Yes; however shutdowns used as offsets or bubbles must be used within one year of the date of the modification or revocation of the source's permit. The one year contemporaneous requirement does not apply to internal offsets for which a specific plan has been approved by the Dept. within one year of the shutdown (or curtailment). Sec. 340-20-265(4).	Yes; however source must demonstrate that similar sources in the area will not increase production and emissions as a result. Sec. 10.18.19.05(A)(6).

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b. Can fugitive emissions be traded?	Yes; however source must demonstrate ambient equivalence of the trade. If open dust is involved, the source owners must undertake a post-approval monitoring program and acknowledge their responsibility to institute further reductions if the predicted ambient effect is not achieved.	Yes; although the reduction must comply with an enforceable RACT emission limitation. Monitoring may be required before and after emissions control. Sec. 6(e)(3).	Yes; however bubbling of fugitive emissions will not generally be allowed, unless quantifiable and enforceable limits can be set. Sec. 7:27-18.4(b). N.J. Bubble Restrictions and Requirements.	Trades involving fugitive dust are subject to the same requirements and analyses required for stack and vent emissions to the eligible. Sec. 340-20-270. Sources of respirable particulate (less than 3 microns) must be offset with particulate in the same size range. Sec. 340-20-260(3).	Trades involving fugitive dust are authorized if they are monitored, and if those involving PM are traded against similarly sized emissions.
c. Do reductions from source curtailments qualify?	Yes; subject however to the requirements controlling shutdowns.	Yes; however, the same requirements for shutdowns apply. Sec. 6(d)(1)(d).	Yes; however DEP may require stronger demonstration of reductions from source curtailments than it requires for shutdowns. Sec.7:27-18.4(c).	Yes; however the same requirements for shutdowns apply. Sec. 340-20-265(4).	No; reductions cannot be credited from a decrease in operation time or production rate. Sec. 10.18.19.05(A)(4).
4. Baselines for Creating Emission Reduction Credits	o In attainment areas, the baseline will be the source's emission level that is representative of source operation on the date which the first complete application for construction of a major source of the particular pollutant is filed. o In nonattainment areas with approved SIPs, the baseline will be the source's actual historical emissions calculated for a representative period of time (e.g., 2-3 yrs.) prior to the application, or allowable emissions (if the attainment strategy in the SIP is based on allowables).	Actual emissions of the source or the application emissions limit for that source, whichever is less. Actual emissions are based on the operating history during the most recent two years of normal source operation, or other period that the Dept. determines is more representative of normal source operation. Sec. 6(d)(1), Sec. 5(a).	o Offsets: actual emissions from an existing facility unless actual emissions exceed allowable emissions in which case the baseline is the allowable emissions. If the state requires the implementation of new controls, the baseline will be the new emissions limits. Sec. 7:27-18.1. o Bubbles: allowable emissions (RACT) or actual emissions without control, whichever is lowest.	Actual emissions of the source or the Plant Site Emission Limit established pursuant to OAR Secs. 340-20-300 to 340-20-320. Plant Site Emission Limits (PSELs) are calculations of total mass emissions per unit time of pollutants specified in a permit. Sec. 340-20-265. In most cases PSELs are based on actual emissions, however PSELs can be established at levels higher that the baseline provided a demonstrated need exists to emit at a higher level and PSD increments and air quality standards would not be violated and reasonable further progress in implementing control strategies would not be violated. Sec. 340-20-310.	o If the emissions from the source are identified in the SIP, the baseline is the actual emissions attributed to the source in the SIP, or a more recent estimate for the year 1980 which the Dept. deems more accurate. o If the emissions from the source are not identified in the SIP the baseline will be actual historical emissions calculated from the operating history of the source over the 36 months prior to the application, or over the life of the source, whichever is less; or if this data is deemed incomplete, the Dept. may require the applicant to

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	o In nonattainment areas lacking a complete SIP demonstrating attainment, the baselines will be determined as follows: a) If the area will not attain the relevant primary standard by 1982 and has not received an attainment extension, the baseline must equal RACT negotiated by the source and state and approved by EPA as a SIP revision. b) If the area has received an extension until 1987 for ozone or CO, then the baseline will be either equal to RACT negotiated by the source and the state and approved by EPA as SIP revision; or actual historical emissions, provided that the source commits itself to producing reductions equivalent to RACT requirements at such time as the state imposes them.				compile operating data for a period of up to 12 months to determine the applicable baseline. o If the Dept. estimates that actual emissions would be less than the baselines determined under Sec. 10.18.19.05(A)(7), then the lower emissions will be the baseline. Sec. 10.18.19.05(A)(7)(d).
5. Minimum Eligible Reductions	(No minimum).	No provision included.	Agency is presently considering whether to include eligibility requirements.	Reductions in most cases must be greater than 10 TPY. Sources in the Medford-Ashland Area and Lane County are exempted from this requirement. Sections 340-20-265(6); 20-225-(22)(Table 2).	To be eligible a source must emit 10 TPY or greater and the reduction be equal to or greater than 5 TPY. Sec. 10.18.19.0[illegible](A)(2), (3).

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6. Authority that Verifies/Approves Emission Reductions as Credits	Authority designated by state.	Department of Environmental Quality Engineering	Department of Environmental Protection.	Department of Environmental Quality	Department of Health and Mental Hygiene
7. Types of Documentation of Reduction Requested	Dept. may require source tests, documentation of operating hours, inputs or *any other acceptable means* of measurement.	Dept. may require source tests or any other acceptable means of measurement. Sec. 6(e)(1). For fugitive emission reductions, Dept. may require monitoring *both before and after* controls. Sec. 6(e)(3).	Application letter should indicate identification number of source operations, the identify and quantity of the reduction, and comparison with the allowable emission rate. At the time of use, the source owner or operator must demonstrate by use of an air quality simulation model approved by DEP that no NAAQS will be exceeded in a nonattainment area and no new violation of an NAAQS will occur as a result of the trade. Sec. 7:27-18.3. Modeling may be waived for certain SO_2 bubbles. Sec. 7:27-9.4 and offsets of particulates and SO_2 within 2 miles (7:27-18.4(b)(1).	Emission calculations showing types and amounts of actual emissions *reduced; date of* reduction; identification of probable uses to which the banked reductions are to be applied; description of procedure by which the reductions can be made permanent and enforceable. Sec. 340-20-265(7).	Dept. may require source tests, or any other acceptable means of measurement to confirm reductions. Sec. 10.18.19.05(B)(1). Sources must submit information including the following: type and rate of emissions before and after reduction; method of emission control before and after reduction; process operation description; description of cause and location of emissions; methods of monitoring, testing or modeling used before and after reduction; stack data. Sec. 10.18.19.04(B).
8. Method of Enforcing Reduction's Permanence	A compliance instrument, including *individual* SIP revisions (when not covered by a generic rule) or state permits issued under 40 CFR 51.18.	Either a consent order or permit condition. Sec. 6(d)(1)(a). Source failure to comply with permit conditions may *result in reduction of the* value of ERCs held by the source. Sec. 6(f).	Revised or new certificate to operate (CTO) is issued. Sec. 7:27-18.7. Signed statements addendum to the bubble application *that allowable hourly and* annual operating limits will not be exceeded. <u>N.J. Bubble Policy, Restrictions and Requirements</u>.	Air Contaminant Discharge Permits which include "Plant Site Emission Limits" reflecting the reduction. Sec. 340-20-265(8), Sec. 340-20-301(1).	Consent order is issued specifying new emissions limits; if an annual operating permit is required, the new operating permit will reflect the consent order requirements. Sec. 10.18.19.05(A)(5). *Failure to comply with the new permit conditions may* result in adjustments of the value of the ERCs held by the source. Sec. 10.18.19.06(B)(3).

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III. STORAGE OF EMISSION REDUCTION CREDITS					
1. Recordkeeping or Tracking Method	Registry available to the public containing a description of credits and the location of the source, including its stack parameters, temperature and velocity of its plume, particle size, the existence of any hazardous pollutants, daily and seasonal emission rates, and any other data which might reasonably be necessary to evaluate potential use of ERCs.	Publicly available notebook of credits and applications for credit (no cite). Revised or new certificates of operation reflect emission reduction credits once they are applied and entry on notebook is voided.	Record registry available to the public. Sec. 6(e)(4).	Informal log (no cite). Use permit is official document used to track ERCs.	Registry. Sec. 10.18.19.05(C). Entries in registry voided when used. Sec. 10.18.19.08(A)(5). Use is defined as completed applications for permits or approvals. Sec. 10.18.19.01(E).
2. Indicia of Ownership of Credits Issued	"Certificate of Ownership" issued upon registration of a credit in the registry.	Not indicated.	Letter of approval issued by DEP (no cite).	Ownership will be indicated in revised permits.	Not indicated.
3. "Life" of ERC	Optional	7 years from the time an ERC is registered and requested for use. ERCs from shutdowns must be committed within 2 years. Unused ERCs are terminated. Sec. (f)(1).	Unlimited at present (no cite).	10 years, unless extended by the Environmental Quality Commission. After 10 years, the credits revert to the Department. Sec. 340-20-265(2). Reductions from shutdowns or curtailments must be used contemporaneously. Sec. 340-20-265(4).	15 years from the date an ERC is registered and used. Sec. 10.18.19.06(B). 5 years for an ERC created by shutdown. Sec. 10.18.19.06(B)(4). ERCs not used within time limits are voided from the registry. Secs. 10.18.19.06(B),(C).

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4. Effect of Future Control Requirements on Banked Credits	The State may select one of the following options or equivalent methods achieving the same objectives: 1) Absolute guarantee against adjustment, but source must meet any additional control requirements imposed by state where the reduction occured; 2) Discount credits by percent reduction required by new control requirements for same source category. (Caveat: for SO_2 and TSP credits, source specific modeling may be necessary to allocate the discount.) 3) Moratorium on the creation, transfer and use of ERCs when State determines it is necessary to assure RFP toward attainment or cure a PSD violation; (See San Francisco banking regulation 2-2-308).	Credits are discounted by the percentage of the additional reduction required by the new regulation adopted after the ERC is registered pertaining to the same type of emission from the same category of sources. Sec. 6(f)(2)(a).	Credits are discounted by the percentage of the reduction required of identical operating sources of emissions affected by the new regulation at the time the banked emissions are offered for use. Sec. 7:27-18.7.	Credits are discounted without compensation by the percentage of the additional reduction required by the new control. Sec. 340-20-265(5).	Credits are discounted by the percentage of the reduction required by the new regulation of the same type of emission from the same category of equipment represented by the ERC. Sec. 10.18.19.06(C)(1).
5. Provisions for Transferring ERCs	Applications for transfer are to be provided by State, or the State is to be otherwise notified of a trade in writing and the transfer is not effective until the State confirms the transfer in writing and notes the transfer on the registry. Before the ERCs are used the new owner must obtain a new or revised compliance instrument reflecting the revised emission limit resulting from the trade.	Dept. verifies existence of the ERCs traded, and it provides technical assistance with regard to future use of ERCs that are bought or transferred. Transfer is not effective until transferor notifies Dept. in writing and the Dept. confirms receipt of the notice. Sec. 6(g).	No provision; however transfers of banked credits would be allowed only to a user of those ERCs under Subchapter 18.	Sources making transactions must notify the Department in writing. Sec. 340-20-265(9).	Dept. verifies the existence of the traded ERCs and provides technical assistance on their potential use. Transfer is not effective until the Dept. is notified and acknowledges notice. Sec. 10.18.19.07.

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IV. USE OF EMISSION REDUCTION CREDITS 1. Uses for ERCs Generally	As offsets, in bubbles and in netting transactions. Can also be used to meet additional control requirements such as RACT, but not to meet LAER and BACT (except in the context of netting) or NSPS.	As offsets, and in bubbles and under stipulated conditions indicated in Sec. 4: i.e., installation of RACT by sources to net out of offset requirements for major modifications in nonattainment areas. Sec. 6(a).	As offsets, Sec. 7:27-18.4; and in VOC and SO_2 bubbles, Secs. 7:27-16.6(c)(5)(viii), 9.1 *et seq.* Banking emission reduction credits not necessary for SO_2 and VOC generic bubbles.	As offsets, Sec. 340-20-240(3); in netting out of nonattainment and PSD requirements Sec. 340-20-245(2)(c); and in bubbles, Sec. 340-20-315. Reductions from shutdowns or curtailments may be used in any trade, but must be traded within one year, or used as internal offsets by the source within 10 years according to a plan approved by the Dept. Sec. 340-20-265(4).	In bubbles, as offsets and for netting and internal offsets in installations at which the ERCs have been created. Sec. 10.18.19.08. ERCs created from source shutdown in the Dept.'s registry may be used at the installation at which they were created without the procedures of Sec. 10.18.02 provided written approval is obtained from the Dept. prior to operating. Sec. 10.18.19.08(E).
2. Restrictions On Trades Across Pollutant Categories	Emissions trades must involve the same criteria pollutant. (Further conditions apply where criteia pollutant stream includes hazardous pollutants.)	Same criteria pollutant only. Sec. 5(c). Must have the same significance (or better) for public health or welfare. See 5(b).	Trades must involve the pollutants of the same quality and nature. In addition, the effective stack height of sources of increased SO_2 and TSP must be greater or equal to the stack height of sources where emissions are reduced. Sec. 7:27-18.4(b)(3).	Must involve the same type pollutant and for respirable particulates (less 3 microns) must be in the same size range. Sec. 340-20-260(3). Where atmospheric reactions are involved, trades can be provided from precursor pollutants. No substitutions are allowed. Sec. 340-20-315(4).	Must involve similar emissions, and for TSP trades, the same range of particle sizes. Sec. 10.18.19.08(A)(2).
3. VOC Restrictions On Trades	No limits included in the Policy.	No trades may involve "replacing" one hydrocarbon compound with another of lesser reactivity. Sec. 5(e). Trades may not increase summer emissions of VOC in exchange for winter decreases. Sec. 5(g). (Latter prohibited anyway under Emissions Trading Policy Statement requirement of "permanence".	Summer increases of allowable VOS cannot be traded for winter reductions of actual VOS emissions. Secs. 7:27-18.4(b0(4), 16.6(c)(4). No increases of toxic VOCs (designated in 7:27-17).	No limits included in the regulations.	General condition that no use of an ERC will be approved unless the emissions being exchanged are "similar". Sec. 10.18.19.08(A)(2).

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4. Restrictions on Trades of Hazardous Pollutants	Hazardous pollutants may only be traded against non-hazardous pollutants if the hazardous pollutants decrease. Where pollutants listed under §112 of C.A.A. are not yet subject to regulation, states may allow trades consisting of equivalent increases and decreases of the same listed pollutant at reasonably close emission points.	In no case may a non-hazardous pollutant be used to balance increased hazardous emissions in a bubble application. The Dept. retains discretion to further limit or condition the control of pollutants based on their hazardous character, photochemical reactivity or other characteristics. Sec. 5(e), 7(g).	No toxic VOS regulated under NESHAPs can be bubbled. Sec. 7:27-16.6(c)(5)(vii). Other TVOs can be bubbled so long as significance levels in Sec. 7:27-17.5(a) are not exceeded (0.1 lb/hr significance level effectively prohibits TVOs from being undercontrolled in a bubble).	Hazardous pollutants cannot be included in a bubble. Sec. 340-20-315(4).	A hazardous pollutant can only be included in a bubble or offset if countervailing decreases of the same pollutant are made at a contiguous location. Sec. 10.18.19.08(A)(2).
5. Liability of Subsequent Owners	Once an ERC has been used by another source to meet a permit requirement, any violation of the condition under which the ERC was created should result in enforcement against the producing source and not the source using the ERC.	No provision; but see Sec. 6(f) which provides that if a person that creates an ERC fails to comply with requirements resulting from its creation, the Dept. will adjust that credit.	No provision included.	No provision included.	Once an ERC has been used, any enforcement actions regarding the conditions or adjustment in value of the ERC due to specified causes detailed in Sec. 10.18.19.06(e) will not affect the user. Sec. 10.18.09.07(D).
BUBBLE PROVISIONS					
1. Status of Rules	Proposed 47 Fed. Reg. 15076 (April 7, 1982); replacing 44 Fed. Reg. 71780 (Dec. 11, 1979).	EPA approved a generic VOC bubble rule for surface coating operations 47 Fed. Reg. 13143 (Mar. 8, 1982). C.M.R. 7.18(2)(b). Mass. is submitting generic VOC rule for other sources on July 1 within 1982 SIP revisions. C.M.R. 7.10 (App. A).	VOS generic bubble rule became effective in March, 1982. EPA proposed approval of the SO_2 generic rule. 47 Fed. Reg. 5014 (Feb. 3, 1982).	Adopted in Oregon Administrative Rules. Sec. 340-20-315. EPA proposed approval of the rule in the 47 Fed. Reg. 18004, 18006 (Apr. 27, 1982) as a generic rule except for SO_2 and TSP bubbles and trades where the sum of increased emissions from the trade exceeds 100 tons.	Internal draft dated Feb. 22, 1982. Sec. 10.18.06.16.
2. Scope	Any pollutant for which NAAQS have been established.	VOC only.	VOC and SO_2 only.	Any pollutant regulated under the Clean Air Act or by the Dept.	VOC, TSP and SO_2.
3. Ownership of Sources in Bubble	None; same or different persons.	One person. Sec. 7(a)(1).	Sources included in the bubble must be under the control of, or operated by, one person. Secs. 7:27-16.6(c)(5)(i), 9.2(d)(1).	One person; no multi-plant sites. Sec. 340-20-315.	None; same or different persons. Sec. 10.18.06.16(B)(3).

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4. Geographic Limitations On Sources That Can Be Included Under A Bubble	Geographic restrictions concern the need for modeling to ensure the ambient equivalence of the trade.	Facilities under the same ownership but located at different sites can bubble, provided for each 10 miles of straight line distance between facilities, an additional 5% reduction in VOC beyond AACI is required, and the bubble will not interfere with RFP toward attainment of NAAQS.	Section limiting VOC bubble to facilities on contiguous premises was eliminated in March, 1982. <u>N.J. Bubble Policy, Restrictions & Requirements</u>. SO_2 stacks in a bubble under the generic rule cannot be separated from any other stack by a distance, measured from the stack center lines, greater than three times the least effective stack height of any stack included in the bubble. Secs. 7:27-9.4(a)(3), (4), unless modelling shows acceptable ambient effects and trade is approved as a SIP revisions.	Within a single plant site, provided that net air quality impact is not increased as demonstrated by modeling required under Sec. 340-20-260. Sec. 340-20-315.	VOC sources must be within same area as defined in COMAR Sec. 10.18.01.03. Sec. 10.18.19.08(D); to be exempt from modeling requirements in a non-attainment area the location of all emission points of SO_2 or TSP must be within .31 miles (1/2 KM) of each other and the effective plume height of the emissions increases and decreases must be within 10 meters (32.8 feet) of each other. Sec. 10.18.19.08(B)(2); in a PSD area, SO_2 or TSP sources must be in the same immediate vicinity but not necessarily co-located. Sec. 10.18.19.08(C)(1).
5. Compliance Status of Sources	o Bubbles can be used to achieve compliance. o The state may also extend compliance deadlines for VOC or CO sources on a case-by-case basis provided that the area has received an attainment extension until 1987 under 42 U.S.C. Sec. 7502(a)(2), the bubble is consistent with RFP, and the extension is approved by U.S. EPA as a SIP revision. All other types of sources must be in compliance or on a compliance schedule.	o The source must demonstrate compliance, or be on an enforceable compliance schedule, or agree to a legally enforceable compliance schedule consistent with CAA requirements. Sec. 7(c)(1). o Application for a bubble does not relieve a source of its obligation to meet present regulations or order unless a specific order is made extending the compliance schedule. No order may extend the date beyond the CAA requirements. Sec. 7(c)(2).	o Bubbles can be used by sources to come into compliance under a DEP-approved schedule of compliance. Remarks of DEP official at Apr. 7, 1982 state bubble and banking meeting (Trenton, N.J.). <u>N.J. Bubble Policy, Restrictions & Requirements</u>, p. 4.	No compliance requirement for a source seeking to bubble. (Comment, Oregon official).	o All sources owned by a person or persons proposing to bubble which discharge 50 TPY or more must be in compliance or on a compliance schedule. Sec. 10.19.06.16(C)(3). o A bubble may be proposed as the method to bring a source into compliance. Submission of a bubble application will not affect any existing legal obligation of the source owner. Sec. 10.18.06.16(C)(4).

EMISSIONS TRADING ISSUE	EPA EMISSIONS TRADING POLICY	MASSACHUSETTS RULE	NEW JERSEY RULE	OREGON RULE	MARYLAND RULE
	o Bubbles cannot be approved for an individual emission source subject to a federal enforcement action unless EPA and the appropriate court approve the proposal and the compliance schedule contained therein.	o No bubble will be approved for a source which is presently subject to or has in the past been subject to a federal enforcement schedule unless the U.S. EPA approves the alternative standard and the schedule for meeting it. Sec. 7(c)(3).			o No bubble may be established for a source subject to a federal enforcement action unless U.S. EPA approves the alternative standard and the schedule for meeting it. Sec. 10.18.06.16(C)(5).
6. Methodology for Guaranteeing Ambient Equivalence of Trades	For VOC and NOx trades, total allowable emissions on a bubble may not exceed the arithmetic sum of the applicable baseline level of emissions determined for each source. (If total emissions exceed the arithemetic sum of the baselines, the source must demonstrate the ambient equivalence of the trade through dispersion modeling). For all other trades, ambient air quality equivalence must be demonstrated using the modeling screen.	Total emissions may not exceed the mathematical equivalent (calculated on a solids applied basis for coating processes) of the existing emission limits determined for each source under the bubble. Sec. 7(b). (VOC only).	VOC sum of the emission rates of the separate source gases may not exceed the sum of the maximum allowable emission rates for the separate source gases determined under Secs. 7:27-16.5,16.6. The mathematical combination of the total sulfur dioxide emissions from the facility do not exceed the maximum allowable SO_2 emissions based on fuel actually burned during a 24 hour period specified at Sec.7:27-9.2(c); the alternative emission control program will not cause a violation of any ambient air quality standard for SO_2 or TSP; and there will be no exceedence of threshold increases set forth in the Offset Rules. Sec. 7:27-9.2(d).	Net emissions for each pollutants are not increased above the Plant Site Emission Limit (see Sec. 340-20-315(2)) which a source must demonstrate through air quality modeling according to procedures in "Guidelines on Air Quality Models" Sec. 340-20-260(1) as referenced in Sec. 340-20-315(3).	Total emissions from a bubble shall not exceed the arithemetic sum of the baseline emissions for each individual source in the bubble. Sec. 10.18.06.16(C)(1).
7. Means of Enforcing Alternative Standards for the Sources Included in the Bubble	Revised permit applications, consent orders or equivalent legal instruments. Bubbles approved under SIP revisions automatically satisfy this requirement.	Alternative emission limitations are incorporated into plan approvals for the affected facilities. Sec. 7(1)(a).	Revised or new certificates to operate. Secs. 7:27-18.7, 8.2. Also enforceable through the SIP. 47 Fed. Reg. 20551 (Apr. 6, 1981).	Specific mass emissions limits (PSELs) for each emission unit under the bubble are incorporated into the source Air Contaminant Discharge Permit. Secs. 340-20-315(6)&(7).	Consent order issued by the Dept. which will be the basis for issuance of annual operating permits for the source or sources of annual operating permits are required (for major sources). Sec. 10.18.06.16(B)(4).

EMISSIONS TRADING ISSUE	EPA EMISSIONS TRADING POLICY	MASSACHUSETTS RULE	NEW JERSEY RULE	OREGON RULE	MARYLAND RULE
8. Effect of Future Control Requirements on Sources in the Bubble	Owner or owners of sources included in a bubble must meet any new or revised control requirements by reducing emissions in the bubble or applying ERCs which are greater or equal to the reduction required by the new standard.	Owner or source must submit revised plan approval applications demonstrating required reductions in total bubble emissions or use of ERCs equal to or greater than new reductions required. If no application is submitted demonstrating the necessary reductions, the Dept. will issue an order requiring compliance with the new or more restrictive emission limitations. Sec. 7(a)(1)(f).	Owner of sources included in a bubble must meet any new allowable rate of emissions promulgated by the Dept. No cite. Banked emissions reductions will be adjusted in accordance with the allowable emission rates in effct at the time when the banked emissions reductions are offered for use. Sec. 7:27-18.4.	Dept. would revise Plant Site Emission Limit (PSEL) downward to reflect new requirements. Sec. 340-20-310(7)(b). Owner or owners of the source would have to submit an application for a permit modification demonstrating reductions for each emission unit under the bubble sufficient to meet the new PSEL. Secs. 340-20-315(2)&(7).	Owner or owners of sources included in a bubble are required to meet any new emission standard promulgated by the Dept. that is applicable to a CTG category. Sec. 10.18.06.16(D).
VI. GENERAL DESCRIPTION OF OFFSET PROVISION	The Emissions Offset Interpretation Ruling (40 C.F.R. Part 51; Appendix S; 44 Fed. Reg. 3274 (Jan. 16, 1979). A major new source or modification which would contribute to a violation of a NAAQS may be allowed to construct only if the following conditions are met: a) The new source is required to meet an emission limit equivalent to the lowest achievable emission rate for such source; b) The applicant must certify that all major sources owned or operated by the applicant in the state are in compliance or on an enforceable compliance schedule;	310 CMR 7000. Appendix A. Sections 3-5. The requirements for offsets in Massachusetts mirror the federal offset requirements. The means of creating offsets in the state are described in Part 2 of this chart entitled "Creation of Emission Reduction Credits." The determination of a net air quality benefit is made by the Dept. for VOC transactions by using the formula below: (Proposed Emission Increase TPY/yr) x (.01 dist. in miles + 1.0) = Offsets Required (ton/yr)	Subchapter 18 of Title 7, Chapter 27 of the N.J. Admin. Code contains the state's offset rules. These essentially mirror the federal requirements. In addition, the regulations contain criteria for qualifying emissions reductions used as offsets (Sec. 7:27-18.4) and prescribe minimum offset ratios depending on the distance of the offsets from the facility at which they were created. In the case of SO_2 & TSP offsets, the effective stack height of the facility using the offsets must be greater than or equal to the height of the stacks at which the reductions were created. Sec. 7:27-18.4. Persons responsible for significant emission increases from a resource recovery source, fuel change because of fuel availability, or state or federally directed equipment change can request postponement of	O.A.R., Sections 340-20-240, 250, 255 and 260. Oregon's regulations mirror the federal offset requirements. Sources in the Salem ozone nonattainment area are exempt from the offset and net air quality benefit requirement but must apply LAER and demonstrate compliance. Resource recovery facilities burning municipal refuse and sources subject to federally mandated fuel switches may be exempted from the offset and net air quality requirements if owners can demonstrate inability to obtain sufficient offsets and that every available offset was secured.	The offset requirements essentially mirror the federal emissions offset policy. Sec. 10.18.06.11(A)(3) would be amended to define "offset" as "use of an ERC to counter-balance the increase in emissions from a new or modified stationary source." Sections 10.18.06.11(C)(2) and Sections 10.18.06.11(D)(2)(c),(d) will be amended to read that "(E)mission (R)eduction (C)redits are used to offset emissions from the proposed new source...(and) (T)he emission reduction represented by the (E)mission (R)eduction (C)redit (must be) sufficiently greater than the emission increases from the proposed new source, at the time the proposed source is to begin operation, so as to represent reasonable further progress toward attainment of the particul[illegible] matter and ozone s[illegible]rds.

EMISSIONS TRADING ISSUE	EPA EMISSIONS TRADING POLICY	MASSACHUSETTS RULE	NEW JERSEY RULE	OREGON RULE	MARYLAND RULE
	c) Emission reductions of applicable pollutants from existing sources in the area of the proposed sources must offset new sources increased emissions; and d) Emission offsets will provide a net air quality benefit in the affected area.	For all other pollutants, the Dept. calculates offsets on a case-by-case basis. The Dept. may deny approval of any proposed offsets which in its opinion are located too far away from the proposed new emissions to justify the conclusion that the new emissions will have no negative air quality impact. Sec. 5(h).	the offset requirement if the person can show offsets are unavailable. Sec. 7:27-18.5. Exemptions from the offset requirement apply to temporary facility and in some instances to the use of alternative fuels in existing fuel burning equipment which will not cause a significant increase in emissions or a violation of a NAAQS. Secs. 7:27-18.6, 18.9.		Application of the offset provisions are limited to Areas III and IV of the State.
VII. PROVISIONS FOR NETTING	Emissions increases and decreases within a single source in PSD areas may "net" out of new source review requirements including the application of BACT and air quality modeling and demonstrations under 42 U.S.C. §7574, provided there is no net significant emission increase above levels indicated at 40 C.F.R. 52.21(b)(23); 45 Fed. Reg. 52737 (Aug. 7, 1980). Similarly emission increases and decreases within a single source in a nonattainment area under EPA's revised definition of "source" (See, 46 Fed. Reg. 50766 (Oct. 14, 1981)) may be netted to exempt the source from offset and other new source requirements under 42 U.S.C. §7503 and applicable state rules if there is no significant emission rate increase from the source defined at 40 C.F.R. 52.24(13), 45 Fed. Reg. 52747 (Aug. 7, 1980).	If a modification contains RACT and total emissions from the source, including those from the proposed modification, do not exceed the total emissions from the source prior to the application for the modification by a significant amount, the offset requirements will not apply. Source owners may apply other banked ERCs in addition to RACT to bring the total emissions below the "significant" threshold that triggers the offset requirement. Sec. 4. Massachusetts also allows netting in PSD areas, but cite is unavailable at this time.	VOC bubble regulations state that new source standards (including BACT) are not to be circumvented by the use of emission reduction credits. Sec. 7:27-16.6(c)(5)(viii).	Netting is allowed in PSD and nonattainment areas as long as calculations of net emission increases, taking into account all accumulated increases and decreases, in actual emissions occurring at the source since Jan. 1, 1978, or since the time the last construction approval issued for the source pursuant to the New Source Review Regulations for the pollutant, do not result in a net significant emission rate increase. Secs. 340-20-225(14), (22).	Not allowed in nonattainment areas. Netting is allowed in PSD areas for which Md. has adopted EPA's PSD rules by reference.

EMISSIONS TRADING ISSUE	EPA EMISSIONS TRADING POLICY	MASSACHUSETTS RULE	NEW JERSEY RULE	OREGON RULE	MARYLAND RULE
VIII. GENERIC PROVISIONS	The Emissions Trading Policy allows the following emission trades without action to formally amend the SIP: 1) Transactions where the sum of the emission increases from individual sources involved in the trade total less than 100 tons per year, where net baseline emissions do not increase (*de minimus* exemption). 2) Transactions involving ERCs from VOC and NO_x sources where net baseline emissions do not increase, *i.e.*, pound-for-pound trades (see 46 Fed. Reg. 20551 April 6, 1981 for EPA approval of New Jersey generic VOC bubble); 3) Trades among TSP, or SO_2 or CO stacks that are in the same immediate vicinity (less than 250 meters) where the increase is from the taller stack; and, 4) Other transactions involving ERCs if all the following conditions are met: a) net baseline emissions do not increase; b) the new emission limits resulting from the trade do not interfere with ambient attainment or maintenance; and c) the ambient equivalence of the trade is guaranteed by a mechanical and replicable formula or model.	Generic bubble for VOC. No explicit generic provision. Generic formula guaranteeing mathematical equivalence of bubble trades in Sec. 7(b)(1).	N.J. was the first state with an approved generic bubble rule for VOC. 47 Fed. Reg. 20551 (Apr. 6, 1981). N.J.A.C Secs. 7:27-16.6(c)(4), (5). The first VOC bubble at the Dupont Chambers Works in Deepwater, N.J. has been approved. Three more have been approved. At least 18 other VOC bubble applications are pending. A generic rule for sulfur content averaging in fuel received proposed approval by EPA in 47 Fed. Reg. 5014 (Feb. 3, 1982), and it is expected to receive final approval shortly.	EPA proposed to approve Oregons regulations as a generic rule. 47 Fed. Reg. 18004 (April 27, 1982). It provides for the processing of all permits, emission offsets, banking of emission credits and most bubble transactions without case-by-case federal approval.	Specific generic provisions are not included in the rule. Md. Dept. of Health & Mental Hygiene states that generic provisions will be included in forwarding documents and EPA approvals with additional state limitations, if any.

APPENDIX VIII

COMPARISON OF SELECTED STATE EMISSIONS BANKING RULES
(Jefferson County, Puget Sound, Bay Area Air Quality Management District, & Allegheny County)

November 5, 1982

Prepared by Leslie Sue Ritts, Timothy R. Henderson
and Alysia Watanabe

Environmental Law Institute

Washington DC

BANKING ISSUE	JEFFERSON COUNTY (Louisville, KY)	BAY AREA AIR QUALITY MANAGEMENT DISTRICT (San Francisco, CA)	PUGET SOUND (Seattle, WA)	ALLEGHENY COUNTY (Pittsburgh, PA)
1. Effective Date of Regulations	Original rules adopted March 1979; new regulations adopted April 1982.	Bank opened January 1, 1980. Regulation amended October 17, 1981.	June 12, 1980. Amendments are currently being prepared though no adoption date is scheduled.	January 1, 1981.
2. Administering Authority	County Air Pollution Control District.	Air Pollution Control Officer (APCO) of District must approve all banking transactions.	Puget Sound Air Pollution Control Agency.	Allegheny County Health Department.
3. Scope of Regulation	Any pollutant for which the District had adopted stationary source control regulations.	Any pollutant from a stationary source for which a NAAQS has been set.	VOC, CO, SO_2, TSP.	Any pollutant, though as a practical matter only those for which a NAAQS has been set would be banked presently.
4. Method of Application	Application form provided by district. Preapplication conference recommended.	Application form provided by District.	Application form provided by Agency.	Application form provided by Department. A separate application is required for each pollutant.
5. Application Fee	$15 permit fee paid to general county revenues. Fee is not associated directly with approval costs.	$900 application fee plus $150 per source; $100 per withdrawal.	No; prohibited by state law. There is a new source review fee of $100 if offsets are needed.	$250 fee to County Treasurer's Department per application. Fee is not associated directly with approval costs.
6. Minimum Deposit	No.	No.	No, although 1 ton practical limit set.	No.

BANKING ISSUE	JEFFERSON COUNTY	BAY DISTRICT	PUGET SOUND	ALLEGHENY COUNTY
7. Time Requirements for Filing Applications	No time limits, except that ERCs must have been created after Aug. 7, 1977.	Not specified, however incentive is to bank on creation because of method for calculating baseline.	Approval of application required prior to implementing emission reduction for future reductions. 90 days for reductions created between 8/7/77 and 6/12/80.	120 days after emission reduction occurs, except within one year of decision to shutdown.
8. Measures for Creating Eligible Emission Reductions (generally)	Plant modernization; overcontrol beyond requirements of SIP; innovative controls beyond SIP requirements; fuel or process change.	Plant modernization; overcontrol; innovative technologies.	Overcontrol; innovative technologies; fuel or process change.	Overcontrol; innovative technologies, fuel or process change.
a. Do shutdowns qualify?	Yes.	Yes; except that portion which would have been achieved through RACT cannot be banked.	Yes; provided further operation of the source is prohibited, and RACT is used as the baseline.	Yes; provided application is filed within one year of "decision" to shutdown.
b. Can fugitive dust be traded?	Yes; APCD would consider requests to bank, but use would require separate SIP revision.	Possibly, if measurable. However, District has not handled such a request to date.	Probably, depends on how Agency will define RACT for fugitive emissions.	Yes.
c. Do reductions from source curtailments qualify?	Yes, if permits are revised.	Yes, provided changes in operating hours and practices are reflected in permit conditions.	Yes; provided owner/operator agrees in writing to meet lower emission limits.	Yes.

BANKING ISSUE	JEFFERSON COUNTY	BAY DISTRICT	PUGET SOUND	ALLEGHENY COUNTY
9. Applicable Baselines for Measuring Surplus Reductions	Applicable baseline level used in SIP attainment demonstration. If emissions not in attainment demonstration source may use representative emissions (average historical emissions).	Based on "actual emission reductions" calculated from average daily emissions based upon the average of source operations over 3 years prior to the submission of the application.	Based on source's "highest" actual emissions since August 7, 1977, or allowable emissions, whichever is smaller (Section 6.08 (f)(3) includes detailed formulas).	Based on emission characteristics on source's actual operating conditions, not to exceed allowables, averaged over 3 calendar years immediately preceding the emission reduction unless Dept. approves some other period more representative of actual operations.
10. Authority That Verifies/Approves Emission Reductions as Credits	Jefferson County Air Pollution Control District (same entity that operates the bank).	Air Pollution Control Officer of Bay Area Quality Management District (same entity that operates the bank).	Puget Sound Air Pollution Control Agency (same entity that operates the bank).	Allegheny Health Dept. (same entity that operates the bank).
11. Types of Documentation of Reduction Requested	Normally by same means used in emissions inventory system; however, district may require source tests, continuous monitors or any other acceptable means of measurement.	Direct measurement by source is the method the District prefers, although it may in some cases allow other tests it finds acceptable. Test results must be calculated as average daily emission rates.	Actual emissions are based on actual operating rates and source test data. Allowable emissions are based on design capacity and the applicable emission limit regulation.	Detailed statement supporting claimed actual and allowable emissions and description of techniques used to quantify emissions rate: (e.g., stack test, emission factors, and any additional "tests specified by the Dept.").

BANKING ISSUE	JEFFERSON COUNTY	BAY DISTRICT	PUGET SOUND	ALLEGHENY COUNTY
12. Method of Enforcing Permanence of Reduction	Banking and operating permits indicate how the banked emissions were created, what permits were voided or modified as a result and the source's operating limits and recordkeeping requirements.	Conditions on authority to construct and permit to operate both account for any reductions agreed to by source creating reduction.	Certificate of title signed by both the source owner or operator and air pollution control officer includes source operating limits, penalties for noncompliance, and other conditions as necessary.	Operating permit reflects reductions at sources creating the reduction.
13. Recordkeeping or Tracking Mechanism	Computerized ledger tracking.	Computer system which tracks status of ERCs. Entries made when certificates are approved, and when ERCs are traded.	Banking ledger and monthly "Agency Activity Report" includes section on available credits.	Registry maintained by Health Department.
14. Indicia of Ownership of Credits Issued	Banking permit and fee statement.	Banking certificate.	Formal banking agreement signed by PSAPCA Control Officer and source/owner representative.	Registration certificate issued by Health Dept.
15. "Life" of emission reduction credit deposited in Bank	No limit.	No limit.	ERCs must be committed for use within 8 years.	ERCs are available for use for a period of five years from the date of their creation.
16. Other Provisions Affecting Ownership of Credits	For officially unclaimed emission reduction credits, the District may award the use of unallocated credits after appropriate notice and public hearing. (Provision has not been used).	None.	After 8 years, if credit is not committed to use by means of a preconstruction permit, the credit will be auctioned by Agency with proceeds to the owner.	Five year period not affected by any stays on the use of credits during rulemaking procedures for new control requirements.

BANKING ISSUE	JEFFERSON COUNTY	BAY DISTRICT	PUGET SOUND	ALLEGHENY COUNTY
17. Provisions for Transfer of ERCs	Transferee must apply to APCD for withdrawal permit with written agreement from depositer. If credit applied to new source, application for use required. If banking is intended, transferee must apply for banking permit.	Transferee sends original certificate with information on amount of ERCs to be withdrawn and to whom transferred to APCA which draws up new certificate reflecting change and sends to Transferor.	Request to PSAPCA must be notarized by applicant and signed by all parties before a transfer is made.	Must notify Director of Dept. in writing within 60 days of transfer.
18. Effect of Future Control Requirements on Banked ERCs	County bank officials have refrained from specifying any conditions on ownership of banked emission reductions because they would discourage deposits.	Changes adopted in offset rules (for withdrawal) have no effect on ERCs for 3 years after banked. APCD may declare moratorium on deposit of ERCs if he determines that additional mandatory controls are necessary to attain NAAQS.	ERCs discounted by amount of additional control requirements.	Nullifies credits to the extent affected. Dept. could reduce or terminate the quantity of reductions credited or the length of the credit's life.
19. Uses for Banked ERCs	Offsets; bubbles; RACT compliance; and netting out of PSD and non-attainment new source offsets for PSD increment consumption.	Internal offsets; netting, except may not circumvent BACT requirement; and external offsets.	Designed for offsets, although could be used in bubbles, netting, etc.	Presently only offsets; however county does not rule out application to bubbles, future control requirements, etc. in the future.
20. Number of Applications Received to Bank Emission Reductions	32 applications received. All approved, some adjustments made to the amount of the credit requested.	12 received -- 2 denied -- 6 approved -- 4 under review.	91 requests for past reductions, 6 requests for future reductions.	6 requests.
21. Number of Applications Approved	33 deposits.	6 deposits.	21 requests granted to 15 applicants (327 TPY TSP; 147 TPY VOC, 3334 TPY CO).	None approved.
22. Number of Withdrawals	17; 4 sales; 11 internal withdrawals; and 2 transfers between separate plants under same ownership.	None.	None.	None.

BANKING ISSUE	JEFFERSON COUNTY	BAY DISTRICT	PUGET SOUND	ALLEGHENY COUNTY
23. Miscellaneous Comments	Present banking program was adopted as part of the District Regulations on April 21, 1982. A Jefferson County "SIP" has been submitted and is awaiting approval. (Note: Jefferson County has the authority to propose SIP revisions to the state in its official capacity).	Formal banking program has not been approved by EPA though it has been submitted. Note that informal banks for internal offsets exist apart from formal bank. District banking officials believe that the coexistence of two banking systems may be the reason for the small number of transactions that the "official bank" has handled thus far. CBE requested the banking moratorium be placed on deposits to the BAAQMD bank in April, 1982. The Air Quality Officer recommended to the air pollution board that no moratorium be imposed. It voted 9-3 not to suspend deposits to the bank.	Puget Sound's banking rules and offset rule require both major sources and "smaller sources: that will have a significant impact on the environment" to obtain offsets. Amendments to the regulations are currently being considered to address new EPA rules and the issues identified over the past two years of the bank's operation.	Officials say that it is really too early to evaluate the bank's success because it is so new. The Dept. has drafted offset banking procedures document, which is designed to add flexibly to current rules in order to address problems it has with the program as they arise.

AIR POLLUTION CONTROL DISTRICT
OF JEFFERSON COUNTY
914 EAST BROADWAY
LOUISVILLE, KENTUCKY 40204
PHONE: (502) 587-3327

JEFFERSON COUNTY, KY

EMISSIONS BANK STATUS REPORT

DATE: 82/06/30

DEPOSITOR	CONTACT	PHONE NO.	POLLUTANT (Tons/Yr) TSP	SO2	VOC
Ashland Oil Refinery	Mike Duffey	606-329-4457	.0	.0	10.0
B.F. Goodrich	W.C. Holbrook	216-524-0200	459.6	.0	652.7
Borden Chemicals	Bailey Barton	613-225-4292	.0	.0	7.8
Ford Motor Company	A.M. Twilley	313-323-2845	.0	.0	5.0
General Electric	Keith Moser	502-452-5678	377.7	.0	33.0
Int'l Harvester(Fdry)	J.F. Mavri	502-367-3226	329.0	.0	95.5
Int'l Harvester(Plt)	J L. Detherage	502-367-3101	27.9	.0	.0
Logan Company	R.C. Hunt, P.E.	502-587-1361	22.0	36.0	.0
L.G.&E., Paddy's Run	R.P. VanNess	502-566-4216	32.0	12900.0	.0
Philip Morris	Tom Scott	804-271-3632	41.2	464.3	.7
Reynolds Metals, #1	F. Muddiman	502-774-2341	2.8	.0	1.0
Unallocated	A.P.C.D.	502-587-3327	135.7	197.8	.0
TOTAL CERTIFIED TONS/YR AVAILABLE			1427.9	13598.1	805.7

Interested parties may contact:

M.T. DeBusschere, P.E. Air Pollution Control District 502-587-3327
Stan Bowling, Louisville Chamber of Commerce 502-582-2421

AIR POLLUTION CONTROL DISTRICT OF JEFFERSON COUNTY

914 EAST BROADWAY
LOUISVILLE, KENTUCKY 40204
PHONE: (502) 587-3327

EMISSIONS BANKING TRANSACTIONS - PARTICULATES

REPORT DATE: 82/06/30

ACC #	PLNT #	PLNT	ACC STAT	TRAN CODE	TRAN DATE	W PL#	INITL D/W	TOTAL D/W	ACC BAL	PLNT BAL
7	35	CAMT	AU	D1	81/ 2/ 5	0	28.7	28.7	28.7	28.
10	58	JCRN	AU	D1	81/ 3/ 9	0	107.0	107.0	107.0	107.
1	82	BFG	AA	D1	79/ 3/12	0	95.0	95.0	.0	.
1	82	BFG	AA	W1	79/ 5/15	82	2.4	2.9	92.1	.
8	82	BFG	AA	D2	80/ 4/18	0	412.8	412.8	.0	.
8	82	BFG	AA	W1	80/ 4/18	82	73.2	87.8	325.0	.
14	82	BFG	AA	D3	82/ 3/22	0	42.5	42.5	42.5	459.
2	97	IHFD	AA	D1	80/ 1/17	0	761.6	761.6	.0	.
2	97	IHFD	AA	W1	79/ 6/25	97	384.7	423.2	.0	.
2	97	IHFD	AA	W2	80/ 6/30	97	8.5	9.4	329.0	329.
3	118	LGAN	AA	D1	79/10/12	0	22.0	22.0	22.0	22.
13	125	LGEP	AA	D1	82/ 2/16	0	32.0	32.0	32.0	32.
5	171	PHMM	AA	D1	8[illegible] 1/28	0	41.2	41.2	41.2	41.
9	186	REY1	AA	D1	80/11/20	0	2.8	2.8	2.8	2.
6	255	IHPL	AA	D1	80/12/11	0	26.4	25.4	26.4	.0
12	255	IHPL	AA	D2	82/ 1/19	0	1.5	1.5	1.5	27.9
11	870	GE	AA	D1	81/10/22	0	180.7	180.7	180.7	180.7
4	877	GE	AA	D1	79/12/28	0	197.0	197.0	197.0	197.0

TOTAL BANKED EMISSIONS FOR THIS POLLUTANT: 1427.9

ACCUMULATED TOTAL OFF-SET EMISSIONS: 54.5

LAST TRANSACTION:

DATE - - - 82/ 3/22

CO. - - - BFC

AIR POLLUTION CONTROL DISTRICT OF JEFFERSON COUNTY

914 EAST BROADWAY
LOUISVILLE, KENTUCKY 40204
PHONE: (502) 587-3327

EMISSIONS BANKING TRANSACTIONS - SULFUR DIOXIDE

REPORT DATE: 82/06/24

ACC #	PLNT #	PLNT	ACC STAT	TRAN CODE	TRAN DATE	W PL#	INITL D/W	TOTAL D/W	ACC BAL	PLNT BAL
3	35	CAMT	AU	D1	81/ 2/ 5	0	197.0	197.0	197.0	197.0
1	118	LOGN	AA	D1	79/12/10	0	36.0	36.0	36.0	36.0
4	125	LGEP	AA	D1	82/ 2/16	0	12900.0	12900.0	12900.0	12900.0
2	171	PHMM	AA	D1	80/ 1/28	0	464.3	464.3	464.3	464.3

TOTAL BANKED EMISSIONS FOR THIS POLLUTANT: 13597.3

ACCUMULATED TOTAL OFF-SET EMISSIONS: .0

LAST TRANSACTION:
DATE - - - 82/ 2/16
CO. - - - LGEP

AIR POLLUTION CONTROL DISTRICT OF JEFFERSON COUNTY
914 EAST BROADWAY
LOUISVILLE, KENTUCKY 40204
PHONE: (502) 587-3327

EMISSIONS BANKING TRANSACTIONS - VOLATILE ORGANIC COMPOUNDS

REPORT DATE: 82/06/30

ACC #	PLNT #	PLNT	ACC STAT	TRAN CODE	TRAN DATE	W PL#	INITL D/W	TOTAL D/W	ACC BAL	PLNT BAL
11	28	BORD	AA	D1	81/ 9/ 1	0	25.0	25.0	.0	.
11	28	BORD	AA	W1	81/10/21	28	15.6	17.2	7.8	7.
4	72	FORD	AA	D1	80/ 1/30	0	429.0	381.0	.0	.
4	72	FORD	AA	W1	81/ 7/30	72	342.0	359.0	.0	.
4	72	FORD	AA	W2	81/12/ 1	72	16.0	17.0	5.0	5.
1	82	BFG	AA	D1	79/ 3/12	0	102.0	102.0	.0	.
1	82	BFG	AA	W1	79/ 5/15	82	4.0	4.4	.0	.
1	82	BFG	AA	W2	80/ 2/ 4	82	8.0	8.8	.0	.
1	82	BFG	AA	W3	80/ 4/18	82	27.7	30.5	58.3	.
15	82	BFG	AA	D2	79/ 3/12	0	669.0	669.0	.0	.0
15	82	BFG	AA	W1	79/ 5/15	82	36.0	39.6	.0	.0
15	82	BFG	AA	W2	81/ 9/ 1	28	25.0	25.0	.0	.0
15	82	BFG	AA	W3	81/10/23	741	10.0	10.0	594.4	652.7
2	97	IHFN	AA	D1	79/10/25	0	384.0	384.0	.0	.0
2	97	IHFN	AA	W1	79/10/ 1	709	74.0	81.0	.0	.0
2	97	IHFN	AA	W2	82/ 1/ 1	875	187.7	206.5	96.5	.0
5	97	IHFN	IA	D1	80/ 1/17	0	45.0	45.0	.0	.0

6	97	IHFN	IA	W1	82/ 1/ 1	875	40.9	45.0	.0	96.5
5	171	PHMM	AA	D1	80/ 1/28	0	.7	.7	.7	.7
9	186	REY1	AA	D1	80/11/20	0	.9	.9	.9	.0
10	186	REY1	AA	D2	80/11/20	0	.1	.1	.1	1.0
7	255	IHPL	IA	D1	80/12/11	0	122.0	122.0	.0	.0
7	255	IHPL	IA	W1	82/ 1/ 1	875	110.9	122.0	.0	.0
13	255	IHPL	IA	D2	82/ 1/19	0	71.5	71.5	.0	.0
13	255	IHPL	IA	W1	82/ 1/19	875	65.0	71.5	.0	.0
12	741	ASHT	AA	D1	81/10/20	0	10.0	10.0	10.0	10.0
3	872	GEB2	IA	D1	79/11/16	0	38.8	38.8	.0	.0
3	872	GEB2	IA	W1	80/10/ 8	875	33.3	38.8	.0	.0
8	873	GEB3	IA	D1	80/ 7/19	0	30.0	30.0	.0	.0
8	873	GEB3	IA	W1	80/10/ 8	875	21.5	21.5	.0	.0
8	873	GEB3	IA	W2	82/ 3/10	875	7.5	8.5	.0	.0
14	876	GEB6	AA	D1	82/ 5/ 3	0	33.0	33.0	33.0	33.0

TOTAL BANKED EMISSIONS FOR THIS POLLUTANT: 306.7

ACCUMULATED TOTAL OFF-SET EMISSIONS: 129.2

LAST TRANSACTION:

DATE - - - 82/ 5/ 3

CO. - - - GEB6

APPENDIX XI

Bubble Information

As of 4/7/83

Approved Bubbles	Industry Category	Source of Emission Credit	Reduction Below RACT	Cost Savings
Narragansett Electric Providence, RI	electric utility	fuel switch	-1,388 tpy SO2	$3 million/yr. fuel savings
Adolph Coors Boulder, CO	pkg. mfg.	change in control	no change VOC	$2.5 million cap'l & $2-300,000/yr op
3M Bristol, PA	tape mfg.	process change	-1,079 tpy VOC	$3 million capital & $1.2 mill yr op.
McDonnell Douglas St. Louis, MO	aerospace	process change	-135 tpy VOC	not available
Green River Station Muhlenberg, KY	electric utility	change in control	no change SO2	$1.3 million/yr operating
Armco, Inc. Middletown, OH	steel	change in control	-3,350 tpy TSP	$10-14 mill. cap'l & $2.5 mill/yr op
Andre's Greenhouse Doyleston, PA	greenhouse	fuel switch	no change SO2	$250,000/yr op.
ITT Rayonier Jessup, GA	pulp mill	change in control	no change TSP	not available
Old Crow Woodford, KY	distillery	change in control	-0.025 lb/Mbtu TSP	not available
3M Guin, AL	glass mfg.	fuel switch	no change TSP	not available
Uniroyal Naugatuck, CT	chem. mfg.	fuel switch	no change SO2	not available
General Motors Defiance, OH	foundry	change in control	-34.8 lb/hr TSP	$12 million cap.
Shenango Allegheny PA	steel	change in control	-207 tpy TSP	$4 million capital

APPENDIX X

Source: EPA

(rev. 4/7/83)

Bubble Summary

Number of Bubbles*

Final EPA approval	26
Proposed EPA approval	9

*Does not include bubbles approved or proposed by states under generic rules.

Pollutants:

VOC	-	8
TSP	-	17
SO_2	-	10

Industry Category:

electric utility	5
steel	8
aerospace	1
package mfg.	1
tape/paper coating	2
cement	1
appliance mfg.	1
greenhouse	2
paper/pulp mill	2
distillery	1
glass/fiberglass mfg.	3
petrochemical	5
foundry	2
meat packing	1
	35

Source of Emission Reduction Credits:

change in control	-	17 (incl. 1 with reduced operation)
fuel switch	-	9
process change	-	4
shutdown	-	2
purchased ERCs	-	1
leased ERCs	-	1
reduced operation	-	2
		35

EPA Region:	Approved	Proposed
I	2	
II	0	
III	6	4
IV	9	
V	5	4
VI	1	1
VII	2	
VIII	1	
IX	0	
X	0	
	26	9

Bubble Information

Approved Bubbles	Industry Category	Source of Emission Credit	Reduction Below RACT	Cost Savings
Corning Glass Works Danville, KY	glass mfg.	change in control	-8.6 lb/hr (allow.) TSP	not available
Fasson-Avery Int'l Lake County OH	paper coating	process change	no change VOC	not available
Owens-Corning Fiberglass Newark, OH	fiberglass mfg.	change in control	-17.18 lb/hr TSP	not available
Moran Generating Station Burlington, VT	electric utility	fuel switch	now in compliance SO2	not available
General Electric Louisville, KY	appliance mfg.	leased ERC	-45 tpy VOC	$1.5 million cap.
Progressive Foundry Perry, IA	foundry	change in control	-25.8 lb/hr TSP	$250,000 cap'l
Borden Chemical Louisville, KY	chem. mfg.	purchased ERC	-1.56 tpy VOC	not available
Union Carbide Texas City, TX	chem. mfg.	shutdown	-14.5 tpy VOC	$3 million cap'l
Gannon Station Tampa, FL	electric utility	fuel switch	no change SO2	$1.3 million/yr fuel savings
General Portland Tampa, FL	cement	shutdown	-18 lb/hr TSP	not available
National Steel Weirton, WV	steel	change in control	-840 tpy TSP	$30 million
U.S. Steel Fairless Hills, PA	steel	change in control	-5 lb/hr TSP	$27 million cap'l
U.S. Steel Allegheny Co., PA	steel	reduced operation	-4272 tpy SO2	$10,000/day

Bubble Information

Proposed Bubbles		Industry Category	Source of Emission Credit	Reduction Below RACT	Cost Savings
Monsanto Chocolate Bayou	TX	chem. mfg.	change in control	-36.4 tpy VOC	not available
Scott Paper Co. Chester,	PA	paper mill	fuel switch	no change SO2	$220,000/yr.
Arbogast & Bastian Allentown,	PA	meat packing	fuel switch	no change SO2	$100,000/yr.
J.H. Thompson Kennett Square,	PA	greenhouse	fuel switch	no change SO2	$100,000/yr.
Bethlehem Steel Bethlehem,	PA	steel	change in control	-3 lb/hr TSP	$10 million cap'l
National Steel Granite City,	IL	steel	change in control	-784 tpy TSP	not available
National Steel Wayne County,	MI	steel	reduced operation change in control	-262 tpy TSP	not available
Toledo Edison Lucas Co.	OH	electric utility	process change	no change in TSP TSP	not available
B. F. Goodrich Lorain Co.	OH	plastic mfg.	reduced operation	-16.2 lb/hr TSP	not available

Bubbles Under Review at Headquarters

(as of 4/12/83)

Company & Location	Region	Industry Category	Pollutant
Monsanto Texas City, TX	6	petrochemical	VOC
DuPont Sabine River, TX	6	petrochemical	VOC
Ashland Petroleum Kenton Co., KY	4	petrochemical	VOC
U.S. Steel Jefferson Co., AL	4	steel	TSP
U.S. Steel Fairless Hills, PA	3	steel	SO_2
U.S. Steel Lorain, OH	5	steel	TSP
Armco Ashland, KY	4	steel	TSP
Packaging Corp of America Wayne Co., OH	5	package mfg.	VOC
Uniroyal Ottawa Co., OH	5	plastic mfg.	VOC

APPENDIX XII

DESCRIPTION OF REPRESENTATIVE BUBBLES

September 2[illegible]98

Bubbles allow existing plants (or groups of plants) to treat all their emission points as though they were under a giant bubble and reduce or eliminate pollution controls where costs are high, in exchange for compensating increased control at emission sources where control costs are low. They give firms great flexibility to meet current or future pollution control requirements more quickly, make innovative control approaches profitable in a balance-sheet sense, and can save companies millions of dollars over the cost of conventional controls. As of the above date:

- EPA had issued an Emissions Trading Policy (47 FR 15076, April 7, 1982) which replaces the original bubble policy and streamlines procedures, giving States and industry more opportunities to use bubbles in many more circumstances and geographic areas.

Specific bubble approvals and proposals include the following.

1. The 3M Company's bubble in Bristol, PA uses solventless coating of tapes and an innovative manufacturing process to overcontrol VOC emissions at three coating lines in return for less control on other lines. The bubble resulted in over a thousand tons per year (TPY) reduction beyond what would have been achieved through compliance with the emissions limits imposed by the state.

Emissions:	
o before bubble or controls:	16,000 TPY
o with conventional controls:	7,000 TPY
o after bubble:	5,921 TPY
o benefit from bubble:	1,079 TPY
Cost savings:	$3 million capital cost in 1st year $1.2 million annual operating cost

2. At McDonnell-Douglas in St. Louis, MO a bubble allows the company to use a water-based solvent in the masking used in an etching process, reducing VOC emissions over fifty percent below conventionally controlled emission levels.

Emissions:	
o before bubble or controls:	355 TPY
o with conventional controls:	260 TPY
o after bubble (1982):	174 TPY
o after bubble (1985):	125 TPY
o benefit from bubble (1985):	135 TPY
Cost savings: not available	

3. DuPont's Chambers Works bubble in Deepwater, NJ is producing annual VOC emissions reductions of over 2,300 tons below conventional controls, saving several million dollars in operating expense per year in addition to over $12 million in capital. The bubble allows DuPont to overcontrol 7 large stacks to 99% in lieu of 85% controls on 119 petrochemical process-fugitive sources. It will also yield faster compliance and easier enforcement, since only the 7 sources need be inspected and controlled. This bubble was the first to become final under New Jersey's generic bubble rule allowing the state to approve VOC bubbles without EPA review.

Emissions:	
o before bubble or controls:	4,750 TPY
o with conventional controls:	2,769 TPY
o after bubble:	438 TPY
o benefit from bubble:	2,331 TPY
Cost savings:	Over $12 million in capital; several million annual operating costs

4. Kentucky Utilities' Green River Station will increase controls on several emission points to compensate for less stringent controls and use of local higher sulfur coal at larger emission points. The company expects to save $1.3 million per year as a result of this strategy, without increasing allowable SO_2 emissions.

Emissions:	
o same allowable emissions as before the bubble	
Cost Savings:	$1.3 million per year

5. General Electric's bubble in Louisville, KY uses emission reduction credits from Jefferson County's emission reduction bank to meet RACT control requirements during a two-year period before GE's VOC-emitting lines are phased out. GE leased the emission reduction credits from International Harvester, avoiding the need to spend $1.5 million for an incinerator which would be worthless to GE after 1983. The bubble provides 110% of the reductions required by state regulations and lets GE comply more rapidly than either incineration or replacement of existing lines.

Emissions:	
o before bubble or controls:	471 TPY
o with conventional controls:	71 TPY
o reductions required:	400 TPY
o credits leased through bubble:	(445 TPY)
o benefit from bubble:	45 TPY
Cost savings:	$1.5 million in capital costs; several hundred thousand in annual operating expenses.

6. Armco Inc.'s steel plant in Middletown, OH is reducing TSP emissions through a bubble allowing controls on storage piles and other sources of open dust in lieu of controls on fugitive process emissions from doors, windows and vents, saving the company over $14 million in capital and $2.5 million in annual operating costs. Armco's comprehensive particulate control program will reduce emissions by approximately 4000 tons per year —— six times more reductions than would be produced by conventional technology. It will bring the plant area into attainment with air quality standards. It includes detailed monitoring to verify expected air quality improvements.

Emissions:	
o reduction required by conventional controls:	650 TPY
o reductions from bubble:	4000 TPY
o benefit from bubble:	3350 TPY
Cost savings:	$14 million in capital costs $ 2.5-3 million annual operating costs

7. At Narragansett Public Utilities in Providence, RI, a bubble allows one generating station to burn higher sulfur (2.2%) fuel oil when a second generating station burns natural gas or does not operate. Considerable cost savings will be realized through reduced oil imports of 600,000 barrels annually, along with estimated emission reductions of 1,388 tons of SO_2.

Emissions:	
o benefit from bubble:	1,388 TPY
Cost savings:	$2-$4 million annually from reduced oil imports of 600,000 bbl./yr.

8. Shenango's steel plant in Allegheny County, PA is reducing TSP emissions through a bubble involving open dust controls on roads at the plant in lieu of controls on fugitive casthouse emissions, saving the company $4 million in capital and reducing particulate emissions by over 200 tons per year more than would have resulted from traditional process-fugitive controls.

Emissions:	
• reduction from bubble:	297 TPY
• reductions from conventional controls:	90 TPY
• benefit from bubble:	[illegible]07 TPY
Cost savings:	$4 million in capital costs

9. Under an approved bubble at the Owens-Corning Fiberglass Corporation plant in Newark, OH, the total revised TSP emission limit for 12 sources will be 89% of that allowed under the previous EPA approved SIP.

Emissions:		
o before bubble:	164.88	lb./hr.
o after bubble:	147.70	lb./hr.
o benefit from bubble:	17.7	lb./hr.
Cost savings: Not available		

10. For a proposed bubble at U.S. Steel's Fairless Hills, PA facilities, TSP controls would be traded amoung 12 sources in a sinter plant, saving $7 million in capital while reducing emissions beyond conventional requirements. The State is also reviewing a potential SO_2 bubble in which low sulfur fuels would be burned in furnaces and boilers in lieu of coke gas desulfurization, saving $15 million in capital alone.

TSP emissions reduction:	
• from conventional controls	1544 lbs/hr
• from bubble	1549 lbs/hr
• benefit from bubble	5 lbs/hr
SO_2 emissions reduction:	
• same as before bubble	
Cost savings:	$7 million from TSP bubble; $15 million from SO_2 bubble.

11. A bubble proposed by Union Carbide in Texas City, TX would use credits from shutting down a low density polyethlene unit instead of controlling VOC emissions from petrochemical storage tanks. The bubble would save $3 million in capital while reducing emissions by 14.5 tons per year.

Emissions:		
• credits from shutdown:	243.3	TPY
• uncontrolled emissions:	228.8	TPY
• benefit from bubble:	14.5	TPY
Cost savings:	$3 million in capital costs	

APPENDIX XIII

Profile of Interviews

As the following profile details, the interviews covered a mix of industrial, environmental, governmental and research groups.

Trade Associations:	American Iron and Steel Institute: Earle F. Young Jr.; American Petroleum Institute: Elizabeth Sowell; Chemical Manufacturers Association: Sanford E. Gaines; Utility Air Regulatory Group: Lewis T. Kontnik; Rubber Manufacturers' Association: Charles F. Lettow.
Individual Companies:	ARMCO, Washington D.C.: G.R. Van Schooneveld; ARMCO, Middletown, Ohio: John E. Barker; BF Goodrich, Louisville, Kentucky: Alice Simpson, Bill Yesovitch; Chevron U.S.A. Inc., Richmond, Calif.: P.S. Williams; General Electric, Louisville, Kentucky: Edward W. Conners, Keith Moser, Jim Waldrin; Louisville Gas and Electric Company, Louisville Kentucky: Robert P. Van Ness Monsanto, St. Louis, Missouri: Charles D. Malloch; Neil E. Prange, Michael F. Weishaar.
Environmental Groups:	Citizens for a Better Environment, Chicago: Kevin Greene; Citizens for a Better Environment, San Francisco, California: Jeffrey Gabe; Natural Resources Defense Council, Washington, D.C.: David Doniger, David G. Hawkins.
Professional Associations:	Association of Local Air Pollution Control Officials, Washington D.C.: S. William Becker Association of Local Air Pollution Control Officials: John A. Paul, Chairman, New Source Review Committee. Dayton, Ohio.

Regional and Local Agencies:	Bay Area Air Quality Management District, San Francisco, Calif.: Bruce D. Appel; Jefferson County Air Pollution Control District, Louisville, Kentucky: Michael T. De Busschere; Monterey Bay Unified Air Pollution Control District, Salinas, Calif.: Lawrence D. Odle, Douglas Quetin; Montgomery County Health District, Regional Air Pollution Control Agency, Dayton, Ohio: William T. Burkhart, John A. Paul, D. David Redic; South Coast Air Quality Management District, El Monte, Calif.: Ed Larson.
State Agencies:	Maryland Department of Health and Mental Hygiene, Office of Environmental Programs, Baltimore, Maryland: George P. Ferreri, Bill Bonta Massachusetts Department of Environmental Quality Engineering, Boston, Mass.: Kenneth A. Hagg; Pennsylvania Department of Natural Resources; Bureau of Air Quality Control Harrisburg, PA: Gary Triplett, John Salvaggio.
Federal Agencies and Offices (excluding EPA):	U.S. General Accounting Office, Program Analysis Division, Washington, D.C.: Charles W. Bausell, Jr. Office of Management and Budget, Washington, D.C.: Ed Clarke, Art Frass, Christina Lund.
Environmental Protection Agency, Headquarters:	Joseph A. Cannon, Associate Administrator, Office of Policy and Resource Management; Regulatory Reform Staff: Mike Levin, Ivan Tether, Leonhard J. Fleckenstein, David Foster, John Palmisano, John Jaksch; Office of Policy Analysis: Mahesh K. Podar, Steven Seidel; Stationary Source Compliance Section: Mark S. Siegler

Office of Air Quality Programs and Standards:
Christina Griffin, Jerry Kurzweg.

<u>Environmental Protection Agency, Regional Offices</u>

EPA Region I, Air Programs Branch, Boston, Mass.: Marcia Spink;
EPA Region III, Air Programs Branch, Philadelphia, Pennsylvania: David Arnold, Gregory Ham;
EPA Region V, Air Programs Branch, Chicago, Illinois: David Kee, R. Rothfuss, Richard Dalton, Mary T. Ryan, Dennis A. Trout;
EPA Region IX, Air Management Division, San Francisco, Calif.: Nancy Harney, Lucille van Ommering, Bruce Schaller.

<u>Research Institutions:</u>

American Enterprise Institute for Public Policy Research, Washington D.C.: Marvin H. Kosters;
Environmental Law Institute, Washington D.C.: Phillip Reed, Leslie Sue Ritts, Timothy Henderson;
Resources for the Future, Washington D.C.: Allen Kneese, Clifford S. Russel, Walter O. Spofford, Paul Portney, Alan Krupnick, Winston B. Harrington, Henry Peskin;
The Brookings Institution, Washington D.C.: Robert W. Crandall;
The Conservation Foundation, Washington D.C.: Richard A. Liroff, Chris Duerksen.

<u>Universities</u>

California Institute of Technology, Pasadena, Calif.: Roger G. Noll;
Harvard University, Business School: Marc Roberts;
Law School: Richard Stewart;
School of Public Administration: David Harrison and Albert Nichols;
School of Public Health: Robert Respetto;
Southwestern University, School of Law, Los Angeles: Robert Lutz;
University of California, School of Law, Los Angeles, Calif.: James Krier;
University of Chicago, School of Law: David Currie;
University of Rhode Island, Wickford, RI: Conrad W. Recksiek.

APPENDIX XIV

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