ANNEX 7

REVISED SPECIFIC GUIDELINES FOR THE ASSESSMENT OF VESSELS

1 Introduction

1.1 The *Specific Guidelines for assessment of vessels*[1] are intended for use by national authorities responsible for regulating dumping of wastes and embody a mechanism to guide national authorities in evaluating applications for dumping of wastes in a manner consistent with the provisions of the London Protocol and when applicable the London Convention. The use of either generic or specific guidelines complements but does not replace the requirements described in annex 2 of the London Protocol.

1.2 The London Protocol follows an approach under which dumping of wastes or other matter is prohibited except for those materials specifically enumerated in annex 1, and in the context of that Protocol, these Guidelines would apply to the materials listed in that annex. The London Convention prohibits the dumping of certain wastes or other matter specified therein and in the context of that Convention these Guidelines meet the requirements of its annexes for wastes not prohibited for dumping at sea. When applying these Guidelines under the London Convention, they should not be viewed as a tool for the reconsideration of dumping of wastes or other matter in contravention of annex I to the London Convention.

1.3 The schematic shown in figure 1 provides a clear indication of the stages in the application of the Guidelines where important decisions should be made and is not designed as a conventional decision tree. In general, national authorities should use the schematic in an iterative manner ensuring that all steps receive consideration before a decision is made to issue a permit. Figure 1 illustrates the relationship between the operational components of annex 2 of the London Protocol and contains the following elements:

.1 waste prevention audit (section 2)

.2 vessels: waste management options (section 3)

.3 waste characterization: chemical/physical properties (section 4)

.4 disposal at sea: best environmental practices (section 5, action list)

.5 identify and characterize dump-site (section 6, dump-site selection)

.6 determine potential impacts and prepare impact hypothesis(es) (section 7, assessment of potential effects)

.7 issue permit (section 8, permit and permit conditions)

.8 implement project and monitor compliance (section 9, monitoring)

.9 field monitoring and assessment (section 9, monitoring).

[1] These guidelines do not address the specific concerns with the disposal of fibreglass vessels.

1.4 These Guidelines are specific to vessels. Adherence to the following is intended to provide additional clarification to enable compliance with annex 2 of the London Protocol, and represents neither a more restrictive nor a less restrictive regime than annex 2 to the Protocol.

1.5 These Guidelines refer to "vessels at sea" as specified in annex 1(1.4) to the London Protocol and in annex I (11)(d) to the London Convention 1972. The Protocol defines vessels as any waterborne craft of any type whatsoever. For the purpose of these Guidelines, this includes submersibles, air-cushioned craft and floating craft whether self-propelled or not. The assessment of platforms or other man-made structures at sea is covered in separate specific Guidelines.

1.6 These Guidelines set out the factors to be addressed when considering disposal of vessels at sea, with particular emphasis on the need to evaluate alternatives to sea disposal prior to sea disposal being determined the preferred alternative. Reuse of the vessel, reuse of parts of vessels, and recycling at appropriate facilities are preferred alternatives to disposal at sea. For the purposes of these Guidelines, appropriate facilities would be those that respect the requirements set out in the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, and its implementation guidelines.[2]

1.7 National authorities should bear in mind the importance of worker safety during vessel clean-up envisioned in agreements such as the Hong Kong Convention, as well as the protection of the marine environment under the London Convention and London Protocol, because preparing vessels for environmentally safe disposal at sea is likely to involve removal of hazardous materials. With this in mind, the development of accurate inventories of the hazardous materials on vessels following the *2015 Guidelines for the Development of the Inventory of Hazardous Materials*, developed for the Hong Kong Convention and adopted by IMO's Marine Environment Protection Committee (MEPC) at its sixty-eighth session, should assist national authorities with waste characterization for both protecting worker safety and determining what materials should be removed from vessels to make them suitable for disposal at sea (see section 4 of these guidelines).

[2] The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (Hong Kong Convention) is aimed at ensuring that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risk to human health and safety or to the environment. The Hong Kong Convention intends to address all the issues around ship recycling, including the fact that ships sold for scrapping may contain environmentally hazardous substances such as asbestos, heavy metals, hydrocarbons, ozone-depleting substances and others. As of […] 2016 the Hong Kong Convention, adopted on15 May 2009, is not yet in force.

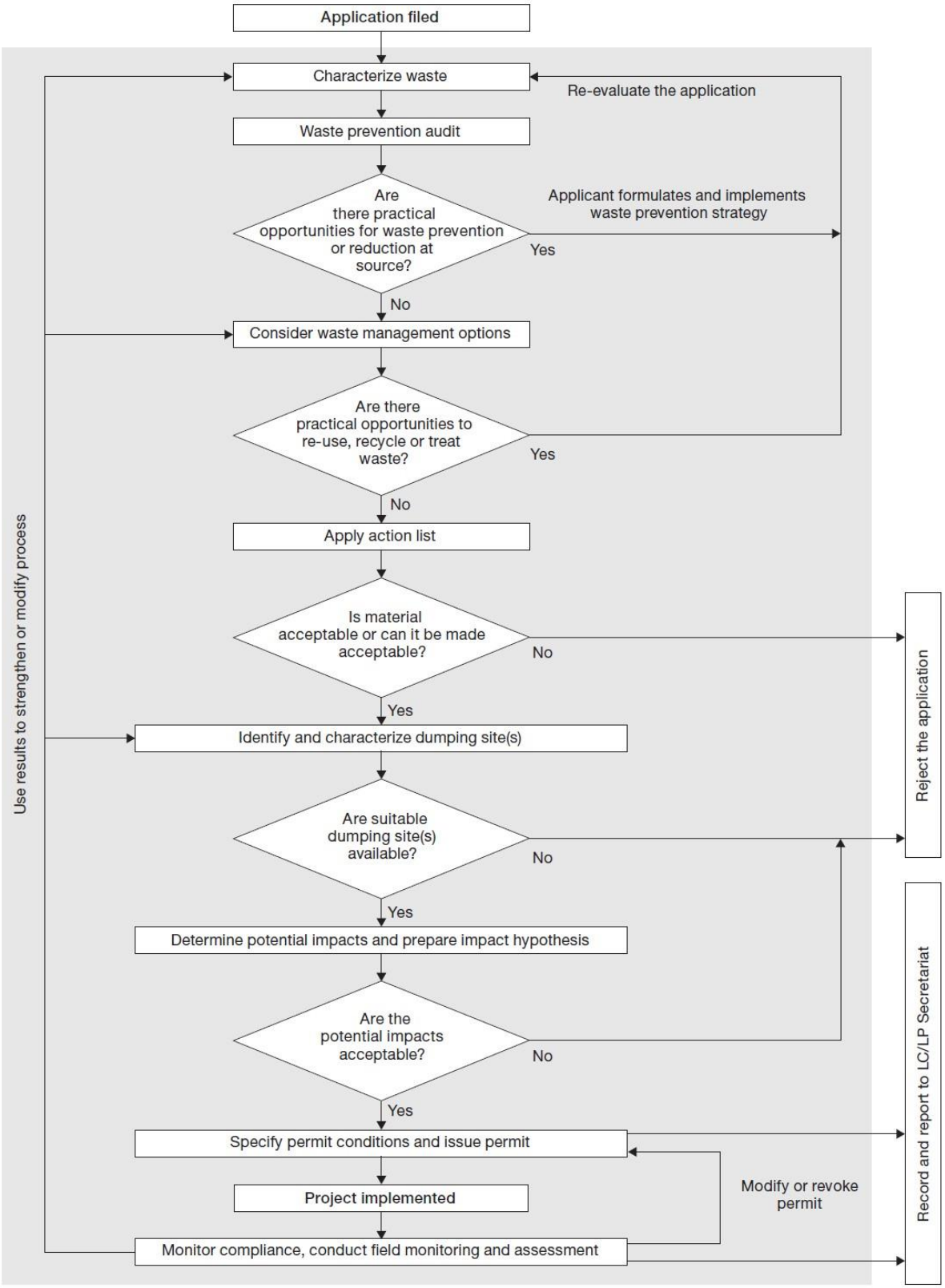

Figure 1 – Assessment framework

2 Waste prevention audit

2.1 The initial stages in assessing alternatives to dumping of wastes and other matter that may be considered for dumping under the London Convention or London Protocol should, as appropriate, include an evaluation of the types, amounts and relative hazards of wastes generated (see also section 4).

2.2 In general terms, if the London Protocol required audit reveals that opportunities exist for waste prevention at source, an applicant is expected to formulate and implement a waste prevention strategy in collaboration with relevant local and national agencies which includes specific waste reduction targets and provision for further waste prevention audits to ensure that these targets are being met. Permit issuance or renewal decisions shall assure compliance with any resulting waste reduction and prevention requirements.

Note: This paragraph is not directly pertinent to the disposal of vessels at sea. However, it is important to acknowledge the obligation to take steps to prevent waste arising, thereby reducing the need for disposal at sea. Such waste prevention audits may inform future design, construction, operation, maintenance and conversion of vessels.

3 Vessels: waste management options

3.1 When vessels are no longer needed, there are several options to consider after taking the vessel out of service, ranging from reuse of the vessel or parts of the vessel, to recycling or scrapping, to final disposal on land or at sea. A comprehensive evaluation of alternatives to disposal at sea, including engineering, safety, economic, and environmental analyses, should be carried out. Applications to dump wastes and other matter under the London Protocol, including disposal of vessels at sea, shall demonstrate that appropriate consideration has been given to the following hierarchy of waste management options under the London Protocol, annex 2, paragraph 5:

.1 reuse of the vessel, or reuse of parts removed from the vessel (e.g. generators, machines, pumps, cranes, and furniture). On rare occasions, vessels may be used as artificial reefs if they pass all criteria in the *Guidelines for the Placement of Artificial Reefs*[3] and if there is a scientifically and technically sound reason for the placement of the vessel as an artificial reef;

.2 recycling (such as use for scrap (e.g. ferrous or non-ferrous metals copper/aluminium/nickel scrap metals) at appropriate facilities where ship-breaking is taking place under controlled conditions, in a harbour and wharf where deconstruction and the collection and disposal of hazardous constituents, such as oils, sludges and other materials, can be managed in an environmentally sound manner); and

.3 disposal on land and into water.

[3] London Convention and Protocol/UNEP (2009). London Convention and Protocol/UNEP Guidelines for the Placement of Artificial Reefs. London, UK, 100 pp.

3.2 To facilitate the above waste management options for vessels, the following actions are recommended, if applicable:

.1 in the case of a vessel at sea, repairs or other measures should be conducted to the extent necessary to ensure that the vessel does not sink unexpectedly while being assessed, prepared for disposal, or transported to the disposal at sea location;

.2 destruction of hazardous constituents contained within the vessel using environmentally sound techniques (e.g. in certain cases, on-shore incineration of liquid wastes from the vessel or wastes generated during the cleaning of the vessel); and

.3 cleaning of the vessel or its components, removal of components, or treatment in order to reduce or remove the hazardous constituents (such as removal of transformers and storage tanks) and treatment of hazardous constituents, such as oils, sludges and other materials, in an environmentally sound manner.

3.3 It should be noted that the actions outlined in section 3.2 can be very complex to carry out and frequently require highly specialized knowledge and experience, depending on the vessel. Parties should consider this complexity and the potential expertise and resources that will be needed when considering the preparation for a vessel for disposal at sea. Parties are encouraged to seek support and advice from organizations or countries that have experience with the preparation, sinking, and post-disposal monitoring of vessels.

3.4 A permit to dump a vessel at sea shall be refused if the permitting authority determines that appropriate opportunities exist to reuse, recycle or treat the vessel without undue risks to human health or the environment or disproportionate costs (London Protocol, annex 2, paragraph 6). The practical availability of other means of disposal should be considered in the light of a comparative risk assessment involving both dumping and the alternatives, taking into account the general obligation to apply a precautionary approach to dumping and the objective of protecting the marine environment from all sources of pollution.

3.5 The comparative risk assessment should take into account factors such as the following:

.1 Potential impact upon the environment:

.1 effect upon marine habitats and marine communities;

.2 effects upon other legitimate uses of the sea;

.3 effect of on-shore reuse, recycling, or disposal, including potential impacts upon land, surface and ground water, and air pollution; and

.4 effect of energy and materials usage (including overall assessment of energy and materials use and savings) of each of the reuse, recycling or disposal options, including transportation and resultant impacts to the environment (i.e. secondary impacts).

.2 Potential impact upon human health:

.1 identification of routes of exposure and analysis of potential impacts upon human health of sea and land reuse, recycling, and disposal options including potential secondary impacts of energy usage or vessel cleanup;

.2 quantification and evaluation of safety risks associated with reuse, recycling, disposal and cleanup; and

.3 consideration of worker safety as envisioned in agreements such as the 2009 Hong Kong Convention.

.3 Technical and practical feasibility:

.1 evaluation of the technical and practical feasibility (e.g. evaluation of engineering aspects per specific types and sizes of vessels) for reuse or for ship-breaking and recycling.

.4 Economic considerations:

.1 analysis of the full cost of vessel reuse, recycling, or disposal alternatives, including secondary impacts; and

.2 review of costs in view of benefits, such as resource conservation and economic benefits of steel recycling.

3.6 In considering the range of options available to manage vessels as wastes, IMO has offered the following observations:

> "in the process of recycling ships, virtually nothing goes to waste. The materials and equipment are almost entirely reused. Steel is reprocessed to become, for instance, reinforcing rods for use in the construction industry or as corner castings and hinges for containers. Ships' generators are reused ashore. Batteries find their way into the local economy. Hydrocarbons on board become reclaimed oil products to be used as fuel in rolling mills or brick kilns. Light fittings find further use on land. Furthermore, new steel production from recycled steel requires only one third of the energy used for steel production from raw materials. Recycling thus makes a positive contribution to the global conservation of energy and resources and, in the process, employs a large, if predominantly unskilled, workforce. Properly handled, ship recycling is, without question, a "green" industry."[4]

Reuse of the vessel, reuse of parts of vessels, and recycling at appropriate facilities are preferred alternatives to disposal at sea and should be regarded as the environmentally preferable options.[5] A permit should only be considered if it can be demonstrated that vessel recycling is not a technically or economically feasible option based on case-specific circumstances.

[4] IMO, 2014: http://www.imo.org/OurWork/Environment/ShipRecycling/Pages/Default.aspx (accessed 3 May, 2016)

[5] The Basel Convention Technical Guidelines for the environmentally sound management of the full and partial dismantling of ships provides guidance to its Parties on the establishment of facilities for ship-dismantling and recommendations on procedures, processes and practices to attain environmentally sound management at such facilities.

4 Waste characterization: chemical/physical/biological properties

4.1 With regard to vessel disposal at sea, waste characterization is primarily relevant to the pollution prevention plan. A pollution prevention plan should be developed that includes specific actions regarding identification of potential sources of pollution. The purpose of this plan is to assure that wastes (or other matter and materials capable of creating floating debris) potentially contributing to pollution of the marine environment have been removed to the maximum extent possible.

4.2 A detailed description and characterization of the waste including potential sources of contamination (including chemical and biological) is an essential precondition for the consideration of alternatives and the basis for a decision as to whether a waste may be dumped at sea. For disposal at sea of a vessel, a detailed description and characterization of the vessel and any items/materials remaining on the vessel is an essential precondition for the consideration of alternatives and the basis for a decision as to whether a vessel may be dumped (London Protocol, annex 2, paragraph 7). The detailed description of the vessel, including its age, use, and maintenance history can be very helpful in identifying the hazards and pollution sources that should be considered further and the degree to which they pose a pollution concern. Characterization by biological or chemical testing is not needed if the required pollution prevention plans are developed and implemented as well as the best environmental practices described in the appendix. However, if a vessel and its contents are so poorly characterized that proper assessment cannot be made of its potential impacts on human health and the environment, that vessel shall not be dumped (London Protocol, annex 2, paragraph 7). Some national authorities have developed clean-up standards for the disposal of vessels at sea.[6]

4.3 In order to be able to characterize the wastes on a vessel, the first requirement is to produce an inventory of hazardous materials on the vessel. The process described in sections 3 and 4 and appendices 1, 2, 4 and 5 of the 2015 *Guidelines for the Development of the Inventory of Hazardous Materials*, developed for the Hong Kong Convention and adopted by MEPC 68, should be considered when developing an inventory of the hazardous materials on the vessel.

4.4 Characterization of the wastes on a vessel and their constituents shall take into account:

.1 origin, total amount (volume and concentration), form and average composition;

.2 properties: physical, chemical, biochemical and biological;

.3 toxicity, including, where appropriate, additive, synergistic or antagonistic effects among constituents of the waste;

.4 persistence: physical, chemical and biological; and

.5 accumulation and biotransformation in biological materials or sediments (London Protocol, annex 2, paragraph 8).[7]

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6 Environment Canada, 2015. Clean-up Standard for Disposal at Sea of Vessels, Aircraft, Platforms & Other Structures, Revision 4. To obtain a copy, contact Environment Canada at Immersionenmer-disposalatsea.ec@canada.ca.

7 Similar considerations are described in London Convention annex III.A and .C required by London Convention article 4, paragraph 2.

4.5 A pollution prevention plan should be developed that includes specific actions regarding identification of potential sources of pollution. See appendix of these guidelines. The purpose of this plan is to ensure that wastes (including materials identified in the hazardous materials inventory or that could act as potential sources of pollution, and those capable of creating floating debris) have been removed to the maximum extent possible leaving no contaminants on board that would require some form of chemical or biological testing. For example the composition and condition of the anti-fouling systems and paints and resulting bioavailability of contaminants left on board in those coatings can be considered when deciding whether remaining paint should be sampled.

5 Disposal at sea: best environmental practices (action list)

5.1 It is very important that vessels are cleaned of contaminants and potential sources of pollution prior to disposal at sea. Relevant authorities should ensure that qualified personnel have taken appropriate measures to remove to the maximum extent practicable all materials that may degrade the marine environment. The pollution prevention plan and the associated clean-up techniques (see appendix) should be implemented in order to ensure that it has been cleaned to the maximum extent feasible, and that no materials remain on board that could require chemical or biological testing.

6 Dump-site selection

Site selection considerations

6.1 Proper selection of a dump-site at sea for vessels is of paramount importance.

6.2 Information required to select a dump-site shall include:

.1 physical and biological characteristics of the seabed and surrounding area, and oceanographic characteristics of the general area in which the site is to be located;

.2 consideration of the potential implications of the vessel's presence on amenities, values (for example, cultural or historical values) and other uses of the sea in the area of consideration;

.3 assessment of the constituent fluxes associated with dumping in relation to existing fluxes of substances in the marine environment; and

.4 economic and operational feasibility (LP annex 2, paragraph 11).[8]

6.3 Further guidance for dump-site selection can be found in a report of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP *Reports and Studies No. 16 – Scientific Criteria for the Selection of Waste Disposal Sites at Sea).*[9] Prior to selecting a dump-site, it is essential that data are available on the oceanographic characteristics of the general area in which the site is to be located. This information can be obtained from the literature but fieldwork should be undertaken to fill the gaps. Information

[8] Similar considerations are described in London Convention annex III.B and .C required by London Convention Article 4, paragraph 2.

[9] http://www.gesamp.org/publications/publicationdisplaypages/rs16.

most relevant to the disposal of properly cleaned vessels at sea pertains largely to ensuring that the vessel sinks to the bottom in the desired dump-site and stays at that dump-site, and that only acceptable physical effects result from the disposal. Generally, appropriate information includes:

.1 the nature of the seabed, including its topography, geochemical and geological characteristics, its biological composition and activity, identification of hard or soft bottom habitats, and prior dumping activities affecting the area;

.2 the physical nature of the water column, including temperature, depth, possible existence of a thermocline/pycnocline and how it varies in depth with season and weather conditions, tidal period and orientation of the tidal ellipse, mean direction and velocity of the surface and bottom drifts, velocities of storm-wave induced bottom currents, general wind and wave characteristics, and the average number of storm days per year, suspended matter; and

.3 although not generally needed for vessel disposal at sea, it might be useful to know the chemical and biological nature of the water column, including pH, salinity, dissolved oxygen at surface and bottom, chemical and biochemical oxygen demand, nutrients and their various forms and primary productivity.

6.4 Some of the important amenities, biological features, and uses of the sea for consideration in determining the specific location of the dump-site include:

.1 the shoreline and bathing beaches;

.2 areas of beauty or significant cultural or historical importance;

.3 areas of special scientific or biological importance, such as sanctuaries;

.4 fishing areas;

.5 spawning, nursery and recruitment areas;

.6 migration routes;

.7 seasonal and critical habitats;

.8 shipping lanes;

.9 military exclusion zones; and

.10 engineering uses of the sea floor, including mining, undersea cables, desalination or energy conversion sites.

Size of the dump-site

6.5 The size of the dump-site is an important consideration for anticipating the possible disposal of more than one vessel at the site:

.1 it should be large enough to have the bulk of the material remain either within the site limits or within a predicted area of impact after dumping;

.2 it should be large enough in relation to anticipated volumes for dumping so that it would serve its function for many years; and

.3 it should not be so large that monitoring would require undue expenditure of time and money.

Site capacity

6.6 In order to assess the capacity of a site, the following should be taken into consideration:

.1 the anticipated number of vessels to be sunk at the site;

.2 expected maximum currents at the site which may move vessels resting on the sea bottom; and

.3 the allowable reduction in water depth over the site because of the size of the vessels that are to be disposed of, or should more than one vessel come to rest on top of another.

Evaluation of potential impacts

6.7 The most important impacts associated with disposal of vessels at sea should be the physical impacts of the vessel on the sea floor and those on existing and adjacent habitats and marine communities (e.g. coral reefs and soft bottom communities). The physical impacts of vessels disposed of at sea can be significant. While physical impacts where the vessel rests on the sea bottom or within a dump-site may be acceptable, permitting authorities should take all steps necessary to ensure that a vessel sinks quickly and comes to rest where it is supposed to, and that once a vessel comes to rest on the sea bottom that it will not move due to wave action or storm water currents. Permitting authorities should also take steps to avoid physical interference with sensitive species, such as marine mammals that may be in the area of the dump-site. Efforts to minimize impacts could include timing activities to avoid sensitive seasons or times of day and selecting disposal sites to avoid particularly sensitive areas.

Note: Paragraphs 6.8 to 6.12 are concerns about impacts, but if the pollution prevention plan (see appendix) and the best environmental practices are followed, these paragraphs are not directly pertinent.

6.8 The extent of adverse effects of a substance is a function of the exposure of organisms (including humans). Exposure, in turn, is a function, inter alia, of input flux and the physical, chemical and biological processes that control the transport, behaviour, fate and distribution of a substance.

6.9 The presence of natural substances and the ubiquitous occurrence of contaminants means that there will always be some pre-existing exposure of organisms to all substances contained in any waste that might be dumped. Concerns about exposure to hazardous

substances thus relate to additional exposure as a consequence of dumping. This, in turn, can be translated back to the relative magnitude of the input fluxes of substances from dumping compared with existing input fluxes from other sources.

6.10 Accordingly, due consideration should be given to the relative magnitude of the substance fluxes associated with dumping in the local and regional area surrounding the dump-site. In cases where it is predicted that dumping will substantially add to existing fluxes associated with natural processes, dumping at the site under consideration should be deemed inadvisable.

6.11 In the case of synthetic substances, the relationship between fluxes associated with dumping and pre-existing fluxes in the vicinity of the site may not provide a suitable basis for decisions.

6.12 Temporal characteristics should be considered to identify potentially critical times of the year (e.g. for marine life) when dumping should not take place. This consideration leaves periods when it is expected that dumping operations will have less impact than at other times. If these restrictions become too burdensome and costly, there should be some opportunity for compromise in which priorities may have to be established concerning species to be left wholly undisturbed. Examples of such biological considerations are:

.1 periods when marine organisms are migrating from one part of the ecosystem to another (e.g. from an estuary to open sea or vice versa) and growing and breeding periods;

.2 periods when marine organisms are hibernating on or are buried in the sediments; and

.3 periods when particularly sensitive and possibly endangered species are exposed.

Contaminant mobility

6.13 A vessel that has been properly cleaned prior to disposal should be relatively free of contaminants. Contaminant mobility is dependent upon several factors, among which are:

.1 type of matrix;

.2 form of contaminant;

.3 contaminant partitioning;

.4 physical state of the system, e.g. temperature, water flow, suspended matter;

.5 physicochemical state of the system;

.6 length of diffusion and advection pathways;

.7 biological activities, e.g. bioturbation; and

.8 age of contaminants.

7 Assessment of potential effects

7.1 Assessment of potential effects should lead to a concise statement of the expected consequences of the sea or land disposal options, i.e. the impact hypothesis. It provides a basis for deciding whether to approve or reject the proposed disposal option and for defining environmental monitoring requirements. As far as possible, waste management options causing dispersion and dilution of contaminants in the environment should be avoided and preference given to techniques that prevent the input of the contaminants to the environment. Thus, vessels shall be cleaned of all potential contamination to the maximum extent feasible to avoid contaminant-related effects.

7.2 The assessment of disposal options should integrate information on vessel characteristics, contaminants remaining on board, and conditions at the proposed dump-site, specify the economic and technical feasibility of the options being considered, and evaluate the potential effects on human health, living resources, amenities, other legitimate uses of the sea, and the environment in general. For vessels, this assessment should be based upon the underlying premise that with implementation of the pollution prevention plan of best environmental practices in the appendix, any adverse impacts will be minimized and will primarily be those resulting from the physical presence of the vessel on the sea floor because the disposed vessels will have had contaminants removed to the maximum extent.

7.3 The assessment should be as comprehensive as possible. The primary potential impacts should be identified during the dump-site selection process. These are considered to pose the most serious threats to human health and the environment. Alterations to the physical environment, risks to human health, devaluation of marine resources and interference with other legitimate uses of the sea are often seen as primary concerns in this regard.

7.4 In constructing an impact hypothesis, particular attention should be given to, but not limited to, potential impacts on amenities (e.g. presence of floatables), sensitive areas (e.g. spawning, nursery or feeding areas), habitat (e.g. biological, chemical and physical modification), migratory patterns, and marketability of resources. Consideration should also be given to potential impacts on other uses of the sea including: fishing, navigation, engineering uses, areas of special concern and value, and traditional uses of the sea.

Note to paragraphs 7.5 to 7.8: The disposal of vessels at sea, where the waste is a solid, does not present the same types of potential environmental concerns as the disposal of other wastes, such as liquids, where the waste materials can be readily distributed into the environment; and thereby does not necessarily fit the standard paradigm of rigorous biological or chemical monitoring due to contaminants in the waste. Potential sources of pollution as described in the appendix, other substances that are likely to cause harm to the environment, and materials capable of creating floating debris shall be removed to the maximum extent possible prior to disposal. When developing the monitoring plan, these factors should be considered.

7.5 Even the least complex and most innocuous wastes left on board a vessel to be disposed of at sea may have a variety of physical, chemical and biological effects. Impact hypotheses cannot attempt to reflect them all, as it must be recognized that even the most comprehensive impact hypotheses may not address all possible scenarios and unanticipated impacts. It is therefore imperative that any monitoring programmes developed be linked directly to the hypotheses and serve as a feedback mechanism to verify the predictions and review the adequacy of management measures applied to the dumping operation and at the dump-site. It is important to identify the sources and consequences of uncertainty.

7.6 The expected (potentially both negative and positive) consequences of dumping should be described in terms of affected habitats, processes, species, communities and uses. The precise nature of the predicted effect (e.g. change, response, or interference) should be described. The effect should be quantified in sufficient detail so that there is no doubt regarding the variables that should be measured during field monitoring. In the latter context, it would be essential to determine *where* and *when* the impacts can be expected.

7.7 Emphasis should be placed on biological effects and habitat modification as well as physical and chemical change. However, if the potential effect is due to substances left on board, the following factors should be addressed:

.1 estimates of statistically significant increases of the substance in seawater, sediments, or biota in relation to existing conditions and associated effects; and

.2 estimate of the contribution made by the substance to local and regional fluxes and the degree to which existing fluxes pose threats or adverse effects on the marine environment or human health.

7.8 In the case of repeated or multiple vessel disposals, impact hypotheses should take into account the cumulative effects of such operations. It will also be important to consider the possible interactions with other waste dumping practices in the area, both existing and planned.

7.9 An analysis of each disposal option should be considered in light of a comparative assessment of the following concerns: human health risks, environmental costs, hazards (including accidents), economics and exclusion of future uses. If this assessment reveals that adequate information is not available to determine the likely effects of the proposed disposal option, including potential long-term harmful consequences, then this option should not be considered further. In addition, if the interpretation of the comparative assessment shows the dumping option to be less preferable, a permit for dumping should not be given.

7.10 Each assessment should conclude with a statement supporting a decision to issue or refuse a permit for dumping.

7.11 Where monitoring is required, the effects and parameters described in the hypotheses should help to guide field and analytical work so that relevant information can be obtained in the most efficient and cost-effective manner.

8 Permit and permit conditions

8.1 A decision to issue a permit should only be made if all vessel clean-up requirements are satisfied, impact evaluations are completed and all monitoring requirements are determined. The provisions of the permit shall ensure, as far as practicable, that environmental disturbance and detriment are minimized and the benefits maximized. The permitting process should include the following essential elements: (1) a description of the best environmental practices (see appendix) for the disposal option selected; (2) cleaning of the vessel; (3) inspection/verification by relevant authorities that adequate cleaning has taken place; and (4) permit issuance. The national permitting authority should ensure that the appropriate hydrographic surveying authority is notified of the longitude and latitude coordinates, depth, and dimensions of the dumped vessel on the sea bottom. The national permitting

authority should also ensure that advance notice of the dumping is issued to national shipping, fisheries, hydrographic surveying authorities and other users of the sea. Any permit issued should contain data and information specifying:

.1 name, IMO number (where available), type, or tonnage of the vessel;

.2 the location of the dump-site(s) for example using specific coordinates or requirements for siting (i.e. depth, distance from shore);

.3 the method of vessel sinking or other sinking-related requirements; and

.4 monitoring and reporting requirements.[10]

8.2 If dumping is the selected option, then a permit authorizing dumping must be issued in advance. It is recommended that opportunities be provided for public review and participation in the permitting process. In granting a permit, the hypothesized impact occurring within the boundaries of the dump-site, such as alterations to the physical, chemical and biological compartments of the local environment is accepted by the permitting authority. If the information provided is inadequate to determine whether a project would pose a significant risk to human health or the environment, the permitting authority should request additional information before taking a decision on issuing a permit. If it becomes evident that a project would pose significant risks to human health or the marine environment, a permit should not be issued. If the information provided is still inadequate to make a decision, a permit shall not be issued (London Protocol, annex 2, paragraph 7).[11]

8.3 Regulators should strive at all times to enforce procedures that will result in environmental changes as far below the limits of allowable environmental change as practicable, taking into account technological capabilities as well as economic, social and political concerns.

8.4 Permits should be reviewed at regular intervals, taking into account the results of monitoring and the objectives of monitoring programmes. Review of monitoring results will indicate whether field programmes need to be continued, revised or terminated, and will contribute to informed decisions regarding the continuance, modification or revocation of permits. This provides an important feedback mechanism for the protection of human health and the marine environment.

8.5 The duration of potential impacts should be considered in determining the appropriate periods of time for retaining permits and other supporting documentation.

8.6 Permits should specify sinking requirements such as route and transit/time of sinking during daylight hours, acceptable method(s) of sinking, observation/clean-up of any materials floating to the surface, documentation of date/time/location/depth at time of sinking, confirmation of the final resting location, etc.

[10] See London Protocol, annex 2, paragraph 17 (permit and permit conditions). Similar considerations are described in London Convention annex III required by London Convention article 4, paragraph 2.

[11] London Convention article 4, paragraph 2 provides for permit issuance only after careful consideration of the factors set forth in London Convention annex III.

8.7 Permits should specify reporting requirements including the name/address of the individual to be sent the sinking report, and the information to be included in the report such as coordinates of the vessel when it disappeared below the surface or where it rests on the bottom, depth at sinking location, observations during sinking, etc.

9 Monitoring

9.1 Monitoring is used to verify that permit conditions are met (compliance monitoring) and that the assumptions made during the permit review and site selection process were correct and sufficient to protect the environment and human health (field monitoring). It is essential that monitoring programmes developed for vessels disposed at sea have clearly defined objectives based on realistic expectations. An appropriately cleaned vessel, dumped in an appropriate location, is unlikely to require much, if any, field monitoring relative to other types of waste disposed of at sea. However, field monitoring should be considered to verify the appropriateness of clean-up and site selection efforts when there is reason to believe that they can be improved.

9.2 The impact hypothesis forms the basis for defining field monitoring. The measurement programme should be designed to ascertain that changes in the receiving environment are within those predicted. The following questions should be answered:

.1 What testable hypotheses can be derived from the impact hypothesis?

.2 What measurements (type, location, frequency, and performance requirements) are required to test these hypotheses?

.3 How should the data be managed and interpreted?

9.3 It may usually be assumed that suitable specifications of existing (pre-disposal) conditions in the receiving area are already contained in the application for dumping. If the specification of such conditions is inadequate to permit the formulation of an impact hypothesis, the permitting authority will require additional information before any final decision on the permit application is made.

9.4 The permitting authority is encouraged to take account of relevant research information in the design and modification of monitoring programmes. The measurements can be divided into two types: those within the zone of predicted impact and those outside. Impacts expected from appropriately cleaned vessels disposed of at sea in suitable locations should be limited to physical perturbations at the resting location.

9.5 When there is reason to believe that the clean-up processes applied to a vessel before disposal could have been improved, the potential impacts of contaminants remaining on the vessel should be addressed through monitoring. Measurements should be designed to determine the extent of change that occurs as a result of the sinking of the vessel, including its presence thereafter. The extent of change is evaluated relative to the baseline state of the environment or potential growth of organisms on the vessel itself. This baseline state should be either based on the newly selected dump-site prior to its use in the case of a new dump-site, or on a nearby zone where historical dumping has not induced changes to the environment. Frequently, these measurements will be based on a null hypothesis, i.e. that no significant change can be detected. Measurements should also take into account those physical, chemical and biological characteristics identified during the waste characterization phase.

9.6 The results of monitoring (or other related research) should be reviewed at regular intervals in relation to the objectives and can provide a basis to:

.1 modify or terminate the field-monitoring programme;

.2 modify or revoke the permit;

.3 redefine or close the dump-site; and

.4 modify the basis on which applications to dump wastes are assessed (including the processes used to ensure that all contaminants have been removed from vessels prior to disposal).

APPENDIX

POLLUTION PREVENTION PLAN

1 Contaminants that are likely to cause harm to the marine environment should be removed from vessels prior to disposal at sea. Because vessels disposed of at sea should have had contaminants removed prior to disposal, action limits for vessels are to be met through the implementation of the pollution prevention plan and the best environmental practices, in order to ensure that it has been cleaned to the maximum extent feasible. The best environmental practices, specifically identified for vessels in the next paragraph, should be followed. Care should be taken during cleaning to ensure that the stability of the vessel remains safe and does not create an environment where the vessel may sink in advance of finishing the clean-up efforts and/or in a location that is not the proposed dump-site.

2 The pollution prevention and clean-up techniques described below should be implemented for vessels that are to be disposed of at sea. The pollution prevention plan should include specific actions regarding those potential sources of pollution identified by the inventory of hazardous materials for the vessel concerned (paragraph 4.3 above, taking into account the amounts and relative hazards of the identified contaminants – both chemical and biological – that may be released to the marine environment). Within technical and economic feasibility and taking into consideration the safety of workers, to the maximum extent, (1) vessels shall be cleaned of potential sources of pollution to the maximum extent feasible as described in paragraph 5.1, and of fuel or other substances that are likely to cause harm to the marine environment, and (2) materials capable of creating floating debris shall be removed to the maximum extent feasible, as required under LP annex 1, paragraph 2.[12] After the required removal, resulting wastes or materials should be reused, recycled or disposed of on land in an environmentally sound manner, among other measures:

.1 floatable materials that could adversely impact safety, human health, or the ecological or aesthetic value of the marine environment are to be removed to the maximum extent feasible;

.2 materials remaining in tanks, piping or holds should be removed to the maximum extent feasible (including, for example, fuels, stocks of industrial or commercial chemicals, or wastes that may pose an adverse risk to the marine environment). All drummed, tanked, or canned liquids or gaseous materials should be removed from the vessel. All materials removed should be managed on land in an environmentally sound manner (e.g. recycling and, in certain cases, on-shore incineration). The decision for removal of equipment containing liquid PCBs, such as fluid filled transformers or fluorescent light ballasts, should be a priority;

.3 any capacitors and transformers containing dielectric fluid from the vessel should be removed to the maximum extent feasible;

.4 if any part of the vessel was used for storage of fuel or chemical stocks such as in tanks, these areas shall be flushed, cleaned, and, as appropriate, sealed or plugged;

[12] London Convention annex I, paragraph 11d provides that a vessel is not an industrial waste provided that material capable of creating floating debris or otherwise contributing to pollution of the marine environment has been removed to the maximum extent.

.5 to prevent release of substances that could cause harm to the marine environment, cleaning of tanks, pipes and other vessel equipment and surfaces should be accomplished in an environmentally sound manner prior to disposal using appropriate techniques, such as high-pressure washing techniques with detergents. The resulting wash water should be handled in an environmentally sound manner consistent with national or regional standards to address potential pollutants; and

.6 to avoid the transfer of harmful aquatic organisms, which may be attached to the vessel or present in the ballast water on board the vessel, as far as practicable, consideration should be given to removing the organisms for treatment and/or disposal on land.

3 The pollution prevention plan should consider the following:

.1 details of the vessel's operational equipment and potential sources, amounts and relative hazards of potential contaminants (including chemical and biological) that may be released to the marine environment; and

.2 feasibility of the following pollution prevention/reduction techniques:

.1 cleaning of pipes, tanks, and components of the vessel (including environmentally sound management of resultant wastes); and

.2 reuse/recycling/disposal of all or some vessel components. Besides ferrous scrap materials, there may be high value components available, such as non-ferrous metals, (e.g. copper, aluminium, nickel) and reusable equipment such as generators, machines, pumps and cranes. Removal from the vessel for reuse should be based on a balance between their age, condition, demand, cost of removal and presence of any hazardous constituents.

4 The principal components of a vessel (e.g. steel/iron/aluminium) are not an overriding concern from the standpoint of marine pollution. However, there are a number of potential sources of pollution that should be addressed when considering management options. These may include:

.1 fuel, lubricants, and coolants;

.2 electrical equipment;

.3 stored paints, solvents, and other chemical stocks;

.4 floatable materials (e.g. plastics, styrofoam insulation);

.5 sludges;

.6 cargo; and

.7 harmful aquatic organisms.

5 Items on vessels that potentially contain substances of concern include:

.1 electrical equipment (e.g. transformers, batteries, accumulators);

.2 refrigeration systems;

.3 scrubbers;

.4 separators;

.5 heat exchangers;

.6 tanks;

.7 storage facilities for production and other chemicals;

.8 diesel tanks including bulk storage tanks;

.9 paints and coatings;

.10 sacrificial anodes;

.11 fire-extinguishing/fighting equipment;

.12 pumps;

.13 engines;

.14 generators;

.15 oil sumps;

.16 hydraulic systems;

.17 piping, valves, anchor chain vaults and fittings;

.18 compressors;

.19 light fittings/fixtures; and

.20 cables.

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