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for advice

A Proposed Scheme for the Control of Perchloroethylene Emission from Dry-cleaning Operation

INTRODUCTION

This paper seeks Members' advice on the proposed scheme for the control of perchloroethylene emissions from dry-cleaning operation.

BACKGROUND

2. Perchloroethylene is a non-flammable colourless liquid with ethereal odour. It causes skin and eye irritation, dizziness, nausea, headaches, and liver and kidney damages. In addition, it is confirmed to be an animal carcinogen and a probable human carcinogen.

3. Perchloroethylene is used mainly in dry-cleaning operation in Hong Kong. There are about 350 dry-cleaning facilities operating about 450 dry-cleaning machines. Many of these dry-cleaning facilities are located in residential areas. The recent Toxic Air Pollutants Emissions Inventory Study completed in December 1995 has recommended that the control of perchloroethylene emissions from dry-cleaning should be accorded with a high priority. This is also one of the action items in the Third Review of the White Paper on Pollution in Hong Kong.

DRY-CLEANING OPERATION

4. Dry-cleaning operations involve three processes, namely, the washing of fabrics in the perchloroethylene solvent, spinning to extract the excess solvent, and drying in a hot air stream. All the three processes are carried out in the same dry-cleaning machine. Two types of dry-cleaning machines are commonly found in Hong Kong, namely, vented machine and non-vented machine.

5. For vented machines, the perchloroethylene vapour are vented to the atmosphere at the end of the drying cycle. Non-vented machines eliminate the need for venting by recycling the vapour through a vapour control device. Recently, in some overseas countries like USA, Germany and Canada, only non-vented type machines are allowed.

6. Dry-cleaning operations emit perchloroethylene from several sources. Vented machines have process emission of perchloroethylene to the atmosphere at the end of the drying cycle. Non-vented machines have no exhaust and thus have no process emission.

PROPOSED SCHEME OF CONTROL

7. To eliminate process emission of perchloroethylene from the dry-cleaning operation, it is proposed that only non-vented type machines are allowed to be used. This means that the vented type machines are either to be replaced with, or modified to a non-vented type machine. The plan is that all new machines will have to use the most advanced design. Existing machines can be allowed to meet a practicable but less stringent standard through in-situ modification. All dry-cleaning machines will be required to be certified to comply with the required standards, and be registered with the EPD. The detailed proposals are described below.

Requirements for new dry-cleaning machines

8. New dry-cleaning machines shall be of a non-vented type and capable of reducing the perchloroethylene concentration in the drum to 300 ppmv or below. A door interlocking system shall also be provided such that the machine door can be opened only when the perchloroethylene concentration in the drum drops to below the 300 ppmv level. Also, the machines will have to be certified by the machine manufacturer to comply with these standards.

Requirements for existing dry-cleaning machines

9. Owners of the existing dry-cleaning machines may either replace their machines with new machines in 5 years, or modify the existing machines to a non-vented type within 18 months. The modified machines will be required to be certified by a Registered Professional Engineer to comply with the following requirements:

(a) equipped with a refrigeration condenser and capable of achieving an outlet vapour temperature, measured downstream of the condenser, of less than or equal to 5°C prior to opening of the machine door;

(b) equipped with an interlocking system such that the machine door can be opened only when the temperature, measured downstream of the condenser, is less than or equal to 5°C.

10. The 5°C requirement, which is a practicable performance standard adopted for modified machines, is to ensure that the perchloroethylene vapour will be adequately condensed to reduce its concentration to an acceptable level.

Registration

11. To ensure that all dry cleaning machines are in compliance with the proposed standards, they are required to be registered with the EPD.

CONSULTATION

12. Individual dry-cleaning laundry owners, suppliers/manufacturers of the dry-cleaning machines, associations from laundry and hotel industries including the Laundry Association of Hong Kong, the Hong Kong Hotels Association and the Federation of Hong Kong Hotel Owners Limited, other major trade associations, and the concerned government departments/branches have been consulted. They are generally in support of the need for the control. The associations for the laundry and hotels industries have expressed concerns on the technical feasibility and economic viability of the modification option. Although the overseas experience and the EPD's assessment have shown that machine modification is practical, the EPD will in addition carry out demonstration works to address their concerns.

IMPLEMENTATION

13. Subject to the Council's endorsement, a regulation will be drafted based on the proposed scheme of control and the technical details to be produced from the demonstration works mentioned above. The plan is to introduce the proposed regulation by early 1998.

ECONOMIC IMPLICATIONS

14. The proposed control scheme will incur additional cost to the trade in the modification or replacement of their machines to comply with the proposed requirements. We estimate that whilst a machine meeting the new standards costs 20 to 50% more than that of a conventional design,

the modification cost of an existing machine is about 20 to 30% of the machine cost. There will however be a saving derived from the substantial reduction in perchloroethylene consumption. On balance, the economic implication to the trade is expected to be minimal.

STAFF IMPLICATIONS

15. The Environmental Protection Department is prepared to absorb the additional workload by the existing staff due to the implementation of the proposed control. However, this will be reviewed in the light of future enforcement experience.

PUBLIC REACTION

16. As the exposure of the public to air toxic pollutants will be reduced through the proposed control, it should be welcomed by the public.

ADVICE SOUGHT

17. Members are requested to advise whether they support the scheme of control outlined above. When the draft regulation has been prepared, it will be submitted for Members' formal advice.

Environmental Protection Department
Air Policy Group
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