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For information

Control of Ship-sourced Pollution within Hong Kong Waters

PURPOSE

This paper informs members of the strategy of Hong Kong to control ship-sourced pollution within Hong Kong waters.

BACKGROUND

2. Hong Kong is an international hub port. It is also home to about seven million people with a diversity of marine life ranging from microscopic algae to dolphins. The Administration is committed to reducing the impact of sea traffic made by local, regional and ocean-going vessels on the surrounding environment.

3. Ocean-going vessels make up a major proportion of the sea traffic. Their operations cut across different jurisdictions. Joint international efforts are thus needed to control their pollution. Through the Marine Department (MD), the Hong Kong SAR Government has been pursuing measures to fulfill its obligations under various international conventions in respect of controlling maritime emissions. These requirements in the conventions, once adopted, will apply whenever appropriate to all vessels in Hong Kong waters irrespective of whether they will cross our boundary.

4. The major international maritime pollution control conventions

include –

(a) **the International Convention for the Prevention of Pollution by Ships (MARPOL)** - this is the primary international convention on ship-sourced pollution. Hong Kong has implemented all of the six MARPOL Annexes;

(b) **the International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004 (BWM) -** this is a convention developed in recent years to preserve marine ecology system. This convention has not yet entered into force internationally. Nevertheless, Hong Kong has been advising and encouraging the shipping industry to follow the Guidelines relating to its implementation; and

(c) **the International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001 (AFS)** - this is a convention developed to preserve marine ecology system. Hong Kong is preparing legislation to give effect to AFS.

A summary of these conventions are at **Annexes A, B and C** respectively.

5. Through various pieces of legislation, MD has been enforcing maritime pollution control stipulated in the above international conventions by means of surveys and certification of Hong Kong-registered ships and locally licensed vessels, as well as conducting Port State Control (PSC) inspections of foreign ships within Hong Kong waters. To strengthen the control of ship-sourced pollution, MD has also introduced additional measures, such as regulating the smoke emission from vessels.

6. Complementing the work of MD, the Environmental Protection Department (EPD) has been monitoring air and water quality to provide a basis for planning further pollution control strategies. We are working out new control measures to strengthen our efforts in reducing maritime emissions.

MARITIME POLLUTION CONTROL

Port State Control

7. To ensure that non-Hong Kong registered ships visiting Hong Kong comply with the requirements of the international conventions, MD officers carry out PSC inspections[1] of ships visiting Hong Kong in accordance with provisions of International Maritime Organisation (IMO) Resolution A787 (19) and the Manual of Memorandum of Understanding on Port State Control in the Asia-Pacific Region. If serious deficiencies are noticed, the ship will be detained and the ship's agent/owner, classification society and flag State will be notified of the detention as well as the requirement for rectification. Generally, serious deficiencies affecting the seaworthiness of the vessel and/or the safety of the crew and/or causing damage to the marine environment are required to be rectified prior to the ship's departure.

Survey and Certification of Hong Kong-registered Ships and Locally Licensed Vessels

8. All Hong Kong-registered ocean-going ships and locally licensed vessels are required to be surveyed and certificated in accordance with the requirements of the various marine safety and pollution prevention regulations to which they are applicable. For Hong Kong-registered ocean-going ships, the surveys and certification are performed by recognized organizations. For locally licensed vessels, they are performed by MD officers, or recognized authorities or independent surveyors authorized by the Director of Marine.

Control of Pollution by Oil

[1] MD officers are empowered to inspect ships under the following pieces of legislation -
Merchant Shipping (Prevention of Oil Pollution) Regulations (Cap. 413A);
Merchant Shipping (Control of Pollution By Noxious Liquid Substances in Bulk) Regulations (Cap. 413B);
Merchant Shipping (Safety) (Dangerous Goods and Marine Pollutants) Regulation (Cap. 413H);
Merchant Shipping (Prevention of Pollution by Sewage) Regulation (Cap. 413K); and
Merchant Shipping (Prevention of Air Pollution) Regulation (Cap. 413M).

9. The majority of oil spills occur in ports at the time of loading, discharging and bunkering. In general, the spills are caused by equipment failure or human mistakes. Marine accidents such as collision and grounding are also potential causes of oil spills.

10. To tackle the problem of oil spillage, MARPOL Annex I stipulates the construction standard for oil tankers, the requirements for continuous monitoring of oily water discharges, and the requirement for governments to provide shore reception and treatment facilities for oily waste at their ports. Specifically, it stipulates that –

(a) every applicable ship is required to be surveyed and issued by flag State or its delegated recognized organization with an Oil Pollution Prevention Certificate to certify compliance with the related requirements; and

(b) any disposal of oily waste such as bilge water or oil sludge etc. has to be recorded in an Oil Record Book.

The above requirements are implemented via the Merchant Shipping (Prevention of Oil Pollution) Regulations (Cap. 413A). While Cap. 413A sets out precautions for preventing oil pollution, the Shipping and Port Control Ordinance (Cap. 313) has made it an offence to deliberately discharge oil into the waters of Hong Kong.

11. MD will verify compliance with the above requirements as part of its PSC inspections of foreign ships visiting Hong Kong. Specifically, it will check the ship's oily water monitoring equipment and Oil Record Book to ensure that the handling of oily waste is in accordance with the regulation requirements, etc. As for local vessels, they are required to carry either a Hong Kong Oil Pollution Prevention (HKOPP) Certificate, a certificate or a document issued by a maritime Administration recognized by the Director of Marine as equivalent to an International Oil Pollution Prevention (IOPP) Certificate or HKOPP Certificate. The certificate is issued after confirmation of compliance with the relevant requirements in a survey.

12. To tackle possible oil spill, MD's Pollution Control Unit (PCU) stands by at all time to tackle possible oil spill. In addition, PCU officers carry out routine inspections on oil barges in Hong Kong waters and advise the masters on the precautions to take. On behalf of the Buildings Department, PCU also checks oil terminals periodically to ensure that their anti-oil pollution equipment is in good order.

Control of Pollution by Noxious Liquid Substances in Bulk

13. MARPOL Annex II stipulates that chemical tankers shall comply with the International Bulk Chemical Code covering –

(a) the international standards for the safe transport of Noxious Liquid Substances (NLS) in bulk by sea;
(b) the design and construction standards for ships involved in such transport; and
(c) the equipment they should carry to minimise the risks to the ship, its crew and to the environment having regard to the nature of the products carried.

14. Hong Kong largely follows MAPROL Annex II requirements and has implemented its requirements via the Merchant Shipping (Control of Pollution by Noxious Liquid Substances in Bulk) Regulations (Cap. 413B). Similar to MARPOL Annex I, ships within Hong Kong waters are required to be surveyed and certified in accordance with the regulation. Furthermore, tank washing after discharge of certain types of NLS cargo and transfer of residual mixtures to shore reception facility in Hong Kong are required to be witnessed by an MD surveyor.

15. The Chemical Waste Treatment Centre (CWTC) serves as the reception facility in Hong Kong for MARPOL Annexes I and II wastes generated from operation of ocean-going vessels. The CWTC contractor is responsible for collecting the wastes from vessels for treatment at the CWTC. The charging scheme for the collection and disposal of MARPOL Annex I and II wastes at the CWTC was given effect through the enactment of the Merchant Shipping

(Prevention and Control of Pollution)(Charges for Discharge of Polluting Waste) Regulation (Cap. 413I), which came into force on 1 August 1995.

Control of Pollution by Packaged Harmful Substances

16. Packaged harmful substances are those substances identified as marine pollutants in the International Maritime Dangerous Goods Code. These substances are carried at sea in freight containers and portable tanks. MARPOL Annex III stipulates the requirements of packing, marking and labeling, documentation, stowage and quantity limitations for the shipment of such substances.

17. Hong Kong largely follows MAPROL Annex III requirements to control pollution by packaged harmful substances from ships and has implemented the requirements via the Merchant Shipping (Safety)(Dangerous Goods and Marine Pollutants) Regulation (Cap. 413H). Also, under the Dangerous Goods (Shipping) Regulations (Cap. 295C), all ships are required to submit dangerous goods manifest including marine pollutant declaration to MD prior to entering the port. MD officers carry out inspections to ensure that those cargoes are packed, labeled, documented and stowed in accordance with the convention requirements.

Control of Pollution by Sewage

18. Hong Kong follows MARPOL Annex IV requirements, which requires ships to be equipped with a sewage treatment plant, or a sewage comminuting and disinfecting system, or a sewage holding tank. The discharge of sewage into the sea is prohibited, except when the ship –

(a) has in operation an approved sewage treatment plant; or
(b) is discharging comminuted and disinfected sewage using an approved system more than three nautical miles from the nearest land; or
(c) is discharging sewage which is not comminuted or disinfected at a distance of more than 12 nautical miles from the nearest land.

19. In Hong Kong, MARPOL Annex IV is implemented via the Merchant Shipping (Prevention of Pollution by Sewage) Regulation (Cap. 413K), which entered into force on 2 February 2007. A fleet of sewage collection vessels provides collection service from ships in Hong Kong waters.

Control of Pollution by Wastes

20. MARPOL Annex V deals with different types of shipboard-generated garbage and specifies the distances from land and the manner in which they may be disposed of. The requirements are much stricter in a number of "special areas"[2]. The most important feature of the Annex V is the complete ban imposed on dumping any forms of plastic into the sea. Moreover, all ocean-going ships are required to have on board the following –

(a) a Garbage Management Plan which provides written procedures for collecting, storing, processing and disposal of garbage; and
(b) a Garbage Record Book which records any incineration or discharge of garbage.

21. In Hong Kong, MARPOL Annex V is implemented via the Merchant Shipping (Prevention of Pollution by Garbage) Regulation (Cap. 413J), which entered into force on 22 December 1995.

22. MD provides garbage collection service for vessels in Hong Kong waters. The service covers ocean-going vessels at berths, anchorages, government mooring buoys as well as local vessels inside typhoon shelters.

23. MARPOL Annex V mainly covers the dumping of wastes produced by ships' operation. To ensure comprehensiveness of our control strategies, the Government has introduced a provision under the Summary Offences Ordinance (Cap. 228) to control marine littering on a smaller scale, including littering from vessels. Under section 4D of the Ordinance, a person depositing litter into the

[2] These "special areas" as set out in Regulation 5 of MARPOL Annex V are the Mediterranean Sea area, the Baltic Sea area, the Black Sea area, the Red Sea area, the Gulfs area, the North Sea area, the Antarctic area and the Wider Caribbean Region.

waters of Hong Kong commits an offence and is liable to a fine of $10,000 and to imprisonment for 6 months.

24. In addition, MD's PCU operates a fleet of specialised refuse scavenging and collection vessels, including six sea cleaners and more than 70 contractor vessels to provide free refuse scavenging and garbage collection service.

Control of Air Pollution

25. MARPOL Annex VI, which entered into force internationally on 19 May 2005, provides for the following –

(a) imposing restrictions on the emissions of harmful substances such as ozone depleting substances, nitrogen oxides, volatile organic compounds and sulphur oxide from ships;
(b) controlling the quality of fuel oil used on board and regulates shipboard incineration; and
(c) requiring ships of 400 gross tonnage or above and propulsion and auxiliary diesel engines with output over 130kW to be surveyed and certified on their compliance with the requirements under MARPOL Annex VI.

26. MARPOL Annex VI specifies that for a ship solely engaged in domestic voyages, an administration may exclude it from the nitrogen oxides emission control requirements, provided that the ship is constructed or the diesel engine therein has undergone a major conversion before the Annex commences. Hong Kong largely follows MAPROL Annex VI requirements to control air pollutant emissions from ships and has implemented its requirements via the Merchant Shipping (Prevention of Air Pollution) Regulation (Cap. 413M), which entered into force on 1 June 2008. Again, the control mechanism to ensure compliance with regulation requirements is through Flag State ship/engine surveys and certification and PSC inspections on foreign ships.

27. In addition, Government vessels have been using ultra-low sulphur

diesel (ULSD)[3] since 2001. By switching from marine light diesel to ULSD, the emissions of sulphur dioxide and particulate matters from a vessel can be reduced by about 99% and 10% respectively.

28. The emission of smoke from ocean-going vessels and local vessels within Hong Kong waters is regulated by the Shipping and Port Control Ordinance (Cap. 313) and the Merchant Shipping (Local Vessels) Ordinance (Cap. 548) respectively. Under the legislation, it is an offence for a vessel to emit smoke in such quantity as to be a nuisance. MD monitors the situation and organises special operations to observe vessels' exhaust emissions in Hong Kong waters. When sufficient evidence is obtained, prosecution will be initiated against the concerned vessels. In addition, MD has organised a Smoky Vessel Spotter Scheme, under which volunteers are trained to use Ringelmann Chart to gauge the level of smoke emission from vessels and to report excessive smoke emission cases to MD. Promotion leaflets have also been distributed to masters and owners to advise them on how to prevent emission of dark smoke from vessels.

Ballast Water

29. Ocean-going vessels like large tankers and bulk cargo carriers use a tremendous amount of ballast water to improve its stability. Ballast water is taken up or discharged when cargo is unloaded or loaded, or when ships need extra stability under foul weather. The discharge of ballast water can release a variety of new species of biological materials, including plants, animals, viruses and bacteria into new areas where they can become marine pests, causing extensive ecological and economic damage to aquatic ecosystems.

30. The BWM Convention was adopted by IMO in 2004. As in October 2008, the Convention was ratified by a total number of 16 Contracting Governments representing 14.24% of the world merchant fleet tonnage. This still falls short of the required number of ratifications to bring the Convention into force internationally. Pending the entering into force of the BWM Convention,

[3] ULSD has a sulphur content not exceeding 50 ppm, which is only 1% that of marine light diesel (not exceeding 5000 ppm) being used.

Hong Kong has advised and encouraged the shipping industry to follow the six Guidelines relating to its implementation. A summary of the Convention and its six guidelines is at **Annex B**. Under the Convention, ballast water treatment system is required to be installed onboard ships after a specified date. In case when ships are not equipped with the treatment system, they are required to exchange ballast water in the open sea 200 nautical miles away from the nearest land in water at least 200 metres in depth.

Seawater Monitoring System

31. EPD has been conducting a comprehensive marine monitoring programme in Hong Kong waters since 1986. The main objectives are to determine the current status of the marine waters; assess their compliance with the statutory Water Quality Objectives; reveal any long-term changes in water quality; provide a basis for planning water pollution control strategies and quantify the benefits of water quality improvement measures. The marine monitoring programme currently covers a total of 94 open-water and typhoon shelters territory-wide. The stations are visited monthly (open-water) or bimonthly (typhoon shelters) and over 20 key physico-chemical and biological parameters are measured.

Air Quality Monitoring Network

32. EPD has set up an air quality monitoring network in Hong Kong. The monitoring network comprises 14 monitoring stations, among which 11 are general stations and three are roadside stations. The main objectives are to provide a true picture of the real-time air quality in Hong Kong; assess to what extent the Air Quality Objectives are being met; provide the public with information on current and forecast air quality; assist the assessment of public exposure to air pollution; and provide a basis for planning further control strategies to improve air quality.

NEW MEASURES BEING CONSIDERED

33. To further control air pollutant emission from marine vessels, apart from implementing MARPOL Annex VI, Hong Kong is studying the feasibility of local ferries using ULSD. A trial will be conducted in 2009. The trial findings will help us map out the way forward for promoting the use of ULSD by local ferries. We will also share our findings with relevant authorities in Guangdong and Macao to explore whether there is scope to extend the use of ULSD to regional vessels plying the Pearl River Delta Region. On a separate front, we plan to install onshore power supply facilities to our new cruise terminal. When available, cruise vessels capable of tapping on on-shore power can shut down the auxiliary diesel generator engines, thereby reducing the air pollution generated[4].

34. On 10 October 2008, in response to the public demand worldwide to further reduce air pollution from ships emission, IMO adopted the amendments to MARPOL Annex VI, which will enter into force internationally on 1 July 2010. Such amendments impose stricter standards for emissions of harmful substances (including sulphur oxides and nitrogen oxides) and the control measures from ships. Hong Kong will implement the revised Annex VI in accordance with the specified timetable.

35. Apart from the above issues in the control of emission from ships, IMO has in recent years adopted amendments to MARPOL Annexes I, II, III and IV to meet the development of the industry and the increasing concern of the public in the protection of the marine environment. We are in the process of amending the relevant local legislation to give effect to those amendments. The following provides a brief account of the amendments –

(a) MARPOL Annex I – Revised in 2007. It incorporated the various amendments adopted since Annex I entered into force in 1983. The revised Annex I is a user-friendly document which included also new requirements. The major ones are double bottom for pump rooms,

[4] Ocean-going vessels have diesel auxiliary engines to provide electricity for powering refrigeration, lights, pumps and other functions (activities referred to as "hotelling") while the vessels are docked at a port. By using onshore power, a vessel can reduce the emission of air pollutants by about 90%.

accidental oil outflow performance calculations, oil fuel tank protection and the amendment to the Condition Assessment Scheme for verification of the structural condition of single hull oil tankers.

(b) MARPOL Annex II – Revised in 2007. It alters the categorization system for noxious liquid substance into four categories, i.e. Cat X, Y, Z and OS (other substances) and significantly lowers permitted discharge levels of certain products. The marine pollution hazards of thousands of chemicals have been evaluated by the IMO giving a Hazard Profile which indexes the substance according to its bio-accumulation, bio-degradation, acute toxicity, chronic toxicity, long-term health effects, and effects on marine wildlife and on benthic habitats.

(c) MARPOL Annex III – Revised in 2006. It requires ship operators to make available a document listing the harmful substances taken on board to the port authority before departure, if any loading or unloading operations, even partial, are carried out at any stopover. Criteria for the identification of harmful substances in packaged form are given in the Appendix to the revised Annex III.

(d) MARPOL Annex IV – Two amendments were adopted in 2006 and 2007 respectively. They are related to the tightening of the effluent standards for sewage treatment plants and the inclusion of the control of sewage originating from spaces containing living animals.

36. As for MARPOL Annex V, its effectiveness is being reviewed by IMO. The review also responds to an urgent need raised by the industry for clearer provisions on cargo hold washings if they are subject to the control of the Annex. It is expected the review will be completed by July 2009.

Environmental Protection Department/Marine Department
December 2008

Annex A

The International Convention for the Prevention of Pollution of Ships, 1973 (MARPOL 73/78)

The International Convention for the Prevention of Pollution of Ships Convention (MARPOL) is the main international convention developed by the International Maritime Organisation ("IMO") to prevent pollution of marine environment by ships from operational or accidental causes. It is a combination of two treaties adopted in 1973 and 1978 respectively and updated by amendments through the years. Therefore, it is also called MARPOL 73/78.

Regulations covering the various sources of ship-generated pollution are contained in six Technical Annexes to MARPOL-

Annex I	Regulations for the Prevention of Pollution by Oil
Annex II	Regulations for the Prevention of Pollution by Noxious Liquid Substances
Annex III	Regulations for the Prevention of Pollution by Harmful Substances in Packaged Form
Annex IV	Regulations for the Prevention of Pollution by Sewage from Ships
Annex V	Regulations for the Prevention of Pollution by Garbage from Ships
Annex VI	Regulations for the Prevention of Air Pollution from Ships

These Annexes are updated regularly. Annexes I and II are compulsory whereas Annexes III to VI are optional.

Hong Kong has implemented all of these six Annexes.

Annex B

International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004

Adoption: 13 February 2004

Entry into force: 12 months after ratification by 30 States, representing 35% of world merchant shipping tonnage.

The Convention incorporates the Articles and an Annex that provides the technical standards and requirements for the control and management of ships' ballast water and sediments.

The main features of the Convention are outlined below.

Reception facilities
Parties undertake to ensure that ports and terminals where cleaning or repair of ballast tanks occur have adequate reception facilities for the reception of sediments.

Management and Control Requirements for Ships
Ships are required to have on board and implement a Ballast Water Management Plan approved by the Administration. Ships must have a Ballast Water Record Book to record the activity relevant to ballast water onboard.

Standards for Ballast Water Management
The Annex provides the ballast water performance standard and the ballast water exchange standard. Ballast water exchange could be used to meet the performance standard.

Summary of the six Guidelines of the BWM Convention

1. Guidelines for ballast water management equivalent compliance

They apply to pleasure craft used solely for recreation or competition or craft used primarily for search and rescue less than 50 metres in overall length and with a maximum ballast water capacity of eight cubic metres.

2. Guidelines for ballast water management and development of ballast water management plans

Guidelines for the development of the plan in preventing, minimising and ultimately eliminating the risk of introducing harmful aquatic organisms and pathogens from ships' ballast water and associated sediments while protecting ships’ safety.

3. Guidelines for ballast water exchange

They provide ship-owners and operators with general guidance on the development of ship specific procedures for conducting ballast water exchange.

4. Guidelines for ballast water exchange design and construction standards

To give guidance to shipbuilders, ship designers, owners and operators of ships in designing safe, environmentally acceptable, technically achievable, practicable, and cost effective ballast water exchange as required in Regulation D-1 of the Convention.

5. Guidelines on design and construction to facilitate sediment control on ships

They provide guidance for ship designers, shipbuilders, owners and operators in the development of ship structures and equipment to minimise the uptake and undesirable entrapment of sediments, facilitate removal of sediments and provide safe access to allow for sediment removal and sampling in compliance with Regulation B-5.2 of the Convention.

6. Guidelines for ballast water exchange in the Antarctic treaty area

These Guidelines apply to those vessels covered by Article 3 of the Convention, taking into account the exceptions in regulation A-3 of the Convention. These Guidelines do not replace the requirements of the Convention, but provide an interim Ballast Water Regional Management Plan for Antarctica under Article 13(3).

Annex C

International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001

This Convention was adopted on 5 October 2001 by IMO and entered into force internationally on 17 September 2008. The Convention prohibits the use of harmful organotins in anti-fouling paints used on ships and will establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems. The organotin compounds persist in water, killing sealife, harming the environment and possibly entering the food chain.

In Hong Kong, all antifouling paints are considered as pesticides and are subject to regulatory control under the Pesticides Ordinance, Cap. 133. Only antifouling paints which are registered pesticides may be imported, supplied and sold by licensed pesticide traders for use in Hong Kong.

A piece of local legislation is being prepared to implement the AFS Convention in Hong Kong.