

For discussion on  
5 December 2000

**LEGISLATIVE COUNCIL  
PANEL ON ENVIRONMENTAL AFFAIRS**

**Vapour Recovery of Dry-Cleaning Machines**

**PURPOSE**

This paper seeks Members' views on a proposal to reduce the emission of perchloroethylene from dry-cleaning machines.

**BACKGROUND**

**Perchloroethylene**

2. Perchloroethylene (PCE) is the most commonly used dry cleaning agent both locally and overseas. It is a non-flammable and colourless liquid with a strong sweet odour. Exposure to very high concentrations of PCE may cause skin and eye irritation, dizziness, nausea, headaches and liver and kidney damage.

3. PCE is classified by the International Agency for Research on Cancer as a "probable human carcinogen". That means long-term exposure to high concentrations of PCE may increase the risk of cancer in human bodies but that there has not yet been sufficient evidence on this. The risk, if it actually exists, would be low compared to other cancer risks. For example, it would be 178 times lower than that of environmental tobacco smoke.

4. The annual ambient PCE level recorded by the Environmental Protection Department (EPD) in 1999 was  $2.34 \mu\text{g}/\text{m}^3$ , which is comparable with some cities in North America such as Los Angeles, Montreal and Ottawa. It is lower than the recommended actionable level of  $17.9 \mu\text{g}/\text{m}^3$  of the California Air Resources Board. There is therefore no immediate threat to public health.

5. The Laundry Association of Hong Kong has estimated that there are 400 dry-cleaning machines operating in hotels and laundry shops and factories. The majority of these operations

are located among residential buildings.

### **Dry cleaning operation**

6. Dry-cleaning operation involves three processes, namely, washing of fabrics in PCE solvent, spinning to extract excessive PCE solvent and drying with hot air stream. All the three processes are carried out inside the same dry-cleaning machine. Two types of dry-cleaning machines are used in Hong Kong: vented and non-vented. About half of the existing dry-cleaning machines in Hong Kong are vented.

7. For vented machines, PCE vapour is released into the air during the drying cycle. Non-vented machines have no exhaust and the PCE vapour from the drying process is recycled through a control device. Some PCE vapour will remain inside the non-vented machine after completion of the whole dry-cleaning cycle and will be released into the air when the door of the machine is opened. The amount of PCE vapour released varies between different models of machines, depending on how effective their vapour recovery system is.

8. Most European countries and the United States regulate the emission of PCE from dry-cleaning machines through phasing out vented machines and controlling the maximum residual PCE concentrations in non-vented dry-cleaning machines. Currently many European countries like Germany, Austria, Denmark, Norway and Sweden, and certain areas in the USA such as Los Angeles, San Francisco and New York adopt a maximum residual PCE concentration of 290 to 300 parts per million by volume (ppmv).

9. All the dry-cleaning machines in Hong Kong are known to be using PCE. Although there are other alternative dry-cleaning solvents, PCE is used because of its proven dry-cleaning performance. In overseas countries, trichlorotrifluoroethane (CFC113) was also used in the past as a dry cleaning solvent but is now banned under the Montreal Protocol for Protecting the Ozone Layer. Importation of CFC 113 to Hong Kong is prohibited. Some petroleum-based solvents are also used overseas for dry cleaning, but they are not commonly used in Hong Kong due to their fire-risk and as the trade regard them as less effective than PCE in removing oil and grease stains.

### **PROPOSAL**

10. Although the annual ambient PCE level is low as mentioned in para.4 above and the emission of PCE from dry-cleaning machines does not pose an immediate threat to public health, we propose that Hong Kong should adopt a precautionary approach and follow other countries in reducing such emission. We propose that regulation be made under the Air

Pollution Control Ordinance to –

- (a) require that all new dry-cleaning machines sold in Hong Kong should be of the non-vented type with a maximum residual PCE concentration of below 300 ppmv (“the standard”). The EPD should establish a list of approved machines that meet the standard and are certified so by the machine manufacturers. The list of approved machines will be updated by the Department from time to time to include new models that meet the standard and should be made available for public inspection and reference. Sale of vented machines and non-vented machines which do not meet the standard and that are already in Hong Kong before the commencement of the proposed regulation should be allowed during the grace periods mentioned in sub-para. (b) and (c) below. Actually, we understand that most if not all suppliers do not keep a stock of new machines and will place an order as and when a purchase is made. Therefore this requirement should not create much difficulty for the suppliers;
- (b) require existing vented dry-cleaning machines to be either modified to meet the standard or replaced with new approved machines within five years from the commencement of the proposed regulation. It is estimated that over 90% of these machines would reach their normal retirement age of 10 to 12 years at the end of this “grace period” and would have to be replaced anyway even if no control scheme is to be introduced;
- (c) require existing non-vented machines that do not meet the standard to be modified to meet the standard or replaced with new approved machines within seven years from the commencement of the regulation. Our estimate is that about 90% of such machines do not meet the standard and would have to be modified or replaced. 86% of them would be reaching their normal retirement age at the end of this “grace period”. A longer “grace period” is proposed for non-vented machines that do not meet the standard because they are generally newer and as by design they emit less PCE vapour than vented machines;
- (d) require all modification work to be certified by a competent examiner registered with the EPD to ensure that it is properly completed. The certificate should be displayed at the machine;
- (e) make it an offence to sell new dry-cleaning machines that do not meet the standard, except those that are already in Hong Kong before the commencement of the proposed regulation. The offence should attract a maximum fine of \$100,000;

- (f) make it an offence to operate dry-cleaning machines that do not meet the standard after the “grace periods”. The offence should attract a maximum fine of \$100,000 and a further fine of \$20,000 each day for continuing operation of the machine; and
- (g) make it an offence for failure to display the certificate of a modified machine. The offence should attract a maximum fine of \$50,000.

The penalties proposed in (e) to (f) above are the same as those for similar offences under the Air Pollution Control Ordinance.

## **CONSULTATION**

11. We have consulted eight relevant trade associations and over 490 laundries. They generally support the introduction of the proposed scheme but have made the following comments –

- (a) the “grace periods” of five years for existing vented machines and seven years for non-vented machines that do not meet the standard should be further extended; and
- (b) Government should subsidize the machine modification or replacement through financial assistance or low interest loan.

12. On para 11(a), our initial proposal was a “grace period” of five years for both vented and non-vented machines that do not meet the standard. Following extensive consultation with the trade, we have revised our proposal to allow longer “grace periods” of five and seven years for vented and sub-standard non-vented machines respectively. We do not recommend further extending the “grace periods” because, as mentioned in para.10(b) above, over 90% of the existing vented machines would approach their normal retirement age at the expiry of the 5-year grace period and would have to be replaced anyway even if the proposed scheme is not to be introduced. As for non-vented machines that do not meet the standard, about 86% of them will reach their normal useful life by the end of the 7-year grace period.

13. Regarding the trade’s request for financial assistance, Members may wish to note that a dry cleaning machine that meet the standard will consume considerably less PCE as the majority of the chemical will be recycled. For a normal operation, the saving could be up to \$10,000 per machine per year depending on the intensity of its operation. Therefore, the

operator would be able to lower his operating cost after modifying or replacing his machine. As the proposed grace periods should cover the normal useful life of the majority of the existing machines, there does not appear to be sufficient grounds for using public money to subsidize the modification or replacement of the machines.

14. We have consulted the Advisory Council on the Environment (ACE) on our proposal. Its members are generally supportive of it. Some have suggested that the Administration should consider offering technical and/or financial assistance to dry-cleaning operators so that the “grace periods” could be shortened.

15. We have considered the ACE’s suggestion carefully. For reasons set out in paragraphs 3 and 4 above, there does not appear to be an overriding urgency for modifying or replacing all existing machines that do not meet the standard.

## **ECONOMIC IMPLICATIONS**

16. The price of a non-vented dry-cleaning machine that meets the standard depends on its size and the make. A machine of the most commonly used size of 12 kg costs about \$200,000 to \$400,000 depending on the make. This is about \$40,000 to \$100,000 more expensive than a sub-standard non-vented machine of the same make. Most operators of vented machines may prefer to replace their machines before the end of the grace period, rather than modifying them. As machines complying with the standard will consume considerably less PCE, an operator can make a saving of up to \$10,000 a year in PCE cost after switching to a new machine.

17. About 10% of the existing non-vented dry-cleaning machines comply with the standard. 40% of those which do not meet the standard are of newer design and can be modified to fully comply with the standard. The modification cost is approximately \$50,000 for each machine. The remaining ones are of older design and their operators may choose to replace rather than modifying them by the end of the 7-year grace period.

## **STAFFING IMPLICATION**

18. The proposed scheme will create additional workload to EPD. The Department will absorb the additional workload, but will review the position in the light of future enforcement experience.

## **PUBLIC REACTION**

19. The general public should welcome the proposed precautionary measure, especially those who live or work in the proximity of dry-cleaning operations.

## **IMPLEMENTATION**

20. We aim to prepare draft regulation and table it at the Legislative Council within its current session.

## **ADVICE SOUGHT**

21. Members' views are sought on the proposal.

**Environment and Food Bureau**  
**December 2000**