

(Appendix 2 to 5 of the original paper not included)

環境污染問題諮詢委員會

ENVIRONMENTAL POLLUTION ADVISORY COMMITTEE

EPCOA 5/85-86  
(FOR ADVICE)

PROPOSALS FOR AIR CONTROL ZONES AND  
AIR QUALITY OBJECTIVES FOR HONG KONG

INTRODUCTION

The purpose of this paper is to seek the Committee's advice on the proposals for the establishment of Air Quality Objectives and the declaration of Air Control Zones for Hong Kong under Part II of the Air Pollution Control Ordinance (1983).

BACKGROUND

2. The Air Pollution Control Ordinance provides for the declaration of air control zones by the Governor in Council (Section 6), and for the establishment by the Secretary for Health and Welfare of air quality objectives for each control zone. Different objectives may be established for different parts of a zone (Section 7). EPCOA has to be consulted on the establishment of these zones and objectives. Section 8 of the Ordinance requires the Authority to aim to achieve the relevant objectives as soon as is reasonably practicable and, thereafter, to maintain the air quality objectives so achieved.

3. These zones and objectives will form the basis for air quality management in Hong Kong. The purpose is to achieve the declared objectives within any air control zone and the present proposal involves the declaration of a single set of air quality objectives for the whole territory with a phased declaration of the ten proposed air control zones.

#### AIR QUALITY OBJECTIVES

4. Air quality objectives are expressed in terms of concentration of air pollutants and they represent those values which are considered necessary to promote the conservation and best use of air in the public interest. Initially, at least, it is proposed to define the "public interest" in this context fairly strictly and by reference to effects on the public health.

5. It is proposed that the air quality objectives should also satisfy the following requirements :-

- (a) they should be able to stand scrutiny against recognized air quality criteria studies (such as those done by WHO and USEPA);
- (b) they should include a 'target' value for each of those air pollutants which provides a good indication of air quality;
- (c) they should be able to be understood and accepted by the community;

(d) they should define and limit the number of times, in any given time period, by which the 'target' values should be allowed to be exceeded;

(e) they should be technically and economically realistic and take account of society's expectations.

6. A single set of objectives is proposed for each pollutant. This avoids the use of terms such as primary, secondary, acceptable, tolerable and detrimental (as are used in some other countries), which may cause confusion. The use of a single set of objectives for the whole of Hong Kong also avoids the invidious task of prescribing different objectives for different zones with objectives based on health considerations, it would be difficult to justify different objectives in different areas. It is also proposed, as an objective, that the 'target' values averaged over 1 hour, 8 hour and 24 hour periods should not be exceeded more than three times in any year (for the 1 hour measurement), or more than once a year (for the 8 hour and 24 hour measurements).

Appendix 1 7. Appendix 1 shows the list of proposed air quality objectives together with a summary of the health effects of each of the pollutants. In preparing the list, the objectives recommended by Environmental Resources Ltd. (in 1976) were critically examined against information provided in documents later issued by WHO and USEPA. They were found  
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to be comparable with established air quality standards and objectives elsewhere, and are considered to be a sound basis for air quality management in Hong Kong.

Appendix 2 8. Appendix 2 gives a comparison between the proposed air quality objectives and the measured air quality in the years 1983-84 and 1984-85. At Kwun Tong, the levels of sulphur dioxide and particulate matter exceeded the objectives for these two pollutants; pollution caused by particulate matter appears to be a territory-wide problem; at some monitoring sites, objectives for carbon monoxide and Appendix 3 nitrogen dioxide were not met. Appendix 3A, B and C provide graphic representations of monitored air quality levels for 1984-85 at the monitoring stations for 1-hourly maxima, daily maxima, and annual average respectively.

#### AIR CONTROL ZONES

9. The main purpose of air control zones is to provide the basic framework for air quality management. Air control zones should have their own self-contained characteristics of air pollutant emissions, meteorological conditions and topographical features. On the basis of these criteria, Hong Kong may be delineated into a number of identifiable airshed areas, which may be regarded as more or less self-contained from the viewpoint of dispersion of air pollutants. However, practical considerations of air quality management also make it desirable that the boundaries of zones should approximate those of administrative boundaries and care has been taken to match

the proposed zones, where possible, with District Board areas. The use of District Board boundaries, where this is feasible, will also make it possible to seek the views of the Boards on perceived needs in their area.

10. A map showing the proposed zone boundaries is attached at Appendix 4. Ten zones are proposed (described in Appendix 5). For practical purposes the boundaries of the proposed air control zones reflect only some minor compromise of airshed and District Board boundaries. However, alignment of the airshed boundary at Junk Bay with the relevant District Board or Constituency boundaries would jeopardize effective air quality management and the proposed Air Control Zone at Junk Bay is, therefore, based on dispersion considerations. The separate airsheds on either side of Lantau Island are proposed to be combined to form a single zone because separation there is not considered necessary for air quality management purposes.

11. It is proposed that the ten air control zones be declared in phases and that Harbour and Tsuen Wan/Kwai Chung should be the first two zones to be declared.

12. A phased declaration of air control zones has the advantage of allowing resources to be focused initially on those areas which require urgent action. At this stage it would be impracticable to plan and implement an air quality management programme across the board. Furthermore, the establishment of a sound air quality management

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programme for a particular ACZ depends very much on the availability of sufficient monitoring data and these would not be available initially although they would be developed over time.

13. A phased declaration will also facilitate the review of implementation of AQOs in declared zones so that experience in one zone can be applied later to other zones.

#### ECONOMIC IMPLICATIONS OF PROPOSALS

14. Action to achieve or enforce air quality objectives may have effects on industry by way of additional air pollution control requirements and these may take the form of changes in method or routine of operations, the use of different (and more expensive) fuels or even investment in pollution control equipment. Generally, it may be necessary to impose stricter controls on motor vehicle emissions and to require the use of a different quality of automotive fuel.

15. Detailed assessment of the cost impact of the introduction of objectives and control zones would have to be based on very broad assumptions as to the effects of a control and air quality management programme in any particular zone. The present proposals do no more than provide the framework for such programmes and the nature of control and enforcement - and therefore of new requirements - cannot be readily predicted until the programmes themselves have been under way for some period of time.

Powers to make additional regulations exist under the Ordinance and such regulations may form part of new requirements arising out of action in the control zones. Any such new regulations would have to follow the consultative procedures prescribed in the Ordinance.

16. To the extent that the establishment of ACOs and ACZs is an important step both in the introduction of regulations to control emissions from 'specified processes' and the continuing enforcement of other regulations applicable to point sources of air pollution, there will be cost implications for the industrial and manufacturing sector. However, these effects are more properly attributable to those regulations rather than these proposals.

#### ADDITIONAL INFORMATION

17. More detailed discussion of the proposals outlined above is provided in Report No. EPA/TF1/65 entitled "Proposals for Air Control Zones and Air Quality Objectives for Hong Kong" and copies of this report have been provided to Members.

#### ADVICE SOUGHT

18. Members are invited to endorse the proposals to:

- (a) establish the Air Quality Objectives as detailed in Appendix 1, as a single set of objectives for Hong Kong; and

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(b)

- (b) to declare ten Air Control Zones in phases in Hong Kong starting with the Harbour and Tsuen Wan/Kwai Chung zones.

Health and Welfare Branch  
Government Secretariat  
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Pollutant	Concentration in micrograms per cubic metre(i)					Health effects of pollutant at elevated ambient levels
	Averaging time					
	1 Hour (ii)	8 Hours (iii)	24 Hours (iii)	3 Months (iv)	1 Year (iv)	
Sulphur Dioxide	800		350		80	Respiratory illness; reduced lung function; morbidity and mortality rates increase at higher levels.
Total Suspended Particulates			260		80	Respirable fraction has effects on health.
Respirable (v) Suspended Particulates			180		55	Respiratory illness; reduced lung function; cancer risk for certain particles; morbidity and mortality rates increase at higher levels.
Nitrogen Dioxide	300		150		80	Respiratory irritation; increased susceptibility to respiratory infection; lung development impairment.
Carbon Monoxide	30,000	10,000				Impairment of co-ordination; deleterious to pregnant women and those with heart and circulatory conditions
Photochemical Oxidants (as ozone) (vi)	240					Eye irritation; cough; reduced athletic performance; possible chromosome damage.
Lead				1.5		Affects cell and body processes; likely neuropsychological effects, particularly in children; likely effects on rates of incidence of heart attacks, strokes and hypertension.

(i) Measured at 293°K (20°C) and 101.325 kPa (one atmosphere.)

(ii) Not to be exceeded more than three times per year.

(iii) Not to be exceeded more than once per year.

(iv) Arithmetic means.

(v) Respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10 micrometres and smaller.

(vi) Photochemical oxidants are determined by measurement of ozone only.