

AIR POLLUTION CONTROL IN SOUTH AFRICA*

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Abstract

The present magnitude of air pollution in South Africa, although not high when compared with that found in the industrialised countries of the world, gives reason for concern. The legislation on air pollution has now been in force for nearly four years. The underlying concept in the legislation is the use of the "best practicable means", i.e. that which is technically possible and economically reasonable. The science of air cleaning is still relatively young and reasonable solutions have not been found for all the pollution problems yet.

1. Introduction.

When one considers that the fight against air pollution started at least as early as 1320 when King Edward II banned the use of "sea coal" in London, it may sound surprising that the evil has not been stamped out yet. In actual fact, merely banning pollution does not solve anything. To purify the air and remove the pollutants requires technical know-how and capital investment. It must be borne in mind that the initial investment as well as the running cost of the equipment is, with the exception of a few cases, a completely unproductive expense.

2. Extent of pollution.

Before drawing comparisons of pollution rates, it must be stressed that the figures are at best authoritative assessments based on computation of available information.

Compared to 3,5 tonnes of SO₂ per square kilometre per year for the United States of America and 19,5 tonnes per square kilometre for England, South Africa has 0,8 tonnes per square kilometre per year. The above are however averages over the whole area of each country. In actual fact this figure is as high as 7,9 tonnes per square kilometre over an area of nearly 75 000 square kilometres in the Southern Transvaal.

Similar figures for fly-ash and industrial dust, again in tonnes per square kilometre per year are: U.S.A. — 1,6; England — 3,9 and South Africa — 1,0.

An even more interesting set of figures however, are the tonnages of SO₂ per head of population per year. For this we find in the United States 0,17; England 0,5 and South Africa 0,03. Taking the European population only, the figure rises to about 0,2.

Having juggled with figures, they must now be assessed in perspective. South Africa, largely underdeveloped, and with vast mineral resources and no really low sulphur fuel, must face the likelihood of a considerable rise unless steps are taken. Unfortunately nature has not provided us

with automatic regular scrubbing facilities in the form of rain. In addition, the highveld area carrying the heaviest burden also has the complication of inversions of more than nominal stability.

Because of the above, the advisability of accepting what is considered reasonable in, for instance, Europe, should receive more than just a superficial glance.

3. Legislation in South Africa.

The Atmospheric Pollution Prevention Act was passed in 1965 and implementation of the control of industrial processes started in July, 1968.

The key to this part of the Act is the words "best practicable means", which are defined as that which can be achieved technically at a cost which is not crippling to the industry as a whole. This is however not the full story because the definition carries on to say "and necessary for the protection of any section of the public".

4. Benefit versus cost.

A recent study of the adverse effects of a heavily polluted atmosphere in the U.S.A. concluded that the cost per capita resulting from damage by pollution was \$84 per year. Another study concluded that SO₂ caused damage to the value of U.S. \$130m per year in the area around Goteborg, Sweden.

On the other side of the balance the cost of pollution control can be illustrated by a few well founded assessments of cost. The cost of desulphurization of residual oil will add 10 to 40% to the price depending on the extent of sulphur removal. During 1970, the British Central Electricity Generating Board spent £17m on new ash removal systems and this amount is expected to rise annually. The price of steel is raised 10 to 15% if 95% of the iron oxide fume is to be removed. In order to equip a modern coal fired power station with high efficiency ash removal plant, 50% may be added to the installation cost. A cyclone fitted to a grey iron cupola will increase the cost of the melting facility by 300 to 400%.

The recently announced scheme by Iscor to spend R100m over the next ten years is equivalent to more than R100 for each taxpayer in South Africa and this does not even cover all the sources of air pollution in two of the more than 700 sites where scheduled processes are being carried on.

To assess the exact monetary value of the detrimental effects of air pollution, and also the total cost implications of removal is an impossible task. The only statement which can be made is that while the cost of harm done by pollution is

*Information used in this paper forms part of a dissertation to be submitted to the University of Cape Town towards fulfilling the requirements for a Ph.D.

being carried by each and every man in the country, the cost of solving the pollution problem is deducted from the gross national product and is therefore also being borne by the same man.

While industry would like to have a subsidy for air cleaning, the taxation rate will have to be increased to cover the amount of subsidy. This will cause a rise in prices.

On the other hand, the man in the street says that industry must pay for the clean-up. With more expense, the production cost rises and this is inevitably followed by a price rise.

The only factor open to speculation, is the level at which the price spiral, due to the interdependence of commodity prices, will stabilize.

5. Conclusion.

The foregoing is not intended to demoralize everybody, but rather to stimulate critical thinking, so that costly experiments and failures can be avoided.

While the most practical ways of tackling the vast variety of pollution sources are being actively investigated and implemented, another side of the problem should not be neglected. This is the problem of disposing of the pollutants collected. Any form of dumping on the surface, of collected pollutant, is open to the action of wind and rain.

It must follow, that any anti-air pollution action is only as good as the measures taken to handle and dispose of the collected material.

I do not wish to dwell on this tail end problem but rather to sweeten the pill by a few examples of how to turn the poison into a more palatable form which may even hold some economic advantage. Recent investigations indicate that the pot gases from aluminium manufacture, when contacted with alumina, will allow up to 99% of the fluorine to be absorbed, resulting in a net credit due to the replacement of fresh cryolite, while avoiding water pollution.

Fly-ash from power stations can in some cases replace part of the cement in concrete producing as good a product, at reduced price.

A new hydro-metallurgical process for the recovery of copper from chalcopyrite gives recoveries of up to 99,6% while the sulphur is obtained in elemental form rather than the low concentration SO₂ off-gas from present smelter operations.

Of necessity any attempt to deal with a topic as wide as air pollution in a few minutes, results in an incomplete skeleton, but I wish to close with a Dutch proverb translated freely as "Hurry thyself cautiously".