

**For discussion
on 11 May 2010**

**LEGISLATIVE COUNCIL
PANEL ON ENVIRONMENTAL AFFAIRS
SUBCOMMITTEE ON IMPROVING AIR QUALITY**

**Measures in Addressing Serious Air Pollution Incidents
Including Impacts of Sandstorms**

Purpose

Hong Kong was affected by an incident of dust plume associated with a distant sandstorm originated from Mongolia and northern China during 21 to 23 March 2010, which caused the Air Pollution Index (API) to reach the “Severe” band (API 201 to 500). In the wake of this unprecedented incident, the Government has reviewed the response system amongst the concerned bureaux and departments and agreed on necessary enhanced measures on public communication, co-ordination and mitigation. This paper sets out the initial outcome of the review.

Background

2. The levels of air pollution in Hong Kong are generally expressed by way of API. The key features of Hong Kong’s API system are as follows –

- (a) API converts air pollution data from five types of air pollutants¹ into a single value ranging from 0 to 500;
- (b) API is divided into five bands according to the potential effects (for details including the potential health implications and general advice, please refer to **Annex**). An API of 100 corresponds to the short-term Air Quality Objectives values (i.e. 1-hour to 24-hour limit values). An API exceeding 100 means that one or more pollutants may pose immediate health effects to some susceptible members of the community (such as those with respiratory or heart illnesses); and

¹ The five types of air pollutant are nitrogen dioxide (NO₂), sulphur dioxide (SO₂), ozone (O₃), carbon monoxide (CO) and RSP.

- (c) there are two types of APIs, namely General API and Roadside API. General API, which makes reference to the measurements at ambient monitoring stations, is more relevant to most members of the community as it represents air pollution a person exposes to for most of the time. Roadside API measures air quality at street level in urban areas. This index is more relevant to those who spend most of their time daily at roadside with heavy traffic.

Serious Air Pollution Incidents

3. Our records show that Hong Kong occasionally experiences air pollution with General API reaching the “Very High” band (API 101 to 200)². According to our records, Hong Kong had in total three occasions in the past 15 years when General API even reached the “Severe” band. The most severe incident was recorded on 22 and 23 March 2010 when APIs reached 200 to 500 due to the impact of dust plume associated with sandstorm from northern China.

4. In east Asia, sandstorm is a meteorological phenomenon originated in the arid or semi-arid desert regions of Mongolia and northern China which usually occurs between March and May. Scientifically, a sandstorm refers to an ensemble of particles of sand and dust energetically lifted to great heights by strong and turbulent wind with visibility reduced to below 1,000 metres. Sandstorms from northern China normally move from west to east and, on rare occasions, to south via the northeast monsoon. Sand and dust from sandstorms dissipate gradually when they move and after travelling a long distance to southern areas such as Hong Kong, the dusty air mass normally has lost the characteristics of a sandstorm but become a suspension of sand and dust in the atmosphere. Sandstorms in northern China normally do not have significant impacts on Hong Kong’s air quality. In the past, the highest API caused by dust plume associated with sandstorm was 109 measured in 2001. The severity of the air pollution incident due to high RSP level that occurred during 21 to 23 March 2010 was unprecedented.

Government Efforts

5. In the wake of the incident on 21 to 23 March 2010, the Government has conducted a review and the concerned bureaux and departments have agreed to step

² Typical causes of high API include high levels of O₃, NO₂ and RSP during weather conditions unfavourable to the dispersion of the pollutants, such as temperature inversion and still wind associated with the subsiding air induced by approaching typhoon. The number of days with General API in the range of 101 to 200 in 2007, 2008 and 2009 were 21 days, 21 days and 22 days respectively.

up the efforts in addressing serious air pollution incidents, including the rare incidents of serious air pollution caused by dust plumes associated with sandstorms from northern China. The details are set out in paragraphs 6 to 12 below.

Monitoring of Serious Air Pollution Incidents

6. The Environmental Protection Department (EPD) continuously monitors Hong Kong's air quality through its air quality monitoring network³. It also reports real-time General and Roadside APIs on an hourly basis and provides API forecast. API information is available on EPD's homepage and an interactive voice recording system at 2827-8541. EPD also disseminates the latest API information report to the media through the Information Services Department on an hourly basis.

7. Meteorological conditions could affect the dispersion and transport of pollutants and hence the air quality. The Hong Kong Observatory (HKO) has been sharing meteorological information with EPD to help the latter to assess and forecast Hong Kong's air quality. In the light of the rare incident of sandstorm from northern China could impact Hong Kong, the two departments have strengthened the collaborative mechanism for monitoring the impact of dust plume on air quality. HKO monitors reports of sandstorm in the Mainland and nearby region and provide additional meteorological information, including trajectory analyses, satellite images and weather reports, to EPD on a regular basis. In parallel, EPD monitors the air quality information in the nearby region including the Mainland and Taiwan with a view to detecting at an early stage any indications of air quality in the neighbouring areas being affected by dust plume from sandstorm.

Alert and Response System

8. In case of a serious air pollution incident or when it is judged that an imminent high API incident caused by dust plume is likely, EPD will issue press release or press briefing as necessary to inform the public to take precautionary measures and provide them with appropriate advice. HKO will report on the low visibility associated with dust plume in its weather bulletin as appropriate.

9. In addition, the Government will activate a response system. EPD will alert the concerned bureaux and departments, including the Education Bureau, the Social Welfare Department and the Labour Department, of the incident for dissemination of the relevant information to schools and service units for taking precautionary measures and provide appropriate advice to employers and outdoor workers.

³ EPD's air quality monitoring network comprises 14 fixed monitoring stations.

10. Other concerned bureaux and departments will also take corresponding actions. For example, when General API reaches the “Severe” band, the Leisure and Cultural Services Department will put up notices at government leisure facilities to alert members of the community using or considering to use such facilities of severe air pollution and provide them with general advice. The Department of Health will alert registered doctors and Chinese medicine practitioners of the incident and provide them with suggested health advice as appropriate. At the same time, the Hospital Authority will closely monitor the attendance and admission rates in the Accident & Emergency Departments of public hospitals. It will activate contingency measures as necessary in the event of an upsurge in service demand to facilitate the handling of a large number of patients.

Mitigation of Air Pollution

11. Furthermore, when API caused by high RSP level is at the “Severe” band, the Food and Environmental Hygiene Department will step up flushing of busy streets by street washing vehicles. Depending on the duration and severity of the incident, EPD may suspend the operation of the incinerator at the Chemical Waste Treatment Centre and request the two power companies to increase the use of cleaner fuels for electricity generation so as to minimize local emissions.

Other Actions

12. Meanwhile, the Government has revised the general advice to the public and susceptible groups, including those with respiratory and heart illnesses, children, the elderly and outdoor workers (**Annex**). To further improve the operation of the API System, EPD has engaged a team of leading academics from local tertiary institutes to conduct a review with a view to providing more timely advice to the community on the effect of air pollution on public health.

Advice Sought

13. Members are invited to note the content of this paper.

Environmental Protection Department
May 2010

Potential Health Implications of Different Air Pollution Levels and Associated Health Advice

| Air Pollution Level | API | Potential Health Implications | Health Advice | | |
|---------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| | | | Advice to Public | Additional Advice to Children and the Elderly | Additional Advice to Outdoor Workers |
| Low | 0-25 | None to the general population. | No response action is required. | Nil | Nil |
| Medium | 26-50 | None to the general population. | No response action is required. | Nil | Nil |
| High | 51-100 | Very few people, if any, may notice immediate health effects. Long-term effects may, however, be observed if you are exposed to such level for a long time. | No immediate response action is suggested. Long-term effects may, however, be observed if exposed at such level persistently for months or years. | Nil | Nil |
| Very High | 101-200 | People with existing heart or respiratory illnesses (such as coronary heart disease and other cardiovascular diseases, asthma and chronic obstructive airways diseases | Persons with existing heart or respiratory illnesses are advised to reduce physical exertion and outdoor activities. They are also advised to seek advice from | Children and the elderly are advised to reduce physical exertion and outdoor activities. | Employers are advised to assess the risk of outdoor work involving heavy manual work, and take appropriate preventive measures to protect the |

| Air Pollution Level | API | Potential Health Implications | Health Advice | | |
|---------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | Advice to Public | Additional Advice to Children and the Elderly | Additional Advice to Outdoor Workers |
| | | <p>including chronic bronchitis and emphysema) may notice mild aggravation of their health conditions.</p> <p>Generally healthy individuals may also notice some discomfort.</p> | <p>a medical doctor before participating in sport activities and take more breaks during the activities.</p> | | <p>health of their employees, e.g. reducing physical exertion with the use of mechanical aids, and scheduling suitable rest breaks.</p> <p>Outdoor workers with existing heart or respiratory illnesses are advised to seek advice from a medical doctor if they are in doubt of their health condition or feel uncomfortable, and inform their employers of the medical advice for suitable work arrangements to be worked out.</p> |
| Severe | 201-500 | <p>People with existing heart or respiratory illnesses (such as coronary heart disease and other cardiovascular diseases, asthma and chronic obstructive airways diseases including chronic bronchitis and emphysema) may experience significant</p> | <p>Persons with existing heart or respiratory illnesses are advised to avoid physical exertion and outdoor activities.</p> <p>The general public are advised to reduce physical exertion and outdoor</p> | <p>Children and the elderly are advised to avoid physical exertion and outdoor activities.</p> | <p>Employers are advised to assess the risk of outdoor work, and take appropriate preventive measures to protect the health of their employees, e.g. reducing physical exertion with the use of mechanical aids, and scheduling suitable rest</p> |

| Air Pollution Level | API | Potential Health Implications | Health Advice | | |
|---------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | Advice to Public | Additional Advice to Children and the Elderly | Additional Advice to Outdoor Workers |
| | | <p>aggravation of their symptoms.</p> <p>There will be also widespread symptoms in the healthy population. These include eye irritation, wheezing, coughing, phlegm and sore throat.</p> | <p>activities. They are also advised to seek advice from a medical doctor before participating in sport activities and take more breaks during the activities.</p> | | <p>breaks.</p> <p>Outdoor workers are advised to seek advice from a medical doctor if they are in doubt of their health condition or feel uncomfortable, and inform their employers of the medical advice for suitable work arrangements to be worked out.</p> |

Note: As the health effects on individuals may vary, you should seek advice from a medical doctor if you are in doubt or feel uncomfortable. If you are a smoker, you should quit smoking now!

Environmental Protection Department
May 2010