Written Submission to the Legislative Council

Special Meeting on 6 October 2009

Honourable Members of the Legislative Council:

In July 2007, I was invited by the Environmental Protection Department (EPD) to serve as a member of the Advisory Panel that oversaw the work of the consultants, Ove Arup and Partners Hong Kong Ltd., who were appointed to conduct this study. Most of my comments below have been presented to the EPD during their meetings with the Panel, which has convened seven times over the past two years. I shall make reference to Arup's Final Report on the 'Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy for Hong Kong – Feasibility Study'.

1. The logic behind the recommended Air Quality Objectives

On Table E.6b, Page E-13 of the Report, the consultant highlighted the number of days in 2008 on which air pollutant concentrations in Hong Kong exceeded each of several World Health Organization (WHO) targets: Interim Target 1 (IT-1), Interim Target 2 (IT-2), Interim Target 3 (IT-3), and the 'ultimate' Air Quality Guideline (AQG). My own interpretation of this presentation is that it suggests a 'pragmatic' approach, whereby the setting of Hong Kong's new Air Quality Objectives (AQOs) is linked to the number of 'exceedances' of the proposed AQO. The adoption of a set of AQOs that are unattainable on most days, resulting in a high number of 'exceedances', is politically unacceptable to the EPD. Thus, targets are chosen so that compliance is achieved for a reasonable part of the year.

This way of thinking is illogical. The purpose of the AQOs is to protect the health of our community, and to prevent the illnesses and deaths that are attributed to air pollution. Setting an AQO that does not protect public health renders the whole exercise pointless;

it goes against the spirit of the Air Pollution Control Ordinance, and of air pollution control laws that are being practised around the world. The EPD may have its own reasons for not adopting the 'ultimate' WHO AQGs, which are more stringent and more protective of public health; but it must state these reasons openly. If the EPD is worried that a set of seemingly impossible objectives makes a mockery of its efforts, it should at least be frank and inform the public that the AQOs being recommended at this stage are but *transitional* AQOs, which are not sufficiently stringent to protect public health. The EPD could then state its determination to actively reduce the amount of air pollutants, both locally and regionally (co-operating with the Pearl River Delta administration), and to move steadily towards the WHO AQGs within a specified time frame.

Without such bold and transparent statements, it is difficult for the public to understand the logic of recommending something clearly sub-standard for our AQOs that, according to the Air Pollution Control Ordinance, 'promote the conservation and best use of air in the public interest'.

2. The use of cost-benefit analysis

The consultants used cost-benefit analysis (CBA) to evaluate the various air pollution control strategies. While the EPD considered the CBA to be a 'standard approach' in comparing control options, I would like to point out its methodological limitations. The results of a CBA are strongly influenced by assumed monetary values of life, the costs associated with illness, and whether the benefits and costs used in the model have been fully enumerated. The valuation of life and health is difficult and prone to error. To avoid potential inaccuracies, the use of cost-effectiveness analysis (CEA) is preferred. Under this approach, benefit is made constant (e.g. one life saved, one hospital illness prevented), while the costs of different air pollution control options are compared for each unit benefit.

Another important point is that all economic analyses, whether CBA or CEA, are merely aids for the politician when making a decision. If their assumptions are not flawed, they

are useful as a reference. However, they are not supposed to be, and should not be, the only criteria for decision making. If we truly value health (particularly, other people's health) above our own economic pursuits, and above the comforts and conveniences that are widely perceived as desirable – such as using motor vehicles for transport, and energy for heating and air conditioning – we will have sufficient justification to adopt control measures that may be more costly, but provide benefit to a larger part of our population.

3. Regional versus local sources of air pollution

In the Report, the EPD pointed out the importance of regional sources of air pollution in the Pearl River Delta (PRD). A review of the 'emission inventory' shows that emissions from Hong Kong contribute a fairly small proportion of the overall emissions. This regional effect has been blamed for the lack of improvement in air quality in Hong Kong despite the Government's efforts to reduce the amount of local emissions. This viewpoint also implies that, regardless of our efforts in reducing the local emission of air pollutants, the effect on the overall air quality of Hong Kong will be limited. The Report then highlighted the achievements of Hong Kong and the PRD in April 2002, when they reached a consensus to reduce air pollutant emissions by agreed levels by 2010.

Since regional sources do contribute to air pollution, it is odd that for all of the control strategies outlined in the Report (measures 1–19 in Phase 1, 20–30 in Phase 2, and 31–36 in Phase 3), every measure was limited to Hong Kong. There was no reference to what actions our Government intends to take in promoting regional collaborative efforts to reduce air pollution, even though this would benefit the health of not just Hong Kong citizens, but also that of a much larger population in the entire PRD. I would like to see a proactive approach towards solving the regional air pollution problem, and concrete proposals on how to seek the cooperation of the PRD. Examples of options that can be considered include: switching to less polluting industries, installing air pollutant removal devices in power plants, using cleaner fuels for electricity production and transport, and promoting railways for public transport within and between cities. I cannot agree with the attitude that since the PRD is outside our jurisdiction, we cannot do anything about air

pollution coming from that source. We need political skills and technical expertise to solve the problem together, for the benefit of all residents in PRD and Hong Kong.

4. Useful local measures

Having stated the importance of regional measures, would local measures have any impact on the health of the Hong Kong citizens? I have no doubt the answer is 'yes'. The reason is that air pollution at the roadside, from transport sources, affects a large proportion of our population. This is aggravated by the growing height of our buildings and narrow roads, creating the notorious 'canyon effect'. A reduction in air pollution by the proposed measures, targeting the highly polluting diesel buses, trucks, and lorries, is an appropriate approach. Nevertheless, the issue of urban planning also needs to be addressed. This was not mentioned in the Report. To improve our air quality, we not only need to reduce emissions from vehicles, but we must also facilitate the dispersion of air pollutants through effective urban design, building regulation, road design and transport management.

5. Regional and international efforts

The growing importance of marine vessels as a source of air pollution was recognised in the Report. However, there seemed to be an unwillingness to tackle this issue, as it involves international laws and regulations. One possible concern is that if we mandate the use of clean fuels in ocean-going ships once they enter Hong Kong waters, we would lose most of our container business to neighbouring seaports that do not have such requirements, perhaps in Shenzhen or along the coast of eastern China. This problem again represents a good opportunity for regional collaboration. The benefits of air pollution control to the health of citizens in multiple Chinese cities must be considered. The results of this consultancy study – which generally convey the idea that the benefits of air pollution control measures exceed their costs – should be communicated to the authorities in these neighbouring seaports. We need to take the initiative to control marine air pollution, rather than wait for others to take action first.

6. On the proposed AQOs

I strongly advocate using the WHO AQGs as Hong Kong's new AQOs. Even if the EPD will not heed this advice, it should at least tighten the proposed standards for PM_{10} to the WHO Interim Target 3 levels of 75 and 30 micrograms per cubic metre ($\mu g/m^3$), for the 24-hour and 1-year AQOs respectively. Similarly, the standards for $PM_{2.5}$ should be set to the WHO IT-2 levels of 50 and 25 $\mu g/m^3$, for the 24-hour and 1-year AQOs respectively. While not ideal, these more stringent AQOs, offer considerably more protection to public health when compared to the highly conservative WHO IT-2 and WHO IT-1 standards proposed for PM_{10} and $PM_{2.5}$ respectively. For the same reason, the AQO for sulphur dioxide (SO_2) should also be tightened to the WHO IT-2 level of 50 $\mu g/m^3$.

Finally, there must be a timeline for the implementation of the pollution control strategies, whether the ones mentioned in the Report or those mentioned here. The lack of a suitable time frame makes the evaluation of the control measures impossible, shows a lack of determination in improving our air quality, and threatens the credibility of the entire exercise.

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Environmental Protection Department

Agreement No CE 57/2006 (EP) Review of Air Quality Objectives and Development of a Long Term Air Quality Strategy for Hong Kong - Feasibility Study

Final Report

ARUP

Taking into account the local circumstances, the WHO IT1 of 160 $\mu g/m^3$ is proposed for 8-hr O_3. It is noted that the EU sets the O_3 at 120 $\mu g/m^3$ with allowance of 25 exceedences according to its local circumstances. However, given the difference between the proposed objectives for Hong Kong and EU's limit values, and taking account of the results of the mathematical air quality modelling following implementation of Phase I control measures, it is proposed that an exceedence of 9 times per year be allowed. The proposed new AQO with exceedences for ozone is statistically similar to the EU air quality standard for ozone.

Fine Suspended Particulates

According to WHO document, health risk attributable to exposure to particulate matter is better represented by $PM_{2.5}$. In view of the latest findings on the health effects of $PM_{2.5}$ in WHO, US, UK, and other leading countries on the subject, it is recommended to include $PM_{2.5}$ in the new AQO to reflect its importance as a pollutant of significant risk on health.

Table E.6 summarizes the $PM_{2.5}$ data at ambient monitoring stations in Hong Kong in Year 2008. The $PM_{2.5}$ data at Tap Mun ambient station, which is representative of the local Hong Kong background, is also presented for comparison.

Table E.6a: Comparison of 2008 $PM_{2.5}$ concentrations with WHO guidelines

Air Pollutant	Avg time	WHO AQG / IT	Highest Concentration in 2008 (Ambient)	Highest Concentration in 2008 (Tap Mun)
$PM_{2.5}$	24-hour	IT-1: 75	113	99
		IT-2: 50		
		IT-3: 37.5		
		AQG: 25		
	Annual	IT-1: 35	41	35
		IT-2: 25		
		IT-3: 15		
		AQG: 10		

Table E.6b: Number of exceedences of the WHO's $PM_{2.5}$ guidelines in 2008

Air Pollutant	Avg time	WHO AQG / IT	No. of Exceedences in 2008 (Ambient)	No. of Exceedences in 2008 (Tap Mun)
$PM_{2.5}$	24-hour	IT-1: 75	39	13
		IT-2: 50	128	87
		IT-3: 37.5	191	160
		AQG: 25	259	219
	Annual	IT-1: 35	×	✓
		IT-2: 25	×	×
		IT-3: 15	×	×
		AQG: 10	×	×

The 2008 monitoring data shows that the annual $PM_{2.5}$ at Hong Kong ambient (including Tap Mun) monitoring stations exceeded the WHO IT1. The annual concentrations at ambient and Tap Mun monitoring stations were 41 $\mu g/m^3$ and 35 $\mu g/m^3$ respectively. The 24-hr $PM_{2.5}$ at Hong Kong ambient monitoring stations exceeded the WHO IT1 by 39 times. The highest recorded concentrations at ambient