ANNEX 2

RESOLUTION LC.52(18)
ON A DREDGED MATERIAL ASSESSMENT FRAMEWORK

THE EIGHTEENTH CONSULTATIVE MEETING,

1 RECALLING Article I of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Convention 1972), which provides that Contracting Parties shall individually and collectively promote the effective control of all sources of pollution of the marine environment;

2 RECOGNIZING the need for maintaining open shipping lanes and harbours for maritime transport and that undue burden should be avoided with regard to the interpretation and application of the provisions of the London Convention 1972;

3 RECOGNIZING ALSO that the major part of the sediments dredged from the waterways of the world is, by nature, similar to undisturbed sediments in inland waters, whereas a minor part is contaminated, mostly resulting from the emission of hazardous substances into internal waters, requiring application of major environmental constraints when depositing these sediments, and that problems will continue until such emissions are controlled at source;

4 RECALLING that the Tenth Consultative Meeting by resolution LDC.23(10) adopted Guidelines for the Application of the Annexes to the Disposal of Dredged Material with a view to assessing the suitability of dredged material for disposal at sea in accordance with the provisions of the London Convention 1972, and the agreement to review these Guidelines within five years time in light of experience gained by Contracting Parties, in particular with regard to the application of the terms "trace contaminants", "rapidly rendered harmless" and "special care" as defined for disposal of dredged material at sea;

5 NOTING the experience with these Guidelines as reported by Contracting Parties;

6 RECALLING that the Fifteenth Consultative Meeting instructed the Scientific Group to carry out a full review of the Guidelines and that it considered the Waste Assessment Framework, which it had adopted on a provisional basis, to be an appropriate starting point for this review;

7 CONSIDERING that the Guidelines for the Application of the Annexes to the Disposal of Dredged Material (resolution LDC.23(10)) had primarily focused on Annex III, Part A of the London Convention 1972, and that the review of these Guidelines would have to include, where appropriate to dredged material, a review of parts B and C of the Guidelines for the Implementation and Uniform Interpretation of Annex III to the London Dumping Convention as contained in resolution LDC.32(11);

8 NOTING the adoption of the Amendments to the Annexes to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, Concerning Phasing out Sea Disposal of Industrial Waste and Concerning Disposal at Sea of Radioactive Wastes and Other Radioactive Matter, by resolutions LC.49(16) and LC.51(16) respectively, in particular with regard to the references contained therein to sea disposal of dredged material;

9 HAVING CONSIDERED the draft Dredged Material Assessment Framework prepared by the Scientific Group;

1. ADOPTS the Dredged Material Assessment Framework as set out at Annex hereto, thereby replacing the Guidelines for the Application of the Annexes to the Disposal of Dredged Material at Sea, as adopted by resolution LDC.23(10);

2. RESOLVES that Contracting Parties to the Convention when assessing the suitability of dredged material for disposal at sea shall take full account of the Dredged Material Assessment Framework;

3. AGREES to review the Dredged Material Assessment Framework within five years time in light of experience gained by Contracting Parties with it, and in light of relevant amendments to the London Convention 1972, adopted in accordance with resolution LC.48(16);

4. REQUESTS Contracting Parties to submit to the Organization for distribution to all Contracting Parties information on their experience gained with the Dredged Material Assessment Framework, including case studies;

5. CALLS UPON Contracting Parties to take all practicable steps at the source to prevent and reduce contamination of marine sediments.

ANNEX

DRAFT DREDGED MATERIAL ASSESSMENT FRAMEWORK

1 INTRODUCTION

1.1 Dredging is essential to maintain navigation in ports, harbours and inland waterways and for the development of port facilities. Much of the material removed during these necessary activities requires disposal at sea. The greater proportion of the total amount of material dredged world-wide is, by nature, similar to undisturbed sediments in inland and coastal waters. A smaller proportion of dredged material, however, is contaminated by human activity to an extent that major environmental constraints need to be applied when depositing these sediments.

1.2 Within the framework of the London Convention 1972, Contracting Parties have recognized that dredged material, due to its characteristics, can be managed separately from waste materials. In 1986, the Tenth Consultative Meeting adopted "Guidelines for the Application of the Annexes to the Disposal of Dredged Material" (resolution LDC.23(10)). It was agreed that the guidelines should be kept under regular review to take into account developments in dredging technology and improved understanding of the environmental consequences of disposal at sea.

1.3 The Dredged Material Assessment Framework (DMAF) is a generic guideline for decision makers in the field of management of dredged material. It is derived from the Waste Assessment Framework and sets out the basic practical, though not necessarily detailed considerations required for determining the conditions under which dredged material might (or might not) be deposited at sea.

2 EVALUATION OF NEED FOR DREDGING AND DISPOSAL

2.1 There are a number of dredging activities which may give rise to the need to relocate or dispose of sediments. These include:

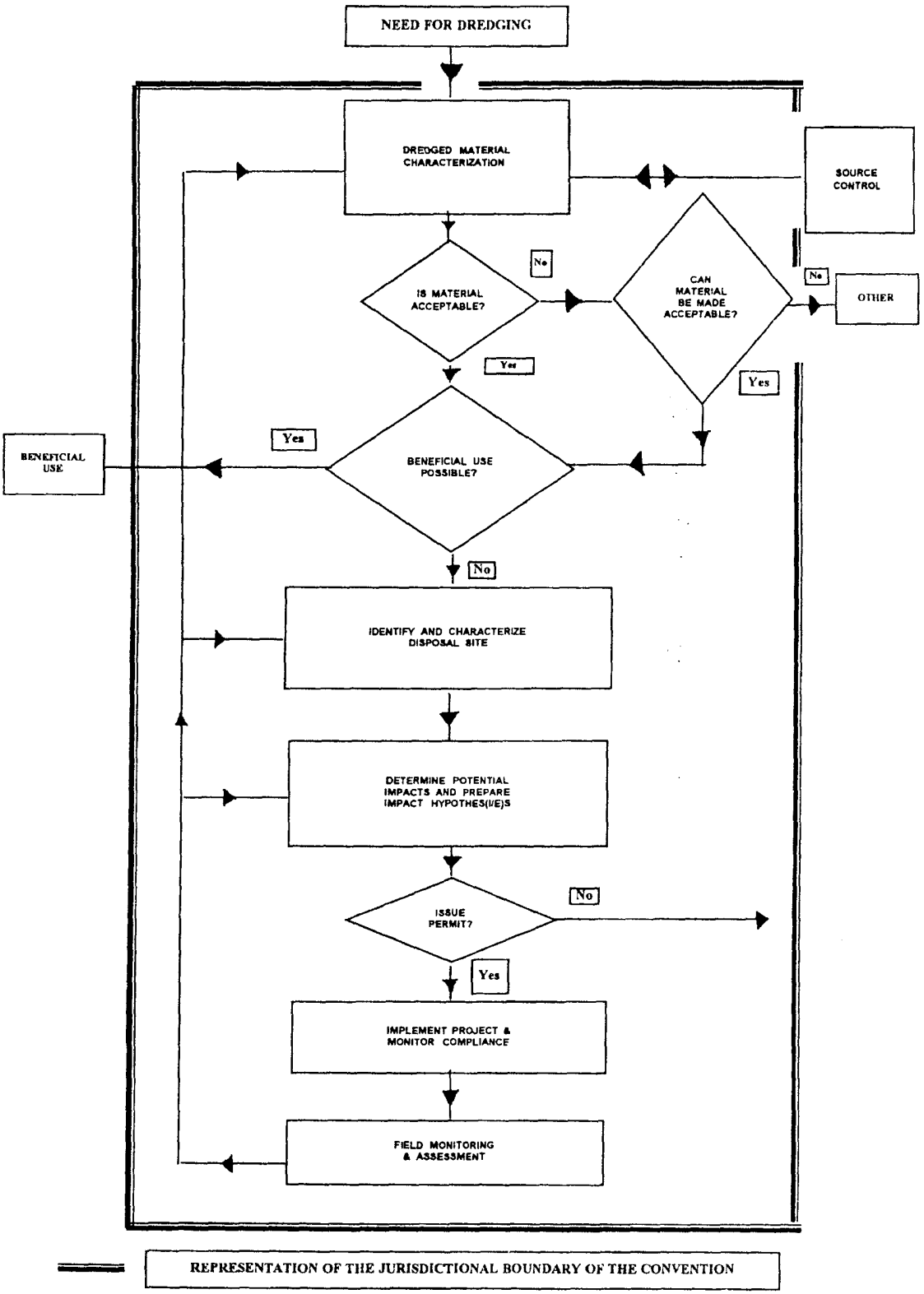
.1 **Capital dredging** - for navigation, to enlarge or deepen existing channel and port areas or to create new ones; and for engineering purposes; e.g., trenches for pipes, cables, immersed tube tunnels, removal of material unsuitable for foundations, removal of overburden for aggregate extractions;

.2 **Maintenance dredging** - to ensure that channels, berths or construction works are maintained at their designed dimensions; and

.3 **Clean-up dredging** - deliberate removal of contaminated material for human health and environmental protection purposes.

2.2 Before beginning a full assessment of the material and the disposal options the question should be asked "Is dredging necessary?". In the event of a subsequent full assessment indicating no acceptable options for disposal it will be necessary to re-address this question in a broader context.

DREDGED MATERIAL ASSESSMENT FRAMEWORK



3 DREDGED MATERIAL CHARACTERIZATION

Physical characterization

3.1 Evaluation of the physical characteristics of sediments for disposal is necessary to determine potential environmental impact and the need for chemical and/or biological testing. The basic physical characteristics required are the amount of material, particle size distribution and specific gravity of solids.

Exemptions from detailed characterization

3.2 Dredged material may be exempted from the full characterization requested in paragraphs 3.3 to 3.9 below if it meets **one** of the criteria listed below:

.1 dredged material is excavated from a site away from existing and historical sources of appreciable pollution, so as to provide reasonable assurance that the dredged material has not been contaminated, **or**

.2 dredged material is composed predominantly of sand, gravel and/or rock, **or**

.3 dredged material is composed of previously undisturbed geological materials.

Dredged material that does not meet one of these criteria will require a full characterization to assess its potential impact.

Chemical characterization

3.3 Sufficient information for chemical characterization may be available from existing sources: in such cases new measurements may not be required of the potential impact of similar material at similar sites.

3.4 Considerations for additional chemical characterization of dredged material are as follows:

.1 major geochemical characteristics of the sediment including redox status;

.2 potential routes by which contaminants could reasonably have been introduced to the sediments;

.3 data from previous sediment chemical characterization and other tests of the material or other similar material in the vicinity, provided this information is still reliable;

.4 probability of contamination from agricultural and urban surface runoff;

.5 spills of contaminants in the area to be dredged;

.6 industrial and municipal waste discharges (past and present);

.7 source and prior use of dredged materials (e.g., beach nourishment); and

.8 substantial natural deposits of minerals and other natural substances.

3.5 Sampling of sediments from the proposed dredging site should represent the vertical and horizontal distribution and variability of properties of the materials to be dredged.

3.6 Further information may also be useful in interpreting the results of chemical testing, such as total organic carbon (TOC).

Biological characterization

3.7 If the potential impacts of the dredged material to be dumped cannot be assessed on the basis of the chemical and physical characterization and available biological information, biological testing should be conducted.

3.8 It is important to ascertain whether an adequate scientific basis exists on the characteristics and composition of the material to be dumped and on the potential impacts on marine life and human health. In this context, it is important to consider information about species known to occur in the area of the disposal site and the effects of the material to be dumped and of its constituents on organisms.

3.9 Biological tests should incorporate species that are considered appropriately sensitive and representative and should determine, where appropriate:

.1 acute toxicity;

.2 chronic toxicity such as long-term sub-lethal effects, covering an entire life cycle;

.3 the potential for bioaccumulation; and

.4 the potential for tainting.

Action List

3.10 The following is a screening mechanism for assessing properties and constituents of dredged material with a set of criteria for specific substances similar to that developed in the Waste Assessment Framework. These should reflect experience gained with published scientific research relating to the potential effects on human health or the marine environment. An Action List should be devised as a trigger mechanism for dredged material management decisions, including the identification and development of source control measures as described in paragraphs 3.13 to 3.15 below.

3.11 Action List levels[1] should be developed on a national or regional basis and might be set on the basis of concentration limits, biological responses, environmental quality standards, flux considerations or other reference values.

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[1] The Action List should, as a minimum, address the substances as currently contained in Annexes I and II to the Convention.

3.12 An Action List may include an upper and lower level giving these possible actions:

.1 material which contains specified contaminants, or which causes biological responses, in excess of the relevant upper levels should generally be considered unsuitable for disposal at sea;

.2 material which contains specified contaminants, or which causes biological responses, below the relevant lower levels should generally be considered of little environmental concern for disposal at sea; and

.3 material of intermediate quality should require more detailed assessment before suitability for disposal at sea can be determined.

Contaminant Source Evaluation and Control

3.13 Contamination of estuarine and coastal marine sediments both as a consequence of historical and present day inputs presents a continuing problem for the management of dredged material. High priority should be given to the identification of sources, reduction and prevention of further contamination of sediments and should address both point and diffuse sources. Successful implementation of prevention strategies will require collaboration among agencies with responsibility for the control of point and diffuse sources of contamination.

3.14 In developing and implementing the source control strategy, appropriate agencies should take into account:

.1 the continuing need for dredging;

.2 the hazards posed by contaminants and the relative contributions of the individual sources to these hazards;

.3 existing source control programmes and other regulations or legal requirements;

.4 technical and economic feasibility;

.5 the evaluation of the effectiveness of measures taken; and

.6 consequences of not implementing contaminant reduction.

3.15 In cases where there has been historical contamination or where control measures are not fully effective in reducing contamination to acceptable levels, disposal management techniques, including the use of containment or treatment methods may be required.

4 EVALUATION OF DISPOSAL OPTIONS

4.1 The results of the physical/chemical/biological characterization will indicate whether the dredged material, in principle, is suitable for disposal at sea. Where sea disposal is identified as an acceptable option it is nonetheless important, recognizing the potential value of dredged material as a resource, to consider the availability of beneficial uses.

Beneficial Uses

4.2 There is a wide variety of beneficial uses depending on the physical and chemical characteristics of the material. Generally, a characterization carried out in accordance with chapter 3 of this Framework will be sufficient to match a material to possible uses such as:

.1 **Engineered uses** - land creation and improvement, beach nourishment, offshore berms, capping material and fill;

.2 **Agricultural and product uses** - aquaculture, construction material, liners; and

.3 **Environmental enhancement** - restoration and establishment of wetlands, upland habitats, nesting islands, and fisheries.

The technical aspects of beneficial uses are well-established and described in the literature.

Management Options

4.3 Where the characteristics of the dredged material are such that its disposal would not meet the requirements of the Convention, treatment or other management options should be considered. These options can be used to reduce or control impacts to a level that will not constitute an unacceptable risk to human health, or harm living resources, damage amenities or interfere with legitimate uses of the sea.

4.4 Treatment, such as separation of contaminated fractions, may make the material suitable for a beneficial use and should be considered before opting for sea disposal. Disposal management techniques may include placement on or burial in the sea floor followed by clean sediment capping, utilization of geochemical interactions and transformations of substances in dredged material when combined with sea water or bottom sediment, selection of special sites such as abiotic zones, or methods of containing dredged material in a stable manner.

5 SEA DISPOSAL SITE SELECTION[2]

5.1 The selection of a site for sea disposal involves not only considerations of an environmental nature but also economic and operational feasibility.

5.2 For the evaluation of a sea disposal site information should be obtained on the following, as appropriate:

.1 the physical, geochemical and biological characteristics of the sea-bed (e.g., topography, redox status, benthic biota);

.2 the physical, chemical and biological characteristics of the water column (e.g., currents, dissolved oxygen, pelagic species); and

.3 proximity to:

.1 areas of natural beauty or significant cultural or historical importance;

.2 areas of special scientific or biological importance such as sanctuaries and critical habitats;

.3 recreational areas;

.4 subsistence, commercial and sport fishing areas;

.5 finfish and shellfish spawning, recruitment and nursery areas;

.6 migration routes of marine organisms;

.7 shipping lanes;

.8 military exclusion zones;

.9 engineering uses of the sea such as mining, undersea cables, water intakes, energy conversion sites, etc.

Such information can be obtained from existing sources complemented by field work where necessary.

5.3 The information on the characteristics of the sea disposal site referred to above is required to determine the probable fate and effects of the dumped material. The physical conditions in the vicinity of the sea disposal site will determine the transport and fate of the dredged material. The physico-chemical conditions can be used to assess the mobility and bioavailability of the chemical constituents of the material. The nature and distribution of the biological community and the proximity of the site of sea disposal to marine resources and amenities will, in turn, define the nature of the effects that are to be expected. Careful evaluation will then permit prediction of the consequences of dumping

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[2] Matters related to criteria for selection of sea disposal sites are addressed by the London Convention 1972 and are currently contained in Annex III thereto. These criteria should be considered in conjunction with this Framework.

if it is authorized. It will also permit determination of environmental processes that may dominate the transport of material away from the sea disposal site. The influence of these processes may be reduced through the imposition of permit conditions.

5.4 In some cases, dumping can augment existing effects attributable to inputs of contaminants to coastal areas through land runoff and discharge, resource exploitation and maritime transport. These existing stresses on biological communities should be considered as part of the assessment of potential impacts caused by dumping. The proposed method of dumping and potential future uses of resources and amenities in the marine receiving area should also be taken into account.

6 IMPACT ASSESSMENT

6.1 Impact assessment should lead to a concise statement of the expected consequences of the disposal option (i.e., the Impact Hypothesis). Its purpose is to provide a basis for deciding whether to approve or reject the proposed disposal option and for defining environmental monitoring requirements.

6.2 Impact assessment comprises a summary of the potential effects on human health, living resources, amenities and other legitimate uses of the sea. It should define the nature, temporal and spatial scales and duration of expected impacts based on reasonably conservative assumptions.

6.3 For a **retentive site**, where the material deposited will remain within the vicinity of the site, the impact assessment should delineate the area that will be substantially altered by the presence of the deposited material and what the severity of these alterations might be. At the extreme, this may include an assumption that the immediate receiving area is entirely smothered. In such a case the likely timescale of recovery or recolonization should be projected after disposal operations have been completed as well as the likelihood that recolonization will be similar to, or different from, the existing benthic community structure. The impact assessment should specify the likelihood and scale of residual impacts outside the primary zone.

6.4 In the case of a **dispersive site**, the impact assessment should include a definition of the area likely to be altered in the shorter term by the proposed disposal operation (i.e., the near-field) and the severity of associated changes in that immediate receiving environment. It should also specify the likely extent of long-term transport of material from this area and what this flux represents in relation to existing transport fluxes in the area thereby permitting a statement regarding the likely scale and severity of effects in the long-term and far-field.

7 PERMIT ISSUE

7.1 If sea disposal is the selected option, then a permit authorizing sea disposal must be issued in advance. In granting a permit, the immediate impact of dredged material occurring within the boundaries of the disposal site such as alterations to the local, physical, chemical and biological environment is accepted by the permitting authority. Notwithstanding these consequences, the conditions under which a permit for sea disposal is issued should be such that environmental change beyond the boundaries of the disposal site are as far below the limits of allowable environmental change as practicable. The disposal operation should be permitted subject to conditions which further ensure that environmental disturbance and detriment are minimized and benefits maximized.

7.2 The permit is an important tool for managing sea disposal of dredged material and will contain the terms and conditions under which sea disposal may take place as well as provide a framework for assessing and ensuring compliance.

7.3 Permit conditions should be drafted in plain and unambiguous language and will be designed to ensure that:

.1 only those materials which have been characterized and found acceptable for sea disposal, based on the impact assessment, are dumped;

.2 the material is disposed of at the selected disposal site;

.3 any necessary disposal management techniques identified during the impact analysis are carried out; and

.4 any monitoring requirements are fulfilled and the results reported to the permitting authority.

7.4 Sufficient surveillance of sea disposal operations should assure the licensing authority that the permit conditions are met.

8 MONITORING

8.1 Monitoring in relation to disposal of dredged material is defined as measurements of compliance with permit requirements and of the condition and changes in condition of the receiving area to assess the Impact Hypothesis upon which the issue of a disposal permit was approved.

Specification of Baseline Conditions

8.2 It may usually be assumed that suitable specifications of existing (pre-disposal) conditions in the receiving area are already contained in the application for disposal. If the specification of such conditions is inadequate to permit the formulation of an Impact Hypothesis, additional information will be required by the licensing authority before any final decision on the permit application is made.

Post-Operational Monitoring

8.3 The Impact Hypothesis forms the basis for defining post-operational monitoring. The measurement programme should be designed to ascertain that changes in the receiving environment are within those predicted. In designing a monitoring programme the following questions must be answered:

.1 what testable hypotheses can be derived from the Impact Hypothesis?

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

.3 how should the data be managed and interpreted?

8.4 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.

8.5 Measurements should be designed to determine two things:

.1 whether the zone of impact differs from that projected; and

.2 whether the extent of change projected outside the zone of impact is within the scale predicted.

The first of these questions can be answered by designing a sequence of measurements in space and time that circumscribe the projected zone of impact to ensure that the projected spatial scale of change is not exceeded. The second question can be answered by the acquisition of measurements that provide information on the extent of change that occurs outside the zone of impact after the disposal operation. Frequently, this latter suite of measurements will only be able to be based on a null hypothesis - that no significant change can be detected.

Feedback

8.6 Information gained from field monitoring (or other related research studies) can be used to:

.1 modify or terminate the field monitoring programme;

.2 modify or revoke the permit; and

.3 refine the basis on which applications to dump dredged material at sea are assessed.

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