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25 March 2019

Chief Council Secretary (1)1
Council Business Division 1
Legislative Council Secretariat
Legislative Council Complex,
1 Legislative Council Road, Central
Hong Kong
(Attention: Ms Angel SHEK)

Dear Ms. Shek,

Panel on Environmental Affairs

Meeting on 25 March 2019
Agenda Item IV on "Review of Air Quality Objectives"

I refer to your letter dated 21 March 2019 enclosing a joint letter from Hon. Tanya CHAN, Hon. Dennis KWOK Wing-hang and Hon. Kenneth LEUNG, on 18 March 2019 for the captioned item. Our responses are set out in the Annex.

Yours faithfully,

(Dave T.Y. HO)
for Director of Environmental Protection

Enclosure - Administration's response to Council Members' written questions on the "Review of Air Quality Objectives"

Annex

Administration's response to Council Members' written questions on the "Review of Air Quality Objectives"

This paper responds to the joint letter from Hon. Tanya CHAN, Hon. Dennis KWOK Wing-hang and Hon. Kenneth LEUNG dated 18 March 2019 to the Chairman of the Panel on Environmental Affairs. One of the recommendations to tighten the Air Quality Objectives ("AQOs") that the "Review of Air Quality Objectives" ("Review") makes is to tighten the AQO of 24-hour fine suspended particulates ($PM_{2.5}$) from the current World Health Organisation ("WHO") Interim Target (IT)-1 (75 $\mu g/m^3$) with allowable exceedances of nine times to IT-2 (50 $\mu g/m^3$) with allowable exceedances of 35 times. The key question of the joint letter is whether increasing the number of allowable exceedances from nine to 35 times is a relaxed standard.

2. Scientifically, the relationship between the concentration limit of an AQO and its number of allowable exceedance entails complex scientific and statistical analysis. We would take air quality monitoring data from the Tung Chung air quality monitoring station as an example to help illustrate the facts. In 2012, the 24-hour average $PM_{2.5}$ concentrations measured at the station were higher than 75 $\mu g/m^3$ on nine days, barely complying with the current AQO set at IT-1 with allowance exceedance of nine times. However, there were 58 days where the 24-hour average $PM_{2.5}$ concentrations were higher than 50 $\mu g/m^3$. Compared with the proposed AQO (i.e. set at WHO IT-2), substantial improvement in air quality would be required to reduce the number of exceedances from 58 to 35 in order to achieve compliance. Therefore, the proposed AQO is undoubtedly more stringent than the current one.

3. The annex of the joint letter cited a study conducted in 2011 by the School of Public Health of the University of Hong Kong ("HKU") to illustrate the view that even if the concentration limit of an AQO is tightened, the health risk would increase if the number of exceedances is allowed to increase. According to our understanding, regarding the AQO for $PM_{2.5}$, the study used 2008 air quality monitoring data to statistically project the annual concentrations of $PM_{2.5}$ under different numbers of allowable exceedance while *keeping the 24-hour concentration limit unchanged at WHO IT-1 (75 $\mu g/m^3$)*, so as to compare the associated health risks under different numbers of allowable exceedance. In the current Review, however, the suggestion is to *tighten the concentration limit of the AQO*. Therefore, it is inappropriate to directly compare the HKU's study results with the proposed AQO.

4. 2015 is set as the base year and 2025 is the target year in the Review. We therefore do not have any data for 2020. As requested by Council Members, the number of exceedances of 24-hour average $PM_{2.5}$ concentration limits

based on 2025 air quality modelling results are shown in **Table 1**. The 2015 data are also included to compare the projected air quality improvement between 2015 and 2025.

Table 1 Number of allowable exceedances for the $PM_{2.5}$ daily average concentrations in 2015 and 2025

Scenario	Frequency of exceeding concentration limit # (attain the objective?)	
	2015	2025
a. 24-hour AQO for $PM_{2.5}$ at 75μg/m^3 and the number of allowable exceedance at "0"	21 (No)	8 (No)
b. 24-hour AQO for $PM_{2.5}$ at 75μg/m^3 and the number of allowable exceedance at "9"	21 (No)	8 (Yes)
c. 24-hour AQO for $PM_{2.5}$ at 75μg/m^3 and the number of allowable exceedance at "35"	21 (Yes)	8 (Yes)
d. 24-hour AQO for $PM_{2.5}$ at 50μg/m^3 and the number of allowable exceedance at "0"	56 (No)	33 (No)
e. 24-hour AQO for $PM_{2.5}$ at 50μg/m^3 and the number of allowable exceedance at "9"	56 (No)	33 (No)
f. 24-hour AQO for $PM_{2.5}$ at 50μg/m^3 and the number of allowable exceedance at "35"	56 (No)	33 (Yes)
# The above values are the maximum number of exceedances in Hong Kong based on the air quality modelling results.		

5. As shown in Table 1, with the implementation of various emission control measures, the projected number of exceedance in 2025 will be smaller than that in 2015, irrespective of whether the 24-hour AQO of $PM_{2.5}$ is set at IT-1 (75 μg/m^3) and IT-2 (50 μg/m^3), thus demonstrating that there will be improvement in health risks. Table 1 also shows that if the 24-hour concentration limit is kept at 75 μg/m^3 but the number of exceedance is adjusted from nine to 35, the AQO could be attained without the need of any air quality improvement. Nevertheless, this is not what the review has recommended despite someone might have a misunderstanding that it is a recommendation of the Review.

6. With regard to the joint letter which enquired whether different numbers of allowable exceedances could be adopted at different districts, Chapter 8 of the WHO Air Quality Guidelines ("Guidelines") stipulates that "The guidelines presented here are recommended to apply to all environments where population exposure occurs and therefore protect all population groups.". Therefore, adopting different AQOs at different districts is not in line with WHO Guidelines' recommendation.

7. In accordance with section 7A of the Air Pollution Control Ordinance, the Secretary for the Environment is required to review the AQOs at least once every five years. We will conduct a review under the established mechanism and examine the feasibility of tightening the AQOs, including the concentration limits as well as the number of allowable exceedance. We shall adopt WHO's guidelines to progressively attain the WHO's ultimate standard with a view to protecting public health.