

Entel UK Statement



Re: Green passport Certificate

In December 2003, UN shipping organisation, the International Maritime Organisation (IMO), came up with guidelines for recycling. These guidelines were laid down in Resolution A.962 (23). The implementation schedule for these guidelines is that they will be ratified in 2008/2009.

The main reason for the implementation of these guidelines is to create a document that will protect the workers and the environment at ship recycling facilities. Most of these facilities are located in developing countries. Another important reason is to provide the crew and passengers with a safer and better environment during the vessel's operation.

Entel UK has a strong position in supplying new buildings in the market with GMDSS emergency equipment. As a manufacturer, supplying to ship yards through our agent network, we have been asked to describe our products according to the new "Green Passport" form.

The products involved are:

Product code	Product Type	Material	% per product
CNB950E	ATEX I.S. Battery for HT900 series radio	Lithium Cobaltate	20-40%
CNB850E	USTC I.S. Battery for HT800 series radio	Aluminium	10-40%
CNB750E	Non-I.S. Battery for HT600 / HT700 series radio	Graphite	10-20%
CLB750E	Non-I.S. Battery for HT600 series GMDSS radio	Copper Foil	5-10%

All Entel products should be recycled by the relevant local authorities (recycling information relating to the WEEE Directive may be found on the Entel web site www.entel.co.uk).

Product Data Sheet For Entel Lithium Ion Batteries

The information below is for Entel lithium ion rechargeable battery products.

Composition Information

The cells used in Entel lithium ion battery packs are composed of the following ingredients

Common chemical name / General name	CAS number	Concentration range	Classification and hazard labelling
Lithium Cobaltate (LiCoO ₂)	12190-79-3	20-40%	-
Aluminium	7429-90-5	10-40%	-
Graphite (natural graphite) (Artificial graphite)	7782-42-5 7740-44-0	10-20%	-
Copper foil	7440-50-8	5-10%	Sensitisation of the skin group No. 2
Organic electrolyte	-	5-20%	Inflammable liquid

Hazards Identification

For the battery cell, chemical materials are stored in a hermetically sealed case designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if exposed to fire, added mechanical shocks, decomposed, added electric stress by misuse, the gas released vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released. Moreover, if heated strongly by a surrounding fire, acrid gas may be emitted

Most important hazards and effects

Human health effects:

- Inhalation: The steam of the electrolyte has an anaesthesia action and stimulates a respiratory tract.
- Skin contact: The steam of the electrolyte stimulates a skin. The electrolyte skin can cause a sore if in contact with your skin.
- Eye contact: The steam of the electrolyte can cause sore eyes.
- Specific hazards: If the electrolyte is in contact with water, it will generate hydrogen fluoride. This electrolyte is inflammable. Do not expose to fire.

First Aid Measures

Internal cell materials of an opened battery cell

- Inhalation:
Make the victim blow his/her nose, gargle. Seek medical attention if necessary.
- Skin contact:
Remove contaminated clothes and shoes immediately. Wash the adhere or contact region with soap and plenty of water immediately.
- Eye contact:
Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

A battery cell and internal cell materials of an opened battery cell

- Ingestion:
Induce vomiting. When it is impossible or the feeling is not well after vomiting, seek medical attention

Fire Fighting Measures

- Suitable extinguishing measures : Water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing, and fire foam.
- Specific hazards: Corrosive gas may be emitted during fire.
- Specific methods of fire-fighting:
When the battery burns with other combustibles use the fire-extinguishing method which corresponds to the combustibles. Extinguish a fire from the windward direction as much as possible.

Accidental Release Measures

Internal cells materials, such as electrolyte leaked from battery cell, should be dealt with as follows:

- Personal precautions: Remove leaked materials with protective equipment. Do not inhale the gas .
- Environmental precautions: Battery should be disposed of according to the disposal section.

Handling and Storage

- Handling: The battery pack and enclosed cells should not be opened. Do not expose to fire or high temperature. Do not soak cells in water. Do not expose to strong oxidizers. Do not crush.
- Storage: Avoid direct sunlight, high temperature, high humidity. Store in a cool place

Exposure Controls / Personal Protection

No personal protection is necessary during normal use. In case of exposure to internal cell materials wash affected area for at least 15 minutes.

Physical and Chemical Properties

- Physical state: Solid. Insoluble in water.
- Odour, pH, vapour pressure etc are not applicable

Stability and Reactivity

- Stability: Stable under normal use.
- Conditions to avoid: Exposure to high temperature or fire and crushing.
- Hazardous decomposition products: None during normal use

Toxicological Information

No known toxicological properties of the batteries during normal handling and use.

Ecological Information

No known ecological risks of the batteries during normal use and handling.

Disposal Considerations

- Entel Li-Ion batteries contain recyclable material. We recommended safe and environmentally responsible disposal where local recycling facilities exist. Do not dispose of in a fire.

Transport Information

These batteries meet the requirements for exemption from dangerous goods regulations under:

- Codes and classifications according to international regulations for transport air.
IATA-DGR: special provision A45
- Codes for classification according to International Maritime Dangerous Goods.
UN classification number: Class 9 3090

Regulatory Information

These batteries are considered as non dangerous as they meet all the requirements of special provision A45 and Class 9 3090.

Other Information

- The information contained in this Safety data sheet is made in good faith and is based on the present state of knowledge and current legislation. Entel disclaims all liability in respect of the information implied or expressed. Equivalent information is available from the cell manufacturer.



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Agenda item 19

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**Adopted on 5 December 2003
(Agenda item 19)**

IMO GUIDELINES ON SHIP RECYCLING

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety, the prevention and control of marine pollution from ships and other matters concerning the effect of shipping on the marine environment,

NOTING the growing concerns about environmental safety, health and welfare matters in the ship recycling industry, and the need to reduce the environmental, occupational health and safety risks related to ship recycling and, at the same time, securing the smooth withdrawal of ships that have reached the end of their operating lives,

NOTING ALSO the roles of the International Labour Organization, the Basel Convention and other stakeholders in ship recycling,

HAVING CONSIDERED the Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships, adopted by the Sixth Meeting of the Conference of Parties to the Basel Convention, and the Guidelines on Safety and Health in Shipbreaking, developed by the International Labour Organization (ILO),

HAVING CONSIDERED ALSO the Code of Practice on Ship Recycling developed by the shipping industry to establish a body of best practice for shipping companies to adopt in respect of ships destined for recycling,

RECOGNIZING that, in order to contribute towards improvements in ship recycling, it is necessary to consider the ship throughout its life cycle,

RECOGNIZING ALSO that the use of hazardous materials should be minimized in the design, construction and maintenance of ships, without compromising their safety and operational efficiency, and that there is a need to prepare ships for recycling in such a manner as to reduce environmental and safety risks and health and welfare concerns as far as practicable,

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HAVING CONSIDERED the recommendation made by the Marine Environment Protection Committee at its forty-ninth session,

1. ADOPTS the IMO Guidelines on Ship Recycling set out in the annex to the present resolution;
2. INVITES Governments to take urgent action to apply the annexed Guidelines, including the dissemination thereof to the shipping and ship recycling industries, and to report to the Marine Environment Protection Committee on any experience gained in their implementation;
3. REQUESTS the Marine Environment Protection Committee to keep this matter under review with a view to further developing the Guidelines in the future;
4. REQUESTS FURTHER that the Marine Environment Protection Committee consider the most appropriate means to promote the implementation of the Guidelines, including a review of the progress made in achieving their intended purpose;
5. URGES the Marine Environment Protection Committee to continue co-operating with the International Labour Organization and the appropriate bodies of the Basel Convention in this field and to encourage the involvement of other stakeholders.

ANNEX

IMO GUIDELINES ON SHIP RECYCLING

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1 INTRODUCTION

1.1 Ships, at some stage, reach the end of their operating life. The life cycle for most ships, from “cradle to grave” or “makers to breakers”, gives a life span of operation of 20-25 years, or more. In 2001, the OECD noted an increasing casualty rate for older ships remaining in operation, especially for bulk ships and tankers. The steady withdrawal of older ships and their replacement by new tonnage, therefore, is a natural commercial process which provides the opportunity for the introduction of safer and more environmentally friendly designs, greater operating efficiency and a general reduction in marine risk.

1.2 In general, recycling is one of the basic principles of sustainable development. For the disposal of time-expired ships there are few alternatives to recycling – lay-up only postpones the issue; there is only a limited opportunity to convert ships for other uses such as storage facilities, breakwaters or tourist attractions; scuttling, strictly controlled by the London Convention, gives no opportunity for the steel and other materials and equipment in a ship to be recycled.

1.3 So, recycling is, generally, the best option for all time-expired tonnage. Furthermore, demand for ship recycling is expected to rise in the near future as ships, particularly oil tankers, which do not conform to the new international requirements set by the MARPOL Convention, reach the end of their commercial lives.

1.4 While the principle of ship recycling is sound, the working practices and environmental standards in the recycling facilities often leave much to be desired. Although responsibility for conditions in the recycling facilities has to lie with the countries in which they are situated, other stakeholders can contribute towards minimising potential problems related to health, safety and protection of the environment in the recycling facilities and should apply these Guidelines.

1.5 These Guidelines have been developed to give guidance to all stakeholders in the ship recycling process. This includes flag, port and recycling States, authorities of shipbuilding and maritime equipment supplying countries, as well as relevant intergovernmental organisations and commercial bodies such as shipowners, shipbuilders, marine equipment manufacturers, repairers and recycling facilities. Additional stakeholders include workers, local communities, environmental and labour bodies.

1.6 These Guidelines seek to:

- .1 encourage recycling as the best means to dispose of ships at the end of their operating lives;
- .2 provide guidance in respect of the preparation of ships for recycling and minimising the use of potentially hazardous materials and waste generation during a ship’s operating life;
- .3 foster inter-agency co-operation; and
- .4 encourage all stakeholders to address the issue of ship recycling.

1.7 In general, these Guidelines accept that the obligation for environmental and worker protection in ship recycling facilities must rest with the recycling facility itself and with the regulatory authorities of the country in which the recycling facility operates. Nevertheless, it is acknowledged that shipowners and other stakeholders have a responsibility to address the issues involved.

2 APPLICATION

2.1 These Guidelines have been developed to provide guidance to flag, port and recycling States, shipowners, shipbuilders, marine equipment suppliers, and recycling facilities as to “best practice”, which takes into account the ship recycling process throughout the life cycle of the ship.

2.2 They take into account the "Industry Code of Practice on Ship Recycling"* and complement other international guidelines addressing this issue; notably those produced by the Conference of Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal focusing on issues related to ship recycling facilities** and those of the International Labour Organization addressing working conditions at the recycling facilities***. Further information on the above-mentioned guidelines is provided in sections 9.5 and 9.6 of these Guidelines. The provisions of other international instruments, or work of their governing bodies, may be applicable to those ship recycling activities addressed by these Guidelines. The Montreal Protocol on Substances that Deplete the Ozone Layer, the Stockholm Convention on Persistent Organic Pollutants (POPs), the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention 1972) and the United Nations Convention on the Law of the Sea are relevant.

3 DEFINITIONS

For the purpose of these Guidelines:

Administration means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly the flag of a State, the Administration is the Government of that State. With respect to fixed or floating platforms engaged in exploration and exploitation of the sea-bed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purpose of exploration and exploitation of their natural resources, the Administration is the Government of the coastal State concerned.

Existing ship means a ship which is not a new ship.

Hazardous material means materials posing harm to human health or the environment identified in the IMDG Code, the Basel Convention, or other international authorities or instruments.

New ship means a ship:

- .1 for which the building contract is placed on or after 31 December 2003; or

* In co-operation with other industry organizations, ICS has produced the "Industry Code of Practice on Ship Recycling", outlining the measures that shipowners should be prepared to take prior to recycling (see www.marisec.org/recycling).

** Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships adopted by the Sixth Meeting of the Conference of Parties to the Basel Convention on 13 December 2002, (see www.basel.int).

*** Guidelines on Safety and Health in Shipbreaking developed by the International Labour Organization (ILO), (see www.ilo.org/public/english/protection/safework/sectors/shipbrk/index.htm).

- .2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 30 June 2004; or
- .3 the delivery of which is on or after 31 December 2006.

Organization means the International Maritime Organization (IMO).

Recycling facility means a site, yard or facility used for the recycling of ships which is authorized or permitted for this purpose by the competent authority of the State where the site, yard or facility is located (Recycling State).

Ship means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms and a vessel that has been stripped of equipment or is towed.

Shipowner means the person or persons or company registered as the owner of the ship or, in the absence of registration, the person or persons or company owning the ship. However, in the case of a ship owned by a State and operated by a company which in that State is registered as the ship's operator, "owner" shall mean such company. This term also includes those who have ownership of the ship for a limited period pending its sale to a recycling facility.

Ship Recycling means all associated operations including, mooring or beaching, dismantling, recovery of materials and reprocessing.

The operating life of a ship means the time when it is capable of performing its current functions.

4 IDENTIFICATION OF POTENTIALLY HAZARDOUS MATERIALS

4.1 The principal materials of a ship (e.g., steel, aluminium) are not an overriding concern from the standpoint of human health or marine pollution. However, there are a number of potential sources of concern that should be addressed—such as:

- .1 fuel, lubricants, and coolants;
- .2 floatable materials (e.g., plastics, Styrofoam insulation);
- .3 materials possibly containing PCBs such as wiring insulation;
- .4 sludges;
- .5 harmful aquatic organisms in ballast water; and, currently (on older ships)
- .6 asbestos used as insulation material and in accommodation panelling.

4.2 Items on ships that may potentially contain substances of concern include:

- .1 electrical equipment (e.g., transformers, batteries, accumulators);
- .2 coolers;
- .3 scrubbers;
- .4 separators;

- .5 heat exchangers;
- .6 storage facilities for production and other chemicals;
- .7 tanks, diesel tanks including bulk storage tanks;
- .8 stored solvents, and other chemical stocks;
- .9 paints;
- .10 electrical cabling installed before 1975 (plastic covering may contain PCBs);
- .11 sacrificial anodes;
- .12 fire extinguishing and fire fighting equipment;
- .13 piping, valves and fittings;
- .14 pumps and compressors;
- .15 engines and generators;
- .16 oil sumps;
- .17 hydraulic systems; and
- .18 light fittings and fixtures.

4.3 In identifying potentially hazardous materials on board ships, there are two key lists to consider for guidance, which are set out as Appendices 1 and 2 to these Guidelines: Appendix 1 is based on the "List of Hazardous Wastes and Substances under the Basel Convention that are relevant to Ship Dismantling" (Appendix B to the "Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships"), and Appendix 2 is based on the list of "Potentially hazardous materials which may be on board vessels delivered to recycling yards" (Annex 1 of the "Industry Code of Practice on Ship Recycling").

5 GREEN PASSPORT

5.1 The Green Passport for ships is a document facilitating the application of these Guidelines providing information with regard to materials known to be potentially hazardous utilised in the construction of the ship, its equipment and systems. This should accompany the ship throughout its operating life. Successive owners of the ship should maintain the accuracy of the Green Passport and incorporate into it all relevant design and equipment changes, with the final owner delivering the document, with the ship, to the recycling facility.

5.2 The Green Passport should contain, at least, the following information:

.1 Ship details:

- .1 the name of the State whose flag the ship is entitled to fly;
- .2 the date on which the ship was registered with that State;
- .3 the date on which the ship ceased to be registered with that State.
- .4 the ship's identification number (IMO number);
- .5 hull number on new-building delivery;
- .6 the name and type of the ship;
- .7 the port at which the ship is registered;
- .8 the name of the shipowner and its address;
- .9 the name of all classification society(ies) with which the ship is classed;
- .10 the ship's main particulars (Length overall (LOA), Breadth (Moulded), Depth (Moulded), Lightweight);
- .11 shipbuilder's name and address;

.2 Inventory of the materials known to be potentially hazardous, containing the location and the approximate quantity/volume of each identified material on board the ship, split into the following parts:

- Part 1 - Potentially hazardous materials in the ship's structure and equipment
- Part 2 - Operationally generated wastes
- Part 3 - Stores

5.3 Any changes relating to the entries referred to in paragraph 5.2 should be recorded in the Green Passport so as to provide updated and current information together with the history of the changes.

5.4 Ship details referred to in paragraph 5.2.1 should be included in the Green Passport by the shipowner.

5.5 Part 1 of the inventory of potentially hazardous materials should be prepared:

- .1 for new ships by the shipbuilder, in consultation with the equipment manufacturers, at the construction stage and passed to the shipowner;
- .2 for existing ships by the shipowner, as far as is practicable and reasonable, by reference to ship's plans, drawings, manuals, technical specifications and ship stores manifests, in consultation with the shipbuilder, equipment manufacturers and others as appropriate.

5.6 Parts 2 and 3 should be prepared by the shipowner prior to the final voyage to the recycling facility.

5.7 The format contained in Appendix 3 may be used as a model for the preparation of the inventory referred to in paragraph 5.2.2.

5.8 Administrations, designers, shipbuilders, and equipment manufacturers should take measures to facilitate the preparation of the Green Passport.

6 PROCEDURES FOR NEW SHIPS RELATED TO SHIP RECYCLING

6.1 Minimization of hazardous substances used in the construction of new ships and their equipment

6.1.1 Some of the problems associated with ship recycling might be addressed at the design and construction stage, not only in relation to the ships themselves but also in respect of ships' equipment. The first step is to identify any potentially hazardous materials which might be incorporated, as a matter of routine, in the structure of ships and their equipment (see Section 4) and, where practicable, consider using less hazardous alternatives.

6.1.2 The second step is to minimize hazardous materials generated during the operating life of a ship and at the end of a ship's life. Shipbuilders should already be aware of the need to minimize emissions and hazardous wastes to a level as low as reasonably achievable.

6.1.3 The initial stages might include an evaluation of:

- .1 the type, amount and potential hazard of materials utilized and their location on board a ship;
- .2 the activities expected during the operation of the ship and any potentially hazardous wastes which might be generated; and
- .3 the feasibility of addressing the potential for hazardous waste generation by considering:
 - .1 product reformulation – installing components utilizing less potentially hazardous materials;
 - .2 cleaner production technologies – which generate less wastes;
 - .3 process modification – to generate less waste;
 - .4 input substitution – utilizing less potentially hazardous consumables or those which generate less waste; and
 - .5 on-site, closed-loop recycling – systems that recycle wastes on board the ship.

6.1.4 Ship designers and shipbuilders are encouraged to take due account of the ship's ultimate disposal when designing and constructing a ship, by:

- .1 using materials which can be recycled safely and in an environmentally sound manner; and
- .2 minimizing the use of materials known to be potentially hazardous to health and the environment.

6.1.5 In general terms, if opportunities exist, ship or equipment designers should recommend designs to ship operators that minimize or prevent waste at source and at the end of the operating life of the ship. Similarly, shipowners and operators should ask for such design considerations for new buildings and retrofits.

6.1.6 Administrations and the competent authorities of ship building States are encouraged to advise shipbuilders to limit the use of hazardous materials in the construction of ships.

6.1.7 The competent authorities of ship building States have a role in encouraging research into the use of less potentially hazardous materials in the construction of ships and promoting the use of techniques which, without compromising safety or operational efficiency, contribute towards the facilitation of the recycling operation.

6.1.8 Substances prohibited or restricted by international conventions such as the Stockholm Convention on Persistent Organic Pollutants (POPs), the Montreal Protocol on Substances that Deplete the Ozone Layer, and the International Convention on the Control of Harmful Anti-fouling Systems on Ships, should not be used in the construction, refit and repair of ships.

6.2 Design of ships and ships' equipment to facilitate recycling and removal of hazardous materials

6.2.1 Ship designers and shipbuilders, without compromising safety or operational efficiency, should take due account of the ship's ultimate disposal when designing and constructing a ship, by considering:

- .1 structural designs that could facilitate ship recycling;
- .2 equipment designs that facilitate removal from ships during recycling;
- .3 the use of structural materials that can be readily recycled;
- .4 providing to the new owner a brief technical document advising on the optimal approach for recycling the ship;
- .5 the use of recycled materials in ship or equipment designs;
- .6 limiting the use of materials that are difficult to separate into their specific individual substances or components; and
- .7 taking measures to facilitate the removal of such materials.

6.2.2 Manufacturers of marine equipment that contain hazardous substances should be encouraged to design them so as to facilitate the safe removal of those substances, or give advice as to how such substances can be safely removed, at the end of the working life of the equipment.

6.3 Preparation of the Green Passport

Shipowners and shipbuilders should prepare the Green Passport in accordance with section 5.

6.4 Minimization of the use of potentially hazardous substances

Shipowners should make every effort to minimize the amount of potentially hazardous materials on board the ship, including those carried as stores, during routine or major maintenance or major conversions, seeking assistance from other parties as necessary.

6.5 Minimization of waste generation

Ship operators should continuously seek to minimize hazardous waste generation and retention during the operating life of a ship and at the end of a ship's life.

7 PROCEDURES FOR EXISTING SHIPS RELATED TO SHIP RECYCLING

7.1 Preparation of the Green Passport

Shipowners should prepare the Green Passport in accordance with section 5.

7.2 Minimization of the use of potentially hazardous substances

7.2.1 Shipowners should make every effort to minimize the amount of potentially hazardous materials on board the ship, including those carried as stores, during routine or major maintenance or major conversions, seeking assistance from other parties as necessary.

7.2.2 The points listed in section 6.1.3 for new ships should be considered when seeking to minimize hazardous materials aboard existing ships.

7.3 Minimization of waste generation

Ship operators should continuously seek to minimize hazardous waste generation and retention during the operating life of a ship and at the end of a ship's life.

8 PREPARATIONS FOR SHIP RECYCLING

8.1 Selection of the recycling facility

8.1.1 A recycling facility should have the capability to recycle the ships it purchases in a manner consistent with national legislation and relevant international conventions. This capability should be monitored by the appropriate national authority and should be in compliance, in particular, with the relevant Guidelines developed by ILO (Guidelines on Safety and Health in Shipbreaking) and the Basel Convention (Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships).

8.1.2 Information on the above is not, currently, widely available. Competent authorities in recycling States should assess the capabilities of their recycling facilities and make available the results of those assessments.

8.1.3 In selecting the recycling facility, a shipowner, in consultation with competent authorities of the recycling State, should consider, in the context of the above guidelines, the working practices and facilities in the ship recycling facility in question, including:

- .1 its ability to handle safely, and dispose of properly, any potentially hazardous materials that may be present in the ship such as asbestos, PCBs, halons, petroleum products and other residues;
- .2 the provision of appropriate and sufficient personal protection and safety equipment;

- .3 the ability of a recycling facility to maintain and monitor the ship in a gas free condition and approved “fit for hot work” during the whole process of ship recycling; and
- .4 other information such as safety records, training programmes for workers and assessment of the work quality.

8.1.4 Some recycling facilities may be capable of recycling almost any ship in an “as is” condition. Others, even though technically advanced, may not be able to properly manage any resulting hazardous materials or wastes. In such cases, shipowners should, following discussions with the recycling facility, arrange to remove and properly dispose of those materials that the facility cannot manage.

8.1.5 Where, after investigation, it is assessed that the selected recycling facility has no means of managing hazardous materials or wastes in a manner consistent with national law and relevant international instruments and guidelines, the shipowner should arrange for the removal of those materials to another appropriate facility or ensure that the facility obtains the technical capability to do so.

8.1.6 While recycling facility selection is made on a commercial and risk management basis, shipowners should select facilities that are best capable of managing all relevant hazardous materials and wastes arising from the recycling process.

8.1.7 In addition to the considerations set out above, the shipowner should consider the following:

- .1 establishing the procedures to be used by the recycling facility in removing and properly disposing of any potentially hazardous materials;
- .2 specifying the method of recycling in the recycling contract;
- .3 reserving in the recycling contract the right to monitor the recycling process; and
- .4 contractual provisions for incentive payments to ensure the recycling is carried out in accordance with the relevant guidelines.

8.1.8 The shipowner, having selected a recycling facility to recycle a ship, should inform the Administration and the competent authority of the recycling State accordingly.

8.2 Delivery of the ship to the recycling facility

8.2.1 At the end of a ship's operating life the shipowner is responsible for delivery of the ship to the recycling facility as described in the contract with the facility. In addition, the shipowner should provide the recycling facility with the ship's Green Passport and, if available, any technical advice from the shipbuilder or equipment supplier on dismantling as described in these Guidelines.

8.2.2 Shipowners should ensure that appropriate insurance is in place to cover response and liability in respect of the voyage of the ship to the recycling facility. Shipowners should also have in place contingency arrangements in the event that either the ship is unable to complete the voyage to the recycling facility (e.g. due to bad weather), or the recycling facility is unable to accept delivery of the ship (shutdown of operations, etc.).

8.2.3 The shipowner, having delivered a ship to a recycling facility, should inform the Administration accordingly in order to deregister the ship.

8.3 Preparation of a ship for recycling

8.3.1 General

8.3.1.1 The preparation of a ship for recycling should address occupational safety and health, environmental issues and the safe operation of the ship prior to and on its final voyage to the recycling facility. Conditions on the ship that may threaten worker safety at the recycling facility should, to the extent practicable, be identified by the shipowner, seeking assistance from other parties if required, and either be rectified or reported to the recycling facility to ensure that appropriate safety precautions are taken. Ideally, a facility should be capable of recycling the whole ship in a responsible way.

8.3.1.2 With regard to potentially hazardous materials which cannot be safely removed and properly disposed of by the purchasing recycling facility, the shipowner should, consistent with the safe operation of the ship, either:

- .1 remove these materials from the ship elsewhere in a manner that is consistent with relevant national and international legislation and relevant guidelines; or
- .2 minimize these materials in amount and location and report to the recycling facility to ensure that suitable arrangements can be made for their reclamation, recycling or disposal.

8.3.1.3 The preparation of the ship for recycling is, to a large extent, dependent on the capabilities of the recycling facility and the requirements of the relevant national authority as referred to in section 8.1.1 of these Guidelines.

8.3.2 Ship recycling plan

8.3.2.1 The preparation of the ship for recycling should begin before the ship arrives at the recycling facility and the recycling facility should work with the shipowner before the delivery of the ship in determining the extent of pre-recycling work that is desirable.

8.3.2.2 The development and implementation of a recycling plan can help ensure that a ship has been prepared to the maximum extent possible prior to its recycling and that the safety of the ship, prior to delivery, has been taken into account. The plan should be developed by the recycling facility in consultation with the shipowner, taking into account the potential hazards which may arise during the recycling operation, the relevant national and international requirements and the facilities available at the relevant recycling facility in terms of materials, handling and the disposal of any wastes generated during the recycling process.

8.3.2.3 A major purpose of the plan is to ensure that wastes potentially contributing to pollution of the environment or potential hazards to worker health and safety, are properly identified and handled.

8.3.2.4 The recycling plan should take into account *inter alia*:

- .1 the Green Passport (section 5);
- .2 any technical advice from the shipbuilder;
- .3 details of the ship's operational equipment and potential sources, amounts and relative hazards of potential contaminants (including chemical and biological) that may be released to the environment as indicated by the inventory; and
- .4 potential hazards to worker safety that may arise during the recycling operation.

8.3.2.5 Agreement to implement the recycling plan should be part of the contract between shipowner and facility.

8.3.2.6 Technical considerations to assist in developing the ship recycling plan include, but are not limited to, the following:

- .1 suggestions for planning work;
- .2 general notes on salvage;
- .3 ship stability during clean-up and transits;
- .4 tank cleaning;
- .5 cleaning compartments with bilges;
- .6 dealing with piping and fittings;
- .7 cleaning fitted machinery;
- .8 suggestions on handling waste.

8.3.3 Preparations to prevent pollution

8.3.3.1 The last owner of a ship sold for recycling should, consistent with the safe operation of the ship:

- .1 minimize the quantities of fuel, diesel, lubricating, hydraulic and other oils and chemicals on board at delivery to the facility;
- .2 if the facility is not equipped with reception facilities, remove wastes at the last port with reception facilities before delivery of the ship to the recycling facility;
- .3 ensure that the Green Passport is completed in accordance with section 5;

- .4 take measures to facilitate the controlled drainage, by the recycling facility, of potentially harmful liquids from the ship; and
- .5 take measures to ensure that the ship's ballast water is managed in accordance with the relevant international or national standards and requirements.

8.3.3.2 Among the items which may be considered by the shipowner in consultation with the recycling facility in accordance with paragraph 8.3.1 prior to recycling, consistent with the safe operation of the ship, are:

- .1 the removal and safe disposal of asbestos or, alternatively, the clear marking of any Asbestos Containing Materials (ACMs) or Presumed Asbestos Containing Materials (PACMs);
- .2 the discharge of halon to an approved facility and the use of portable and returnable fire-fighting equipment for the final voyage to the recycling site;
- .3 the removal of materials remaining in tanks or piping, to the maximum extent possible (including fuel, lubricating oils, hydraulic fluids, cargoes and their residues, and grease). Drummed, tanked, or canned liquids or gaseous materials should be removed from the ship. All materials removed should be managed in an environmentally sound manner (e.g., recycling and, in certain cases, onshore incineration);
- .4 the removal of equipment containing liquid PCBs;
- .5 the identification of capacitors and transformers containing dielectric fluid;
- .6 the removal of residues from parts of the ship used for storage of fuel or chemical stocks such as tanks (these areas should be flushed and cleaned);
- .7 the provision of advice on the nature of any hazardous materials on board, as in the inventory of potential hazardous materials; and
- .8 the clear marking of other potentially hazardous materials and spaces on board the ship.

8.3.4 Preparations to protect occupational health and safety

8.3.4.1 Prior to recycling, the shipowner should, in accordance with paragraph 8.3.1 and consistent with the safe operation of the ship:

- .1 in connection with the delivery of a ship, provide or arrange for a gas-free certificate or hot work safe certification as applicable, issued by a relevant and appropriate body, for enclosed spaces on board ship (It should be recognized that any such certification is valid only at the time it is issued and that such certification should not discourage the ship recycling facility from conducting their own inspections of such areas);

- .2 ensure that any compartments on the ship which may contain an oxygen-deficient atmosphere are clearly marked as such, and that the facility is duly notified of these and other hazardous enclosed spaces. (This should not preclude or discourage recycling facilities from conducting similar inspections);
- .3 ensure that any area of the ship where there may be structural integrity problems (e.g., collision damage) are identified and their location indicated to avoid collapses and accidents; and
- .4 ensure that any area of the ship where there are critical support structures that should be dismantled in a way that avoids accidental structural collapse are identified and their location indicated.

8.3.4.2 Guidance with regard to safe working practices and procedures for hot work and entry into enclosed spaces on board ships which are provided in circular MSC/Circ.1084 "Principles for hot work on board all types of ships" and in Assembly resolution A.864(20) "Recommendations for entering enclosed spaces aboard ships", are presented in Appendices 4 and 5 to these Guidelines.

9 ROLE OF STAKEHOLDERS AND OTHER BODIES

9.1 General

9.1.1 In recent years, certain Governments and other bodies have been developing and implementing incentive mechanisms and programmes to promote quality shipping that operates in an environmentally sound manner. The "Green Award" programme, created through the Port of Rotterdam, is one example. The reduction and minimization of hazardous materials aboard ships during their operating lives is often a key component of these incentive mechanisms. This contributes to reducing the hazardous materials that recycling facilities must manage at the end of ships' operating lives.

9.1.2 Another example of an incentive mechanism is a financial benefit for recycling facilities that meet sound environmental requirements, e.g. lower import taxes could make "green facilities" more competitive and ease the choice of a shipowner in favour of human health and environment.

9.1.3 The development of such incentive mechanisms for operating cleaner shipping by Governments and other bodies, therefore, can significantly assist the implementation of these Guidelines. Administrations and other stakeholders should consider such mechanisms.

9.2 Role of the flag State

The role of the Administration covers the whole operating life of a ship (including its final voyage) and, during that life it should ensure that the ship complies with applicable IMO conventions and other relevant requirements for as long as the ship is operational. Administrations should promote the application of these Guidelines.

9.2.1 Criteria for “ready for recycling” conditions

Administrations should establish criteria to declare a ship "ready for recycling". The basic criteria would be the completion of the work to prepare a ship for recycling, set out in section 8 of these Guidelines.

9.2.2 Implementation

Administrations should:

- .1 promote the use of a ship recycling sale and purchase contract, such as DEMOLISHCON, the BIMCO standard contract, in order to ensure that full account is taken of all relevant environmental, health and safety considerations included in these Guidelines; and
- .2 co-operate with recycling States to facilitate the implementation of the Guidelines.

9.3 Role of the port State

The port State assumes a role in verifying compliance with international maritime conventions by the inspection of foreign ships in national ports to check that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with these rules. The port State functions also in respect of recycling of ships as a supplement to flag State control, when it executes port State control.

9.3.1 Port State control procedures for ships destined for recycling

9.3.1.1 Ships destined for recycling are subject to current port State control procedures, as any other ship, in accordance with applicable international regulations.

9.3.1.2 Co-ordination between the port State and the flag State is encouraged to ensure the ship meets all relevant IMO requirements, and any other applicable requirements, at all times.

9.3.2 Implementation

Port States should:

- .1 promote the widespread use of these IMO Guidelines within the industry; and
- .2 co-operate with flag States and recycling States to facilitate implementation of the Guidelines.

9.4 Role of the recycling State

9.4.1 General

9.4.1.1 The role of the recycling State is to enforce international obligations and national legislation in respect of worker safety, health and welfare, and the protection of the environment in the ship recycling industry, in particular, with respect to hazardous and other wastes handled at a recycling facility.

9.4.1.2 The recycling State should introduce national regulations in relation to the condition of ships purchased for recycling, both at the time of purchase and at the time of delivery. In effect, the recycling State should lay down any conditions it considers necessary before a ship is accepted for recycling.

9.4.1.3 The Green Passport, including its inventory of potentially hazardous materials, which should be delivered to the recycling facility by the last owner of the ship, gives information which might be demanded by the recycling State as to the materials on the ship. The recycling State should check that any potentially hazardous wastes which might be generated during the recycling operation can be safely handled before it accepts the ship for recycling.

9.4.1.4 After the ship has been accepted, the recycling State is responsible for monitoring the safe handling of any hazardous materials generated during the recycling process.

9.4.1.5 Competent authorities in recycling States should assess the capabilities of their recycling facilities and make available the results of those assessments.

9.4.2 Reception facilities for ship-generated wastes

9.4.2.1 MARPOL 73/78 provisions require the Government of each Party to ensure the provision of adequate port reception facilities without causing undue delay. For example, regulation 12(1) of Annex I to MARPOL 73/78 requires Governments to provide reception facilities “at oil loading terminals, repair ports, and in other ports in which ships have oily residues to discharge” which are “adequate to meet the needs of the ships using them”. Regulation 12(2)(c) extends this to “all ports having ship repair yards or tank cleaning facilities”.

9.4.2.2 Regulation 17(1)(c) of Annex VI of MARPOL 73/78 requires the Government of each Party to the Protocol of 1997 to ensure the provision of port reception facilities adequate to meet the needs in ship recycling facilities for the reception of ozone-depleting substances and equipment containing such substances when removed from ships.

9.4.2.3 While only Annex VI of MARPOL 73/78 requires explicitly the provision of reception facilities at recycling facilities, Governments of recycling States should ensure that, in authorizing a recycling activity, adequate reception facilities are in place.

9.4.2.4 The IMO Manual for Port Reception Facilities provides detailed guidance to manage ship-generated wastes. The Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships, adopted by the Conference of the Parties to the Basel Convention, also provides guidance.

9.4.3 Measures for the control of ships delivered for recycling

9.4.3.1 Recycling States should, in their national legislation, lay down the conditions under which ships may be accepted into their State as imports for recycling and, equally, define and enforce appropriate worker health and safety requirements.

9.4.3.2 Recycling States should introduce and enforce legislation which requires that all ships being recycled have a gas-free certificate or hot work safe certification as applicable, issued by a relevant and appropriate body, for enclosed spaces on board ship.

9.4.3.3 Recycling States should also promote that those acting on behalf of recycling facilities in purchasing ships for recycling utilize a standard ship recycling contract, such as DEMOLISHCON, the BIMCO standard contract document, in order to ensure that full account is taken of all relevant environmental, health and safety considerations included in these Guidelines.

9.4.3.4 The recycling facility should be required by the recycling State to check every ship before it accepts it for recycling. This check should ensure that the actual condition of the ship is consistent with these and other relevant international guidelines, the purchase contract, and that national requirements are fulfilled. From the moment the recycling facility accepts the ownership of the ship for recycling, the responsibility for the proper handling of any wastes generated lies with the facility.

9.4.4 Measures for the control of recycling facilities

9.4.4.1 The recycling State should introduce, implement, and enforce sound legislation and other requirements concerning the recycling of ships, including measures to authorize or license recycling facilities. To this end, recycling States should examine and, where necessary, adopt national legislation or requirements, any applicable internationally developed conventions, recommendations and guidelines relevant to the ship recycling industry such as these Guidelines and those produced by the International Labour Organization (ILO) and under the Basel Convention.

9.4.4.2 Those Authorities with responsibilities for recycling facilities should ensure that the handling and disposal of asbestos, oils and other hazardous substances, whether prior to the ship's arrival at the recycling facility, or subsequently, have been conducted in an acceptable manner.

9.4.4.3 The recycling State should also be prepared to give support to their facilities in the decision to accept or not to accept a ship for recycling. The facilities themselves are responsible for handling the ship and ensuring that the recycling operation is in compliance with national legislation and other national requirements.

9.5 The role of the Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was adopted in 1989 and entered into force in 1992. The main objective of this Convention is to protect human health and the environment against adverse effects caused by the generation, improper management and transboundary movements of hazardous and other wastes. One of the fundamental aims of the Basel Convention is to ensure that hazardous and other wastes are managed in an environmentally sound manner (ESM). Article 2, paragraph 8 of the Convention defines ESM to mean “taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes”.

(For more information on the Convention, and the obligations it imposes, see the Basel Convention website: www.basel.int.)

9.5.1 Environmentally sound dismantling of ships

9.5.1.1 In order to assist countries that have or wish to establish recycling facilities, the Conference of the Parties to the Basel Convention, at its sixth meeting in December 2002, adopted the Technical Guidelines for the Environmentally Sound Management and Full and Partial Dismantling of Ships, which provide information and recommendations on procedures,

processes, and practices that should be implemented to conform with the environmentally sound management obligations under the Convention. These Technical Guidelines provide guidance for Parties, where dismantling of ships occur, to fulfil their obligations under the Convention.

9.5.1.2 The Technical Guidelines are applicable to existing, as well as to new, ship recycling facilities. They include principles for the environmentally sound management of ship dismantling, good practice in environmental control procedures at ship recycling facilities, good practice in design, construction and operation of ship recycling facilities and how to achieve protection of the environment and human health. Under the Basel Convention, also other technical guidelines for specific operations and for specific wastes have been developed which may be relevant to ship recycling activities*.

9.5.2 Principle of notification and prior written consent

9.5.2.1 The Basel Convention addresses the transboundary movement of hazardous wastes. Although the legal aspects of ships destined for recycling are being considered under the Basel Convention, its provisions may provide some useful concepts to address transboundary concerns of the final voyages for ships destined for recycling.

9.5.2.2 A key component in the implementation of the Basel Convention is that transboundary movements of hazardous and other wastes covered by the Convention, occur with the prior written notification and consent of the importing State upon notification by the exporting State. The basic procedures under the Basel Convention are that the exporter notifies its Government (the exporting State) of the intended movement, the exporting State notifies transit and importing States, which respond to the notification by consent or refusal or seeking additional information before issuing the written consent.

9.6 The role of the International Labour Organization

9.6.1 The ILO is concerned with ship recycling where land-based workers in the industry can be exposed to an extremely dangerous work environment with a high accident rate. All major occupational risks - chemical, physical, biological, ergonomic and psychosocial - are present. Although not drafted with ship recycling in mind, a considerable number of existing ILO Conventions, Recommendations and Codes of Practice can be applied to deal with numerous occupational safety and health hazards and worker protection issues arising from ship recycling**. As a complement to the work undertaken in IMO and under the Basel Convention, ILO has adopted “Guidelines on Safety and Health in Shipbreaking”.

9.6.2 ILO will provide advice and guidance in helping countries to implement the “Guidelines on Health and Safety in Shipbreaking”, thereby improving working conditions at recycling facilities. It would also assist administrations in establishing criteria by which facilities might be ranked as meeting certain minimum requirements, as contained in its guidelines, in order to obtain Government approval. The ILO is invited to continue to develop programmes for raising awareness on improving working conditions at ship recycling facilities.

* www.basel.int.

** www.ilo.org.

9.7 The London Convention 1972/1996 Protocol

9.7.1 Dumping of vessels

9.7.1.1 The primary function of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Convention 1972) and of the 1996 Protocol to the London Convention 1972 is to control the disposal at sea of wastes or other matter. Under the London Convention the disposal at sea of industrial wastes and of radioactive wastes are prohibited, whereas under the London Protocol all disposal at sea is prohibited with certain exceptions. Both the Convention and the Protocol allow, in principle, the disposal at sea of decommissioned ships. However, in accordance with the “Specific Guidelines for Assessment of Vessels”^{*} which were adopted in 2000 as an authoritative interpretation of both the Convention and the Protocol, the assessment of any proposal for disposal at sea is required where recycling is considered one of the alternatives to disposal.

9.7.1.2 The “Specific Guidelines for Assessment of Vessels”, as a first step, work through a process of comprehensively examining alternatives to disposal at sea. If the option to recycle a ship is selected by the owner then the process for evaluation of the disposal at sea proposal stops. The process can, however, assist in preparing the vessel for the recycling option, as would be carried out similarly if it were disposed of at sea. The aforementioned guidelines outline in detail the equipment and contaminants aboard a vessel that should be removed prior to disposal. This process can be used as a guide for both shipowners, flag States and recycling States when preparing a ship for the recycling facility or the last voyage.

9.7.2 Abandonment of ships

9.7.2.1 One concern related to ship recycling is that the final shipowner, in order to avoid recycling costs (clean-up, structural repairs for last voyage, towing, insurance, etc.), may choose to abandon a ship at sea or in port. The abandonment of a ship at sea, for the purpose of its disposal, constitutes an uncontrolled dumping operation and, therefore, should be considered a violation of the London Convention/Protocol and subject to enforcement procedures of relevant Parties following investigation. The abandonment of a ship in port, with or without its crew, is not covered by the London Convention/Protocol, but would be a liability matter for the port State to pursue with the flag State and the shipowner. In cases where the crew is also abandoned, port States should be encouraged to ensure the care and safe return of crew members to their countries of origin, citizenship, or residence as appropriate and to pursue recovery of the costs of such measures with the parties responsible for the abandonment in accordance with the relevant international standards presently being discussed by the Joint IMO-ILO *Ad Hoc* Expert Working Group on Liability and Compensation regarding claims for Death, Personal Injury and Abandonment of Seafarers.

9.7.3 “Placement” of vessels on the sea-bed

Vessels, or parts thereof, are sometimes used for the construction of artificial reefs, or placed on selected locations for marine habitat enhancement or creation of a diving attraction. “Placement of matter for a purpose other than the mere disposal thereof” is excluded from the definition of “dumping” both under the London Convention and Protocol, provided such placement is not contrary to the aims of the Convention/Protocol and not used as an excuse for disposal at sea of

^{*} See www.londonconvention.org/4-Vessels.pdf.
I:\ASSEMBLY\23\RES\962.DOC

waste materials. Notwithstanding the distinct differences between “dumping” and “placement”, in practice, a vessel needs to be well prepared and cleaned for such operations. Some national administrations have chosen to apply their licensing system for dumping also to construction of artificial reefs, possibly using vessels, in order to control the materials used for such construction.

9.7.4 Reports under the London Convention regarding dumping of vessels

In most reports received by the London Convention Secretariat concerning permits issued by Contracting Parties for sea disposal of vessels, the removal of all floatable materials is mentioned, and the removal of all fuels, oils, liquid chemicals, and flushing of pipelines etc. Some national administrations have developed detailed clean-up standards for decommissioned vessels with particular attention given to disposal of vessels in shallow waters as diving attractions. In these standards, asbestos would not be removed from vessels as standard practice, as this does not harm the marine environment, but would be removed where there was a possibility of exposure to divers.

9.7.5 Options for disposal of decommissioned vessels

Controlled sea disposal operations of decommissioned vessels under the London Convention/Protocol, controlled placement activities of such vessels on the seabed in accordance with national regulations, and recycling of decommissioned vessels on land have the same goal of preventing pollution of the (marine) environment. However, recycling of decommissioned vessels on land, where this is possible, is the preferred option from the perspective of the London Convention/Protocol.

9.8 Role of the shipping industry

The co-operation between the shipowner and the recycling facility, before and during the recycling operation, is essential in facing and finally solving the problems associated with ship recycling. Shipowners and the recycling facilities should develop this co-operation.

The shipping industry should also continue its co-operation with the other stakeholders towards improving plans to decommission ships in a safe and environmental sound manner.

9.8.1 Industry Code of Practice on Ship Recycling

9.8.1.1 The Industry Working Party on Ship Recycling was established under the co-ordination of the International Chamber of Shipping (ICS) in February 1999 in response to growing concerns expressed by Governments, environmental groups and the industry itself regarding:

- .1 the legal position with respect to potentially hazardous substances on ships sold for recycling;
- .2 the working conditions and safety provisions for workers in recycling facilities; and
- .3 environmental controls at recycling facilities.

9.8.1.2 The Industry Group, recognising the concerns of various parties, has developed a Code of Practice, outlining a series of recommendations which would constitute “good practice” in respect of ships destined for recycling. This Code of Practice is available from the Industry Working Party participants*.

9.8.1.3 The shipping industry is encouraged to continue the further development of the “Industry Code of Practice on Ship Recycling”, seeking endorsement of and comments on its work from the Organization at regular intervals in the future.

9.8.2 Contract covering the sale and purchase of a ship for recycling

At the end of a ship’s operating life the shipowner is responsible for delivery of the ship as described in the contract, including all the documents in accordance with these Guidelines. Although contractual matters are the purview of the parties involved, it is recommended that sellers (shipowners) and purchasers (recycling facilities) use a standard contract that deals with all the relevant issues. BIMCO has revised its standard contract covering the sale of ships for recycling, DEMOLISHCON, to incorporate, in the standard terms and conditions, reference to the aforementioned "Industry Code of Practice on Ship Recycling". BIMCO is invited to consider revising DEMOLISHCON, taking into account these Guidelines.

9.9 The role of the ship recycling industry

9.9.1 The ship recycling industry itself is an important stakeholder with responsibilities for the adoption and implementation of these Guidelines even though the standards and methods of operation in those shore-based industries involved in ship recycling do not fall within the remit of IMO. However, the ship recycling industry has an important role in establishing control standards in their facilities that can contribute towards ensuring the safe and environmentally friendly disposal of time-expired ships.

9.9.2 The ship recycling industry should:

- .1 take due note of available technical guidance on ship recycling such as the guidelines adopted by ILO and the Parties to the Basel Convention and those developed by national bodies** and Recognised Organizations***;
- .2 develop a code of practice appropriate to that industry, as guidance on work practices in relation to shore-based activities in recycling facilities to ensure acceptable environmental, safety and health standards and to monitor its application;
- .3 encourage appropriate international bodies to endorse any such industry code of practice;
- .4 encourage recycling facilities to make available details regarding procedures for the chosen method for the safe handling of hazardous materials (e.g. asbestos, PCBs and PABs, halon/freon, oily residues) and working practices in enclosed spaces;

* www.marisec.org.

** EPA, A Guide to Ship Scrappers, Tips for Regulatory Compliance, Summer 2000.

*** Technical Report DNV RN 590, Decommissioning of Ships, Environmental Standards, Decommissioning Guidelines, The GUIDEC Approach.

- .5 improve the quality management system of the recycling facilities by implementing measures as proposed by the relevant technical guidelines and by improving the skills of the personnel and the quality of the equipment; and
- .6 establish adequate waste management systems.

9.10 Role of Other Interested Stakeholders

Other Interested Stakeholders are encouraged to contribute to addressing issues associated with ship recycling.

10 TECHNICAL CO-OPERATION

10.1 Ship recycling, if conducted in an environmentally sound and a safe manner, is a positive benefit to the overall environment and to specific national and local economies and represents the most viable method of disposing of the majority of time-expired tonnage. Therefore, if the transfer of technology or aid funding is necessary to improve facilities and working practices in the facilities, organizations or nation groupings with access to economic assistance funds should co-operate with the Governments concerned with recycling on actual infrastructure projects.

10.2 National or regional organizations should co-operate with Governments in ship recycling States and other interested parties on projects involving the transfer of technology or aid funding to improve facilities and working practices in the recycling facilities.

APPENDIX 1

LIST OF HAZARDOUS WASTES AND SUBSTANCES THAT ARE RELEVANT TO SHIP RECYCLING

(based on Appendix B to the "Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships, 2002").

This list is intended to be used for the identification of potentially hazardous materials inherent in the ship's structure and on board ships (see sections 4, 6 and 7) and is not part of the Green Passport.

The numbers in the tables refer to Annex VIII to the Basel Convention.

Table 1 Wastes and substances that may be inherent in the ship structure

Wastes	Possible waste-location on the ship
<i>A1 Metal and metal-bearing wastes</i>	
A1010 Metal wastes and waste consisting of alloys of any of the following:	
Antimony *	alloys with lead in lead-acid storage batteries, solder
Beryllium *	hardening agent in alloys, fuel containers, navigational systems
Cadmium *	bearings
Lead	connectors, couplings, bearings
Mercury	thermometers, bearing pressure sensors
Tellurium *	in alloys
A1020 Waste having as constituents or contaminants, excluding metal waste in massive form, any of the following:	
Antimony; antimony compounds *	fire retardation in plastics, textiles, rubber, etc.
Cadmium; cadmium compounds	batteries, anodes, bolts and nuts
Lead; lead compounds	batteries, paint coatings, cable insulation
A1030 Wastes having as constituents or contaminants any of the following:	
Arsenic; arsenic compound	Paints on the ships' structure
Mercury; mercury compounds	thermometers, light fittings, level switches
A1040 Wastes having as constituents any of the following:	
Hexavalent chromium compounds	paints (lead chromate) on the ships' structure
A1080 Waste zinc residues not included on list B, containing lead and cadmium in concentrations sufficient to exhibit Annex III characteristics	anodes (Cu, Cd, Pb, Zn)
A1160 Waste lead-acid batteries, whole or crushed	batteries: emergency, radio, fire alarm, start up, lifeboats
A1180** Waste electrical and electronic assemblies or scrap containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III (note the related entry on list B B1110)	level switches, light tubes and fittings (capacitors), electrical cables

<i>A2 Wastes containing principally inorganic constituents, which may contain metals and organic materials</i>	
A2010 Glass waste from cathode-ray tubes and other activated glasses	TV and computer screens
A2050 Waste asbestos (dusts and fibres)	thermal insulation, surfacing material, sound insulation
<i>A3 Wastes containing principally organic constituents, which may contain metals and inorganic materials</i>	
A3020 Waste mineral oils unfit for their originally intended use	hydraulic fluids, oil sump (engine, lub. oil, gear, separator, etc.), oil tank residuals (cargo residues)
A3140 Waste non-halogenated organic solvents but excluding such wastes specified on list B	antifreeze fluids
A3180 Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB), polychlorinated terphenyl (PCT), polychlorinated naphthalene (PCN) or polybrominated biphenyl (PBB), or any other polybrominated analogues of these compounds, at a concentration level of 50 mg/kg or more	capacitors in light fittings, PCB in oil residuals, gaskets, couplings, wiring (plastics inherent in the ships' structure)
<i>A4 Wastes which may contain either inorganic or organic constituents</i>	
A4030 Wastes from the production, formulation and use of biocides and phytopharmaceuticals, including waste pesticides and herbicides which are off-specification, outdated, or unfit for their originally intended use	paints and rust stabilizers, tin-based anti-fouling coatings on ships' bottoms
A4060 Waste oils/water, hydrocarbons/water mixtures, emulsions	sludge, chemicals in water, tank residuals, bilge water
A4070 Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish excluding any such waste specified on list B (note the related entry on list B B4010)	paints and coatings on the ships' structure
A4080 Wastes of an explosive nature (but excluding such wastes specified on list B)	compressed gases (acetylene, propane, butane), cargo residues (cargo tanks)
A4130 Waste packages and containers containing Annex I substances in concentrations sufficient to exhibit Annex III hazard characteristics	cargo residues

Footnotes:

- * If the component is present it is most likely bound in an alloy or present at a very low concentration.
- ** The ship components are also covered by other List A entries (overlapping).

Table 2 Wastes and substances that may be on board the ship

Wastes	Product where waste may be found
A1170 Unsorted waste batteries excluding mixtures of only list B batteries. Waste batteries not specified on list B containing Annex I constituents to an extent to render them hazardous.	portable radios, torches
A3140 Waste non-halogenated organic solvents but excluding such wastes specified on list B	solvents and thinners
A3150 Waste halogenated organic solvents	solvents and thinners
A4010 Wastes from the production, preparation and use of pharmaceutical products but excluding such wastes specified on list B	miscellaneous medicines
A4030 Wastes from the production, formulation and use of biocides and phytopharmaceuticals, including waste pesticides and herbicides which are off-specification, outdated, or unfit for their originally intended use	insecticide sprays
A4070 Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish excluding any such waste specified on list B (note the related entry on list B B4010)	paints and coatings
A4140 Waste consisting of or containing off specification or outdated chemicals corresponding to Annex I categories and exhibiting Annex III hazard characteristics	consumables

Table 3 Waste components that are relevant to ship recycling and which are not included in List A in the Basel Convention

Potentially hazardous materials not covered by List A in the Basel Convention:	Ship component
CFC (R12 - dichlorodifluoromethane, or R22 - chlorodifluoromethane)	refrigerants, styrofoam
Halons	fire fighting equipment
Radioactive material	Liquid-level indicators, smoke detectors, emergency signs
Microorganisms/ sediments	ballast water systems (incl. tanks)
Fuel oil, diesel oil, gas oil	

APPENDIX 2

POTENTIALLY HAZARDOUS MATERIALS WHICH MAY BE ON BOARD SHIPS DELIVERED TO RECYCLING FACILITIES

(based on Annex 1 to the “Industry Code of Practice on Ship Recycling, August 2001”)

This list is intended to be used for the identification of potentially hazardous materials on board ships (see sections 4, 6 and 7) and is not part of the Green Passport.

A. Operational Substances and Consumables

1. Cargo Residues including Slops
2. Dry tank Residues
3. Fuel oil, Diesel oil, Gas oil, Lubricating oil, Greases & Anti-seize Compounds
4. Hydraulic oil
5. Waste oils (contents of sludge tank)
6. Antifreeze fluids
7. Kerosene and White Spirit
8. Boiler and Feed Water Treatment Chemicals
9. Boiler and Feed Water Test Re-agents
10. De-ioniser Regenerating Chemicals
11. Evaporator Dosing and Descaling Acid
12. Domestic Water treatment Chemicals
13. Paints and Rust Stabilisers
14. Solvents and Thinners
15. Refrigerants (R12 or R22)
16. HALON
17. CO2 (in cylinders - engine room fire protection)
18. Acetylene, Propane and Butane
19. Hotel Services Cleaners
20. Lead-acid Batteries
21. Battery Electrolyte
22. PCB and/or PCT and/or PBB at levels of 50 mg/kg or more
23. Mercury
24. Radio-active Material i.e. liquid level indicators
25. Miscellaneous Medicines
26. Insecticide Sprays
27. Miscellaneous Chemicals such as Alcohol, Methylated Spirits, Epoxy Resins, etc.
28. Plastics as covered by MARPOL
29. Raw and Treated Sewage
30. Perfluorocarbons (PFCs)

B. Toxic Materials (as part of the ship's structure)

1. Asbestos
2. Lead-based Paint Coatings on Ship's Structure
3. Tin-based Anti-fouling Coatings on Ship's Bottoms
4. Others

APPENDIX 3**INVENTORY OF POTENTIALLY HAZARDOUS MATERIALS ON BOARD**

(Based on Annex 2 to the “Industry Code of Practice on Ship Recycling, August 2001”*)

This model inventory is part of the ship’s Green Passport (see section 5) and provides information with regard to materials known to be potentially hazardous and utilised in the construction of the ship, its equipment and systems. It may be supplemented, as appropriate, with technical information in respect of certain categories of potentially hazardous materials listed in this document, particularly with regard to their proper removal and handling.

* www.marisec.org/recycling.
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PART 1 - POTENTIALLY HAZARDOUS MATERIALS IN THE SHIP'S STRUCTURE AND EQUIPMENT

1A. Asbestos (Note: All asbestos containing materials (ACMs) or presumed asbestos containing materials (PACMs) should be prominently labelled as such).

Type of Asbestos Materials (Board, Pipe lagging, Contained)	Location	Approximate quantity/volume
	Engine Room/Machinery Rooms	
	Steam supply piping and hangers (General)	
	Steam exhaust piping and hangers (General)	
	Relief & safety valves (General)	
	Miscellaneous piping outer covering and hangers (General)	
	Water pipes and hangers (General)	
	HP Turbine Insulation (General)	
	Boiler drums & casings (General)	
	Heaters, Tanks etc. (General)	
	Other (General)	
	Specific Machinery Locations e.g. Pump Room, Boiler Room	
	Accommodation	
	Sanitary & Commissary spaces (General)	
	Interior decks – including underlay (General)	
	Steam & exhaust pipes (General)	
	Refrigeration pipes (General)	
	Air conditioning ducts (General)	
	Cable transits (General)	
	External bulkheads (General)	
	Internal bulkheads (General)	
	External deckheads (General)	
	Internal deckheads (General)	
	Decks adjoining machinery spaces (General)	
	Other (General)	
	Specific accommodation locations	
	Deck	
	Steam supply piping (General)	
	Exhaust piping (General)	
	Tank cleaning piping (General)	
	Stripping pump (General)	
	Other (General)	
	Specific deck locations	
	Machinery	
	Brake linings	

Caution!! Asbestos containing material (ACM) may be found underneath materials that do not contain asbestos.

1B. Paint (on vessel's structure) - Additives

Additive (Lead, Tin, Cadmium, Organotins (TBTs), Arsenic, Zinc, Chromium, Strontium, Other)	Location

1C. Plastic Materials

Type	Location	Approximate quantity/volume

1D. Materials containing PCBs, PCTs, PBBs at levels of 50mg/kg or more

Material	Location	Approximate quantity/volume

1E. Gases sealed in ship's equipment or machinery

Type	Location	Approximate quantity/volume
Refrigerants (R12/R22)		
HALON		
CO2		
Acetylene		
Propane		
Butane		
Oxygen		
Other (Specify)		

1F. Chemicals in ship's equipment or machinery

Type	Location	Approximate quantity/volume
Anti-seize Compounds		
Engine Additives		
Antifreeze Fluids		
Kerosene		
White Spirit		
Boiler/Water Treatment		
De-ioniser Regenerating		
Evaporator Dosing and Descaling Acids		
Paint/Rust Stabilisers		
Solvents/Thinners		
Chemical Refrigerants		
Battery Electrolyte		
Hotel Service Cleaners		
Other (Specify)		

1G. Other Substances inherent in ship's machinery, equipment or fittings

Type	Location	Approximate quantity/volume
Lubricating Oil		
Hydraulic Oil		
Lead Acid Batteries		
Alcohol		
Methylated Spirits		
Epoxy Resins		
Mercury		
Radioactive Materials		
Other (Specify)		

Part 1. completed by		Date	

PART 3 - STORES

3A. Gases in store

Type	No. and size of Cylinders	Location	Approximate quantity/volume
Refrigerants (R12/R22)			
HALON			
CO2			
Acetylene			
Propane			
Butane			
Oxygen			
Other (Specify)			

3B. Chemicals in store

Type	Location	Approximate quantity/volume
Anti-seize Compounds		
Engine Additives		
Antifreeze Fluids		
Kerosene		
White Spirit		
Boiler/Water Treatment		
De-ioniser Regenerating		
Evaporator Dosing and Descaling Acids		
Paint/Rust Stabilisers		
Solvents/Thinners		
Refrigerants		
Battery Electrolyte		
Hotel Service Cleaners		
Other (Specify)		

3C. Other Packaged items in store

Type	Location	Approximate quantity/volume
Lubricating Oil		
Hydraulic Oil		
Lead Acid Batteries		
Medicines		
Insecticide Sprays		
Alcohol		
Methylated Spirits		
Epoxy Resins		
Paint		
Fire fighting clothing, equipment (e.g. blankets)		
Other (Specify)		

Part 3 completed by	Date

APPENDIX 4

LIST OF PRINCIPLES FOR HOT WORK ON BOARD ALL TYPES OF SHIPS (Annex to MSC/Circ.1084 “Principles for hot work on board all types of ships”)

1 General

1.1 Hot work means any work requiring the use of electric arc or gas welding equipment, cutting burner equipment or other forms of naked flame, as well as heating or spark generating tools, regardless of where it is carried out on board a ship.

1.2 The Safety Management System (SMS) on board should include adequate guidance on control of hot work and should be robust enough to ensure compliance. Absence of guidance should be regarded as prohibition, rather than approval.

1.3 Whenever possible, a space such as a workshop where conditions are deemed safe, should be designated for hot work to be performed and first consideration given to performing any hot work in that space.

1.4 Hot work performed outside that space should be subject to the following considerations.

2 Hot work outside the designated space

2.1 The master or designated safety officer should be responsible for deciding whether hot work is justified and whether it can be conducted safely.

2.2 A permit-to-work system should be employed.

2.3 Hot work procedures should take account of national laws or regulations or other national safety and health rules.

2.4 A responsible officer, not involved in the hot work, should be designated to ensure that safe procedures are followed.

2.5 A written plan for the operation should be agreed by all who will have responsibilities in connection with the hot work.

2.6 The work area should be carefully prepared and isolated before hot work commences.

2.7 Fire safety precautions should be reviewed, including fire equipment preparations, setting a fire watch in adjacent compartments and areas, and fire-extinguishing measures.

2.8 Isolation of the work area and fire precautions should be continued until the risk of fire no longer exists.

APPENDIX 5

RECOMMENDATIONS FOR ENTERING ENCLOSED SPACES ABOARD SHIPS

(Annex to Assembly resolution A.864(20))

PREAMBLE

The object of these recommendations is to encourage the adoption of safety procedures aimed at preventing casualties to ships personnel entering enclosed spaces where there may be an oxygen deficient, flammable and/or toxic atmosphere.

Investigations into the circumstances of casualties that have occurred have shown that accidents on board ships are in most cases caused by an insufficient knowledge of, or disregard for, the need to take precautions rather than a lack of guidance.

The following practical recommendations apply to all types of ships and provide guidance to seafarers. It should be noted that on ships where entry into enclosed spaces may be infrequent, for example, on certain passenger ships or small general cargo ships, the dangers may be less apparent, and accordingly there may be a need for increased vigilance.

The recommendations are intended to complement national laws or regulations, accepted standards or particular procedures which may exist for specific trades, ships or types of shipping operations.

It may be impracticable to apply some recommendations to particular situations. In such cases, every endeavour should be made to observe the intent of the recommendations, and attention should be paid to the risks that may be involved.

1 INTRODUCTION

The atmosphere in any enclosed space may be deficient in oxygen and/or contain flammable and/or toxic gases or vapours. Such an unsafe atmosphere could also subsequently occur in a space previously found to be safe. Unsafe atmosphere may also be present in spaces adjacent to those spaces where a hazard is known to be present.

2 DEFINITIONS

2.1 *Enclosed space* means a space which has any of the following characteristics:

- .1 limited openings for entry and exit;
- .2 unfavourable natural ventilation; and
- .3 is not designed for continuous worker occupancy,

and includes, but is not limited to, cargo spaces, double bottoms, fuel tanks, ballast tanks, pump-rooms, compressor rooms, cofferdams, void spaces, duct keels, inter-barrier spaces, engine crankcases and sewage tanks.

2.2 *Competent person* means a person with sufficient theoretical knowledge and practical experience to make an informed assessment of the likelihood of a dangerous atmosphere being present or subsequently arising in the space.

2.3 *Responsible person* means a person authorised to permit entry into an enclosed space and having sufficient knowledge of the procedures to be followed.

3 ASSESSMENT OF RISK

3.1 In order to ensure safety, a competent person should always make a preliminary assessment of any potential hazards in the space to be entered, taking into account previous cargo carried, ventilation of the space, coating of the space and other relevant factors. The competent person's preliminary assessment should determine the potential for the presence of an oxygen-deficient, flammable or toxic atmosphere.

3.2 The procedures to be followed for testing the atmosphere in the space and for entry should be decided on the basis of the preliminary assessment. These will depend on whether the preliminary assessment shows that:

- .1 there is minimal risk to the health or life of personnel entering the space;
- .2 there is no immediate risk to health or life but a risk could arise during the course of work in the space; and
- .3 a risk to health or life is identified.

3.3 Where the preliminary assessment indicates minimal risk to health or life or potential for a risk to arise during the course of work in the space, the precautions described in 4, 5, 6 and 7 should be followed as appropriate.

3.4 Where the preliminary assessment identifies risk to life or health, if entry is to be made, the additional precautions specified in section 8 should also be followed.

4 AUTHORIZATION OF ENTRY

4.1 No person should open or enter an enclosed space unless authorised by the master or nominated responsible person and unless the appropriate safety procedures laid down for the particular ship have been followed.

4.2 Entry into enclosed spaces should be planned and the use of an entry permit system, which may include the use of a checklist, is recommended. An Enclosed Space Entry Permit should be issued by the master or nominated responsible person, and completed by a person who enters the space prior to entry. An example of the Enclosed Space Entry Permit is provided in the appendix.

5 GENERAL PRECAUTIONS

5.1 The master or responsible person should determine that it is safe to enter an enclosed space by ensuring:

- .1 that potential hazards have been identified in the assessment and as far as possible isolated or made safe;
- .2 that the space has been thoroughly ventilated by natural or mechanical means to remove any toxic or flammable gases, and to ensure an adequate level of oxygen throughout the space;
- .3 that the atmosphere of the space has been tested as appropriate with properly calibrated instruments to ascertain acceptable levels of oxygen and acceptable levels of flammable or toxic vapours;
- .4 that the space has been secured for entry and properly illuminated;
- .5 that a suitable system of communication between all parties for use during entry has been agreed and tested;
- .6 that an attendant has been instructed to remain at the entrance to the space whilst it is occupied;
- .7 that rescue and resuscitation equipment has been positioned ready for use at the entrance to the space, and that rescue arrangements have been agreed;
- .8 that personnel are properly clothed and equipped for the entry and subsequent tasks; and
- .9 that a permit has been issued authorizing entry.

The precautions in .6 and .7 may not apply to every situation described in this section. The person authorizing entry should determine whether an attendant and the positioning of rescue equipment at the entrance to the space is necessary.

5.2 Only trained personnel should be assigned the duties of entering, functioning as attendants, or functioning as members of rescue teams. Ships' crews should be drilled periodically in rescue and first aid.

5.3 All equipment used in connection with entry should be in good working condition and inspected prior to use.

6 TESTING THE ATMOSPHERE

6.1 Appropriate testing of the atmosphere of a space should be carried out with properly calibrated equipment by persons trained in the use of the equipment. The manufacturers' instructions should be strictly followed. Testing should be carried out before any person enters the space, and at regular intervals thereafter until all work is completed. Where appropriate, the testing of the space should be carried out at as many different levels as is necessary to obtain a representative sample of the atmosphere in the space.

6.2 For entry purposes, steady readings of the following should be obtained:

- .1 21% oxygen by volume by oxygen content meter; and
- .2 not more than 1% of lower flammable limit (LFL) on a suitably sensitive combustible gas indicator, where the preliminary assessment has determined that there is potential for flammable gases or vapours.

If these conditions cannot be met, additional ventilation should be applied to the space and re-testing should be conducted after a suitable interval. Any gas testing should be carried out with ventilation to the enclosed space stopped, in order to obtain accurate readings.

6.3 Where the preliminary assessment has determined that there is potential for the presence of toxic gases and vapours, appropriate testing should be carried out using fixed or portable gas or vapour detection equipment. The readings obtained by this equipment should be below the occupational exposure limits for the toxic gases or vapours given in accepted national or international standards. It should be noted that testing for flammability does not provide a suitable means of measuring for toxicity, nor vice versa.

6.4 It should be emphasized that pockets of gas or oxygen-deficient areas can exist, and should always be suspected, even when an enclosed space has been satisfactorily tested as being suitable for entry.

7 PRECAUTIONS DURING ENTRY

7.1 The atmosphere should be tested frequently whilst the space is occupied, and persons should be instructed to leave the space should there be a deterioration in the conditions.

7.2 Ventilation should continue during the period that the space is occupied and during temporary breaks. Before re-entry after a break, the atmosphere should be re-tested. In the event of failure of the ventilation system, any persons in the space should leave immediately.

7.3 In the event of an emergency, under no circumstances should the attending crew member enter the space before help has arrived and the situation has been evaluated to ensure the safety of those entering the space to undertake rescue operations.

8 ADDITIONAL PRECAUTIONS FOR ENTRY INTO A SPACE WHERE THE ATMOSPHERE IS KNOWN OR SUSPECTED TO BE UNSAFE

8.1 If the atmosphere in an enclosed space is suspected or known to be unsafe, the space should only be entered when no practical alternative exists. Entry should only be made for further testing, essential operation, safety of life or safety of a ship. The number of persons entering the space should be the minimum compatible with the work to be performed.

8.2 Suitable breathing apparatus, e.g. of the air-line or self-contained type, should always be worn, and only personnel trained in its use should be allowed to enter the space. Air-purifying respirators should not be used as they do not provide a supply of clean air from a source independent of the atmosphere within the space.

8.3 The precautions specified in 5 should also be followed, as appropriate.

8.4 Rescue harnesses should be worn and, unless impractical, lifelines should be used.

8.5 Appropriate protective clothing should be worn particularly where there is any risk of toxic substances or chemicals coming into contact with the skin or eyes of those entering the space.

8.6 The advice in 7.3 concerning emergency rescue operations is particularly relevant in this context.

9 HAZARDS RELATED TO SPECIFIC TYPES OF CARGO

9.1 Dangerous goods in packaged form

9.1.1 The atmosphere of any space containing dangerous goods may put at risk the health or life of any person entering it. Dangers may include flammable, toxic or corrosive gases or vapours that displace oxygen, residues on packages and spilled material. The same hazards may be present in spaces adjacent to the cargo spaces. Information on the hazards of specific substances is contained in the IMDG Code, the Emergency Procedures for Ships Carrying Dangerous Goods (EMS) and Materials Safety Data Sheets (MSDS). If there is evidence or suspicion that leakage of dangerous substances has occurred, the precautions specified in 8 should be followed.

9.1.2 Personnel required to deal with spillages or to remove defective or damaged packages should be appropriately trained and wear suitable breathing apparatus and appropriate protective clothing.

9.2 Bulk liquid

The tanker industry has produced extensive advice to operators and crews of ships engaged in the bulk carriage of oil, chemicals and liquefied gases, in the form of specialist international safety guides. Information in the guides on enclosed space entry amplifies these recommendations and should be used as the basis for preparing entry plans.

9.3 Solid bulk

On ships carrying solid bulk cargoes, dangerous atmospheres may develop in cargo spaces and adjacent spaces. The dangers may include flammability, toxicity, oxygen depletion or self-heating, which should be identified in shipping documentation. For additional information, reference should be made to the Code of Safe Practice for Solid Bulk Cargoes.

9.4 Oxygen-depleting cargoes and materials

A prominent risk with such cargoes is oxygen depletion due to the inherent form of the cargo, for example, self-heating, oxidation of metals and ores or decomposition of vegetable oils, animal fats, grain and other organic materials or their residues. The materials listed below are known to be capable of causing oxygen depletion. However, the list is not exhaustive. Oxygen depletion may also be caused by other materials of vegetable or animal origin, by flammable or spontaneously combustible materials, and by materials with a high metal content:

- .1 grain, grain products and residues from grain processing (such as bran, crushed grain, crushed malt or meal), hops, malt husks and spent malt;
- .2 oilseeds as well as products and residues from oilseeds (such as seed expellers, seed cake, oil cake and meal);
- .3 copra;
- .4 wood in such forms as packaged timber, roundwood, logs, pulpwood, props (pit props and other propwood), woodchips, woodshavings, woodpulp pellets and sawdust;
- .5 jute, hemp, flax, sisal, kapok, cotton and other vegetable fibres (such as esparto grass/Spanish grass, hay, straw, bhusa), empty bags, cotton waste, animal fibres, animal and vegetable fabric, wool waste and rags;
- .6 fishmeal and fishscrap;
- .7 guano;
- .8 sulphidic ores and ore concentrates;
- .9 charcoal, coal and coal products;
- .10 direct reduced iron (DRI)
- .11 dry ice;
- .12 metal wastes and chips, iron swarf, steel and other turnings, borings, drillings, shavings, filings and cuttings; and
- .13 scrap metal.

9.5 Fumigation

When a ship is fumigated, the detailed recommendations contained in the Recommendations on the Safe Use of Pesticides in Ships* should be followed. Spaces adjacent to fumigated spaces should be treated as if fumigated.

10 CONCLUSION

Failure to observe simple procedures can lead to people being unexpectedly overcome when entering enclosed spaces. Observance of the principles outlined above will form a reliable basis for assessing risks in such spaces and for taking necessary precautions.

* Refer to the Recommendations on Safe Use of Pesticides in Ships, approved by the Maritime Safety Committee of the Organization by circular MSC/Circ.612, as amended by MSC/Circ.689 and MSC/Circ.746.

APPENDIX

EXAMPLE OF AN ENCLOSED SPACE ENTRY PERMIT

This permit relates to entry into any enclosed space and should be completed by the master or responsible officer and by the person entering the space or authorized team leader.

General		
Location/name of enclosed space.....		
Reason for entry.....		
This permit is valid	from:.....hrs	Date.....
	to :.....hrs	Date.....
		(See note 1)

Section 1 - Pre-entry preparation		
(To be checked by the master or nominated responsible person)		
	Yes	No
● Has the space been thoroughly ventilated ?	<input type="checkbox"/>	<input type="checkbox"/>
● Has the space been segregated by blanking off or isolating all connecting pipelines or valves and electrical power/equipment ?	<input type="checkbox"/>	<input type="checkbox"/>
● Has the space been cleaned where necessary ?	<input type="checkbox"/>	<input type="checkbox"/>
● Has the space been tested and found safe for entry ? (See note 2)	<input type="checkbox"/>	<input type="checkbox"/>
● Pre-entry atmosphere test readings:		
- oxygen.....% vol (21%)	By:.....	
- hydrocarbon.....% LFL (less than 1%)		
- toxic gases.....ppm (specific gas and PEL)	Time:.....	
(See note 3)		
● Have arrangements been made for frequent atmosphere checks to be made while the space is occupied and after work breaks ?	<input type="checkbox"/>	<input type="checkbox"/>
● Have arrangements been made for the space to be continuously ventilated throughout the period of occupation and during work breaks ?	<input type="checkbox"/>	<input type="checkbox"/>
● Are access and illumination adequate ?	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
● Is rescue and resuscitation equipment available for immediate use by the entrance to the space ?	<input type="checkbox"/>	<input type="checkbox"/>
● Has a responsible person been designated to be in constant attendance at the entrance to the space?	<input type="checkbox"/>	<input type="checkbox"/>
● Has the officer of the watch (bridge, engine room, cargo control room) been advised of the planned entry ?	<input type="checkbox"/>	<input type="checkbox"/>
● Has a system of communication between all parties been tested and emergency signals agreed ?	<input type="checkbox"/>	<input type="checkbox"/>
● Are emergency and evacuation procedures established and understood by all personnel involved with the enclosed space entry ?	<input type="checkbox"/>	<input type="checkbox"/>
● Is all equipment used in good working condition and inspected prior to entry ?	<input type="checkbox"/>	<input type="checkbox"/>
● Are personnel properly clothed and equipped ?	<input type="checkbox"/>	<input type="checkbox"/>

Section 2 - Pre-entry checks		
(To be checked by the person entering the space or authorized team leader)		
	Yes	No
● I have received instructions or permission from the master or nominated responsible person to enter the enclosed space	<input type="checkbox"/>	<input type="checkbox"/>
● Section 1 of this permit has been satisfactorily completed by the master or nominated responsible person	<input type="checkbox"/>	<input type="checkbox"/>
● I have agreed and understand the communication procedures	<input type="checkbox"/>	<input type="checkbox"/>
● I have agreed upon a reporting interval of.....minutes	<input type="checkbox"/>	<input type="checkbox"/>
● Emergency and evacuation procedures have been agreed and are understood	<input type="checkbox"/>	<input type="checkbox"/>
● I am aware that the space must be vacated immediately in the event of ventilation failure or if atmosphere tests show a change from agreed safe criteria	<input type="checkbox"/>	<input type="checkbox"/>

Section 3 - Breathing apparatus and other equipment		
(To be checked jointly by the master or nominated responsible person and the person who is to enter the space)		
	Yes	No
• Those entering the space are familiar with the breathing apparatus to be used	<input type="checkbox"/>	<input type="checkbox"/>
• The breathing apparatus has been tested as follows:		
- gauge and capacity of air supply	
- low pressure audible alarm	
- face mask - under positive pressure and not leaking	
• The means of communication has been tested and emergency signals agreed	<input type="checkbox"/>	<input type="checkbox"/>
• All personnel entering the space have been provided with rescue harnesses and, where practicable, lifelines	<input type="checkbox"/>	<input type="checkbox"/>

Signed upon completion of sections 1,2 and 3 by:

Master or nominated responsible person..... Date..... Time.....

Responsible person supervising entry Date..... Time.....

Person entering the space or authorized team leader Date..... Time.....

Section 4 - Personnel entry		
(To be completed by the responsible person supervising entry)		
Names	Time in	Time out
.....
.....
.....
.....

Section 5 - Completion of job

(To be completed by the responsible person supervising entry)

- Job completed Date..... Time.....
- Space secured against entry Date..... Time.....
- The officer of the watch has been
duly informed Date..... Time.....

Signed upon completion of sections 4 and 5 by:

Responsible person supervising entry Date..... Time.....

THIS PERMIT IS RENDERED INVALID SHOULD VENTILATION OF THE SPACE STOP OR IF ANY OF THE CONDITIONS NOTED IN THE CHECKLIST CHANGE

Notes:

- 1 The permit should contain a clear indication as to its maximum period of validity.
- 2 In order to obtain a representative cross-section of the space's atmosphere, samples should be taken from several levels and through as many openings as possible. Ventilation should be stopped for about 10 minutes before the pre-entry atmosphere tests are taken.
- 3 Tests for specific toxic contaminants, such as benzene or hydrogen sulphide, should be undertaken depending on the nature of the previous contents of the space.

