

For discussion

**Legislative Council
Panel on Development**

Enhancing Control of Fresh Water Cooling Towers

PURPOSE

This paper briefs Members on a package of measures to enhance the control of fresh water cooling towers, in tandem with the promotion of their wider use in Hong Kong on energy efficiency consideration.

BACKGROUND

2. Water-cooled air-conditioning systems (WACS) using fresh water cooling towers are generally more energy-efficient, consuming up to 20% less electricity than air-cooled air-conditioning systems. Noting that buildings account for about 90% of electricity consumption in Hong Kong, the wider use of WACS will enhance energy efficiency of buildings and contribute to the quality and sustainability of our built environment.

3. To promote wider use of WACS, the Electrical and Mechanical Services Department (EMSD) convened an inter-bureaux/departmental Working Group¹ in 2000 to launch a scheme, namely the “Scheme for Wider Use of Fresh Water in Evaporative Cooling Towers for Energy Efficient Air-conditioning Systems” (the FWCT Scheme). EMSD will provide professional advice in regard to environmental and health issues to owners who opt to apply for participation in the FWCT Scheme for their cooling towers with a view to facilitating their compliance with the requirements of relevant statutory regulations².

4. Due to the growing public awareness on environmental performance of buildings and the better energy efficiency of fresh water cooling towers, it is

¹ Membership of the inter-bureaux/departmental Working Group comprises representatives from the Development Bureau, Environment Bureau, Water Supplies Department, Department of Health, Buildings Department, Drainage Services Department, Lands Department, Planning Department and Electrical and Mechanical Services Department.

² They include requirements under the Waterworks Ordinance, the Buildings Ordinance and the Noise Control Ordinance.

anticipated that WACS will be increasingly used in air-conditioning installations when more new building projects and retrofitting works in existing buildings are progressively implemented in the coming years.

CONCERN ON FRESH WATER COOLING TOWERS

5. As revealed in some overseas cases that fresh water cooling towers could be sources of spreading Legionnaires' disease (LD)³, there is a health concern on their use if they are not properly designed, installed, operated and maintained. Although there is no evidence to show that the sources of infection of the LD cases in Hong Kong could be related to fresh water cooling towers, we are mindful of the potential risk⁴ of LD related to these installations. To address the concern, EMSD has been implementing the following measures:

- (a) requiring owners of fresh water cooling towers under the FWCT Scheme to comply with the "Code of Practice for Prevention of Legionnaires' Disease" published by the Prevention of Legionnaires' Disease Committee (PLDC⁵);
- (b) promulgating the "Code of Practice of Water-cooled Air-conditioning Systems" (CoP for WACS) to provide guidelines on design, installation, operation and maintenance of fresh water cooling towers to the trade. Compliance with the CoP for WACS is also a requirement under the FWCT Scheme; and
- (c) carrying out periodic water sampling inspections and surveillance visits of some existing fresh water cooling towers since 2001. Owners of cooling towers found not properly maintained during inspections would be advised to carry out remedial actions and proper

³ LD is an acute pneumonic illness with symptoms of malaise, muscle pains, cough, breathlessness, headache and fever, often culminating in respiratory failure.

⁴ According to research findings, the fatality rate of the disease is about 10 to 15% even though the infection rate of LD in an outbreak is less than 5%.

⁵ PLDC was established in 1985 to advise the Government from the public health, microbiology and engineering services perspectives on -
(a) the minimization of the risk of LD; and
(b) the promotion of good practices to the building owners and associated practitioners to prevent the outbreak of LD.

PLDC is currently chaired by Professor Sian Griffiths and comprises members from the medical and engineering professions as well as relevant government departments.

maintenance via advisory letters and publicity leaflets.

6. In its Report No. 53 published in October 2009, the Audit Commission recommended the Administration to conduct a review and take measures to ensure that cooling towers under the FWCT Scheme are properly maintained and to keep in view the need for introducing alternative strategies and additional measures for controlling unauthorized cooling towers in the long term.

PACKAGE OF ENHANCEMENT MEASURES

7. There is currently no specific legislation to control and regulate fresh water cooling towers in a holistic manner. While enactment of the enabling legislation for controlling cooling towers is planned to be pursued, EMSD will continue to take the lead to enhance the control of the use of fresh water cooling towers in the territory. Since the publication of the Audit Report, a package of multi-pronged enhancement measures has been formulated for implementation in tandem with the promotion of the wider use of WACS on energy efficiency consideration. These measures include:

- (a) regulating improperly maintained or contaminated fresh water cooling towers by EMSD under the Public Health and Municipal Services Ordinance (PHMSO);
- (b) regulating the design and installation of cooling towers by EMSD in collaboration with the Water Supplies Department (WSD) via the granting of permission for use of fresh water for cooling under the Waterworks Ordinance (WWO);
- (c) regulating the supporting structures of fresh water cooling towers by the Buildings Department (BD) under the Buildings Ordinance (BO) and the Minor Works Control System (MWCS) to be implemented under the Building (Minor Works) Regulation; and
- (d) stepping up publicity to enhance public awareness of the proper use of fresh water cooling towers.

Regulatory Control Measures in respect of Operation and Maintenance

8. If a fresh water cooling tower is in such a state as to be a nuisance or injurious or dangerous to health under the PHMSO, it can be dealt with summarily under the ordinance. With the delegated power under the PHMSO, public officers may enter premises, take water samples, carry out tests and, by issuing a nuisance notice⁶, require owners/occupiers to rectify unsatisfactory conditions of fresh water cooling towers within a reasonable period of time. The designated authority for taking relevant enforcement action under the PHMSO currently rests with the Director of Food and Environmental Hygiene (DFEH). In this connection, DFEH is prepared to delegate his power and function under the respective sections of the PHMSO to DEMS so that EMSD can take regulatory control on the operation and maintenance of fresh water cooling towers.

9. With the delegated power under the PHMSO, EMSD will carry out sample inspections of fresh water cooling towers in respect of their water quality, handle complaints and investigate on cases of improperly maintained fresh water cooling towers as appropriate and, depending on testing results, take regulatory actions where necessary in accordance with the provisions under the PHMSO.

Regulatory Control Measures in respect of Design and Installation

10. Any person who uses water for cooling without WSD's written permission shall be guilty of an offence⁷. WSD will in the meantime, through the application of the WWO, supports EMSD in enhancing regulatory control of the design and installation of fresh water cooling towers.

11. In this regard, EMSD will upon receipt of applications for participation in the FWCT Scheme make assessment of the design and installation of the fresh water cooling towers and advise WSD whether the particular applications are acceptable to EMSD. WSD will consider the applications under the WWO, particularly the adequacy of the water supply system to meet the water demand so generated, besides taking into account EMSD's advice. For acceptable cases, WSD will also attach

⁶ A nuisance notice may be caused to be served on the responsible person requiring him to rectify the unsatisfactory situation within a specified period, failing which he shall be guilty of an offence and is liable on summary conviction to a fine at level 3 (which is currently \$10,000) and a daily fine of \$200 for a continuing offence.

⁷ The offender is liable on summary conviction to a fine at level 3 (which is currently \$10,000).

suitable permit conditions reflecting EMSD's requirements on the design and installation of the cooling towers. An advisory statement will also be included requiring the applicants to comply with the good practices in designing, installing, operating and maintaining fresh water cooling towers promulgated via the CoPs issued by PLDC and EMSD.

12. WSD will at the same time step up enforcement actions under the WWO against unauthorized fresh water cooling towers by asking the users to apply for the permission. If the users fail to comply with the request, prosecution will be instituted by WSD.

Regulatory Control Measures in respect of Supporting Structures

13. As far as the supporting structures of fresh water cooling towers are concerned, BD will continue to examine the design and construction of the new supporting structures through the normal building submission and approval process under the BO. With the implementation of the MWCS on 31 December 2010, some smaller types of supporting structures of cooling towers are designated as minor works which can be erected through simplified procedures under the supervision of prescribed building professionals and prescribed registered contractors, thereby improving building safety. Besides, BD will also continue to take enforcement actions against unauthorized supporting structures under the current enforcement policy⁸.

Publicity to Promote Public Awareness

14. EMSD in collaboration with other departments through the inter-bureaux and departmental Working Group referred to in paragraph 3 above will step up publicity to enhance public awareness on the maintenance of fresh water cooling towers. To facilitate trade practitioners and owners to properly design, install, operate and maintain fresh water cooling towers, promotional materials (such as leaflets and teaching kit) on good practice will be published. In addition, from 2011 onward, we will increase the frequency of promotional seminars for the trade, which is currently held once each year.

⁸ Priority will be given to the removal of unauthorized supporting structures which are newly found, or constitute obvious or imminent danger to life or property, or constitute a serious hazard or a serious environmental nuisance, or are identified in buildings targeted for large scale operations.

Progress of Implementation

15. EMSD is now conducting a territory-wide survey of existing fresh water cooling towers totalling about 10,000 in order to update their actual number, location and distribution in Hong Kong. An opportunity is also taken to collect basic technical information and general condition of the cooling towers as far as practicable. The survey will be completed by end 2010. Separately, an exercise to inspect about 1,000 of these fresh water cooling towers commenced in July 2010 and will be completed by early 2011. Water samples are collected and tested in the process. The updated information obtained from the territory-wide survey will be useful for the implementation of the enhanced control measures. The water sampling results will enable EMSD to follow up with the owners on remedial actions to improve the water quality where necessary.

16. We will brief PLDC on the implementation of the enhanced control measures on fresh water cooling towers at its meeting scheduled for December 2010.

ADVICE SOUGHT

17. Members are invited to note the package of measures for enhancing the control of fresh water cooling towers in paragraphs 7 to 16 above and provide comments, if any, on the control measures.

**Development Bureau
Electrical and Mechanical Services Department**

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