

# Air Quality Management or Best Practicable Means

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## Summary

The successful control of air pollution from industry depends largely on the implementability of the legislation. Although various alternative principles or approaches may serve as basis for legislation, most countries make use of air quality management or best practicable means. The merits and weakness of these two alternatives are discussed.

## Introduction

Air pollution is not new to man in the twentieth century, nor are his efforts to control it. The initial endeavours centered on prohibition, with severe penalties for transgression. Towards the end of the nineteenth century, understanding the problem led to more realistic legislation, but the evolution of effective control measures was slow and has not reached its final and most effective form yet.

Modern legislation for air pollution control is based almost exclusively on either air quality management or best practicable means. A number of other approaches are, however, also available and deserve attention.

## Effective Legislation

Any legislation, to be effective, must fulfil certain requirements and although all may not be met fully, none can be disregarded. These requirements for legislation may be summed up as follows:

- (i) It must be enforceable.
- (ii) Implementation must require a minimum effort.
- (iii) It must not disrupt or interfere with other legislation.
- (iv) Implementation must not disrupt other activities in the national household.
- (v) All possible circumstances must be catered for.
- (vi) Sufficient flexibility must exist for adjusting to changing circumstances.

## Alternative Approaches to Legislation

Eight approaches or legislative principles can be identified from history and theoretical dissertations on air pollution. They are discussed briefly as this may assist in attaining better understanding.

- (i) Prohibition — As early as 1306 prohibition was introduced to curb air pollution in London. This form of legislation, however, proved ineffective because it does not recognise that the evolution of the pollutants is neither intentional nor malicious. The only way to fulfil the requirement would therefore be to discontinue the manufacturing process.
- (ii) Private or Common Law — Two remedies are available, namely the interdict or court order and the *actio legis Aquiliae* or claim for injury or damage done. The former requires proof that the continued emission of air pollutants from a source will result in damage or harm while the second is only available after damage has been sustained. Neither comes into play automatically and the presentation of satisfactory proof rests with the complainant. Both actions are time-consuming and costly.
- (iii) Effluent Tax — According to this principle, the polluter must pay a tax for emissions to atmosphere. If the tax is severe enough, it is claimed that industry will elect to apply abatement. The argumentation is pure but the difficulties of measuring each source of emission continuously and accurately for tax assessment makes it impractical. The administration of such a system will be costly and involved, and the selection of an equitable tax level may take decades, as it has to be adjusted for each improvement in technology.
- (iv) Dispersion — Air pollution may be dispersed from tall chimneys so that acceptable ground level

concentrations are achieved. This technique is, however, not effective enough when multiple sources occur within a limited area. The approach is also worthless in large areas of heavy industrialisation like Europe where each source contributes to the background.

- (v) Industry Placement — A proper dispersion of industries, together with tall chimneys, will achieve acceptable ground level concentrations. Placement is, however, only of value if the individual industries have limited emissions and can be spaced properly. For practical reasons like transport, raw material sources and market location, the approach has limited value except when a large country has very few industries.
- (vi) Cost-Benefit — This most elegant approach utilises the marginal return concept of economics and aims at the maximum value or benefit for the community. If abatement cost of the remaining undesirable pollution is made equal to the disadvantage suffered by the community, any further abatement will cost more than the benefit derived from such expenditure. The principle cannot be faulted but it defies implementation because it is not possible to compute in monetary terms the exact total disbenefit of any given pollution level.
- (vii) Air Quality Management — In this approach, the first step is the establishment of criteria of air purity acceptable to man. The difficulties inherent in setting such criteria or standards will be discussed later. Once the criteria have been established, an interpretation or plan must be developed via the dispersion parameters of the atmosphere, to determine the maximum emissions to be allowed from each source so as to meet the criteria. The second serious weakness lies in this interpretation which has to make use of the variables of atmospheric dispersion. The last part of this approach requires that the emissions be monitored so that when a violation of the air quality standards occurs, the offender can be traced and charged. Such a process is involved and costly.
- (viii) Best Practicable Means — In this approach the control authority is charged with the responsibility of deciding what steps shall be taken at every source of air pollution to reduce the emission. In these decisions the authority is guided by what may be considered the best practicable means for the particular source.

With the exception of prohibition, which is unthinkable in the present technological age, all other approaches aim at the same point, namely air of an acceptable quality. The interpretation of what is acceptable may be open to different interpretations and therefore dispute, but the aim is consistent. The only differences are to be found in the route to be taken towards the goal.

In practice, air quality management or best practicable means is used in more than 90% of all existing legislation. These two approaches represent the two extremes, the first working from the goal to the action to be taken, while the second works from source control towards the goal. Both approaches may include elements of the other principles and they are discussed below as implemented in the United States of America and South Africa respectively.

## Air Quality Management

The United States pioneered this logical approach which starts at what is to be achieved and works backwards through the actions required to satisfy the needs. It appeals to both the scientist, though the well-defined scientific approach, and the layman, because it sets out the aims clearly.

The first step is the determination of air quality criteria, or purity of air which will be acceptable to man. Already at this point the first difficulty arises. In theory it is possible to establish the concentration at which each air pollutant will not be harmful to man. In practice this is virtually impossible because humans differ greatly and hence the most sensitive member must be selected as parameter. If this is not done, it implies that some

members of the community will be at risk. When the most sensitive member has been identified, it is necessary to determine the highest level of air pollutant which will not be harmful over a life-span of unknown duration.

Once individual pollutant criteria have been set, it becomes necessary to consider synergistic effects of combinations of two or more pollutants at different concentration ratios. With more than 10 000 known air pollutants the task of only enumerating the combinations becomes nearly impossible, and the setting of criteria becomes totally impossible. Assumptions must therefore be made, thus eroding the aim of scientific impeccability.

Faced with the duty of advising on air quality criteria and the lack of factual evidence, it is only human for the controller to err on the safe side. In the American legislative scheme, air quality standards must be set after public hearings and in the light of the criteria determined as above. The standards are therefore not likely to be set at a level higher than the criteria.

Accepting the air quality standards as a basis, an air quality plan or strategy must be worked out for the permissible emissions from each source. To do this, the dispersion of the pollutants through the atmosphere must be considered. The meteorological factors determining dispersion together with topographical influences on air movement, form an ever-changing pattern. Such predictions, based on extensive and complex input data can, in themselves, be a source of grave error, as proved by the numerous computer programmes available.

Requiring industry to reduce emissions to below the calculated values is not difficult. A dilemma arises however when ground level air pollutant concentrations have to be monitored continuously at all locations where people may be affected. An even worse difficulty is faced when a violation of the standards has been detected and the causal source has to be traced and proved so that legal action may be instigated.

The first national legislation on air pollution in America was enacted in 1955, providing central government aid and advice to States in adapting air quality standards and implementing control. Very little progress was made and in 1963 a new act was passed to bolster the action. This latter act was amended in 1965 and again in 1966. In 1967 the four-year-old legislation, already twice amended, was rewritten. By 1969 the expenditure on air pollution control by the authorities passed the US \$1 000 million per year mark, but the Secretary for Health found it necessary to report to Congress that no significant progress was being made. A new Clean Air Act was signed into law in 1970, still making use of the same approach but providing for sanctions against States failing to achieve progress. Apparently the desired progress remained elusive because during 1976 the legislation was in the process of being rewritten again.

It is small wonder that as eminent an authority on the American approach as Professor A.C. Stern in 1976 found more merit in the principle of best practicable means than in air quality management. His main arguments against the latter were the difficulties in implementation, the inflexibility of the standards concept and the inability to adjust policy and implementation to economic fluctuations. He commented unfavourably on the initial tardiness and subsequent over-reaction in implementation and the complexity of the American legislation.

## Best Practicable Means

This form of legislation was introduced for the first time in 1863 in England and remained in force essentially unaltered until 1976. During all this time it was not even deemed necessary to define the words 'best practicable means'. By comparison with air quality management, this approach, at first glance, is the epitome of simplicity. It merely requires that industry shall make use of the best practicable means to reduce emissions of air pollutants to atmosphere.

The South African Atmospheric Pollution Prevention Act, 1965, is more modern than the British forerunner and thus more suitable to compare with its American counterpart. The essence of the local legislation is that the Chief Officer must require industry to make use of the

best practicable means as defined, read in conjunction with the main text which is very brief.

The definition reads as follows: "best practicable means, when used with reference to the prevention of the escape of noxious or offensive gases or the dispersal or suspension of dust in the atmosphere or the emission of fumes by vehicles, includes the provision and maintenance of the necessary appliances to that end, the effective care and operation of such appliances, and the adoption of any other methods which, having regard to local conditions and circumstances, the prevailing extent of technical knowledge and the cost likely to be involved, may be reasonably practicable and necessary for the protection of any section of the public against the emission of poisonous or noxious gases, dust or any such fumes".

The aim of the legislation is clear from the last part of the definition, namely "the protection of any section of the public" against air pollutants. Protection includes both direct and indirect harm and may be extended to amenity. The interpretation of protection is partially clarified in the first half of that clause, in that when protection is "necessary", it is to be provided regardless of cost. If protection is to be extended to include amenity, reasonable practicability must be considered. The dilemma of what is necessary, is identical to that in the air quality management approach, but is often singled out as a major weakness by critics of best practicable means. In so doing they lose sight of the fact that defining the problem via air quality criteria, does not present a solution.

In the definition due recognition is given to "the prevailing extent of technical knowledge" and to "local conditions and circumstances". Neither of these parameters is specified closely nor tied to a specific time. This imparts total flexibility of policy formulation and implementation. An important part of the definition is the reference to "the cost likely to be involved" which couples with the phrase "may be reasonably practicable". This is in essence the cost-benefit principle, which is generally recognised as the most ideal approach. A common error in interpreting the legislation is to read the cost clause as a determinant on protection. Closer study will reveal that this is not the case.

Provision is made in the definition for the use of "dispersion" and the "adoption of any other methods". This represents a concession to use the dispersion principle if better means are not available, bearing in mind that the title of the act refers to prevention as the primary aim.

The industry placement principle is also recognised, in the definition, but in the main text of the act, under section 11 (4). It does not permit the active selection of the site for a new industry by the authority but provides for the prior approval of all new sites where scheduled processes are to be continued.

The South African legislation on air pollution, although primarily based on best practicable means, has built into it the principles of dispersion, industry placement and cost-benefit. It was enacted in 1965 and very minor amendments of an administrative nature were introduced in 1973. The act contains one overriding cause for criticism in that all decisions, be it on cost, meteorology, technology and even protection considerations are to be taken by the Chief Officer. With no detailed prescriptions on any point, the decisions must of necessity be subjective. To guard against misuse of the extensive powers lodged with the Chief Officer, an appeal facility has been provided in the Act. This has only been used once in more than nine years.

After intensive study of the British legislation which lacks the refinements introduced in South Africa, Lord Ashby finds the best practicable means tentative, untidy and piecemeal. He accords the legislation only one merit; it works while definitive, tidy and comprehensive legislation does not. In future comments he finds that the weakness of the best practicable means is inseparable from its strength: because it is realistic, it appears too indecisive, too modest and too indulgent to industries. Essentially the same comments hold true for the South African Act.